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Disaggregated Inorganic Grain Size and Trace Metal Analyses of Surficial Sediments in Sydney Harbour, N.S., 1999

by

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ABSTRACT

Surficial bottom sediment samples were collected from 94 stations in Sydney Harbour, Nova Scotia, on October 19 - 20, 1999. The disaggregated inorganic grain size distribution of the sediment samples was determined via electro-resistance particle sizing techniques using a Coulter Multisizer IIE. The bottom sediments from 89 stations were subsampled for trace metal analyses using ICP-AES and ICP-MS. This report presents the station locations, grain size distributions, and levels of trace metal concentrations in the harbour. These data can be used to characterize the sediment dynamics of the harbour and its approaches.

RÉSUMÉ

Des échantillons de sédiments superficiels ont été recueillis à 94 postes dans le fond du port de Sydney, en Nouvelle-Écosse, du 19 au 20 octobre 1999. La ventilation de la taille des grains inorganiques désagrégés des échantillons de sédiments a été déterminée au moyen de techniques de mesures de l'électro-résistance de particules à l'aide d'un compteur Coulter Multisizer IIE. Les sédiments de fond de 89 postes ont été divisés en sous-échantillons aux fins de l'analyse de métaux traces par ICP-AES et ICP-MS. Le présent rapport présente l'emplacement des postes, les données sur la ventilation de la taille des grains et les niveaux de concentration de métaux traces dans le port. Ces données peuvent ensuite servir à caractériser la dynamique des sédiments du port et de ses approches.

INTRODUCTION

Sydney Harbour is a Y-shaped estuary, 2.2 km wide, located on the Northeast coast of Cape Breton, Nova Scotia. The total area of the harbour is 52.0 km^2 with a volume of 517.0 $10^6 m^3$ and a maximum depth of 19 m (Gregory et al., 1993). The tides are semi-diurnal with an amplitude of 0.9 m, tidal volume of 47.9 $10^6 m^3$, and peak tidal current speed of 0.03 ms^{-1}. Flushing time is on the order of 140 hours. The estuary is comprised of a North West arm (axial length 6.5 km, width 2.6 km) and a South Arm (axial length 10.7 km, width 2.2 km) which connects to Sydney River.

There has been much discussion regarding anthropogenic inputs to Sydney Harbour due to urban and industrial activities in the region. In industrialized coastal areas, sediments have been proven to be a major repository and potential source for heavy metal contamination if disturbed (Loring et al., 1996). Heavy metal and PAH pollution concerns within the harbour have arisen from sediment studies associated with dredging activities (Vandermeulen, 1989). The main point-sources of waste have historically come from raw sewage and Sysco steel operations, which include coal-coking and steel manufacture. The coking of bituminous coal produces coal tar, which is necessary for steel production in blast furnaces (Vandermeulen, 1989). The steel mill coke oven effluent drains into Coke Oven Brook, forming the Sydney tar ponds at its mouth. The tar ponds, a source of possible contaminants, connect to the South Arm of the Harbour through Muggah Creek. The sediment dynamics of Sydney Harbour and its approaches, together with Muggah Creek, will control the distribution of surface-active contaminants.

Disaggregated inorganic grain size (DIGS) analysis can be used to estimate the relative amount of flocculated material deposited to the sediment from the water column (Kranck, 1993). Flocculation of fine particulate material in suspension will determine the present distribution of contaminants not only through deposition (Milligan and Loring, 1997) but also as a possible controlling factor in their uptake by ingestion. Parameters derived from the DIGS distribution of surficial sediments collected in October 1999 (Fig. 1) are being used to characterize the present depositional conditions in Sydney Harbour and its approaches (Milligan and Loring, 1997; Kranck et al., 1996a,b). Grain size analyses, in conjunction with analyses of trace metal concentrations, were used to determine whether fine sediments correlated with elevated levels of trace metals. Mapping the sedimentary conditions in the Harbour based on the degree of flocculation and the reworking history of the sediments effectively integrates the physical processes occurring in the Harbour on both long term and event scales.

This study was undertaken in support of the toxic substance research initiative (TSRI). Natural remediation of the sediment is an integral component of habitat recovery, a focus of the TSRI. The analysis of DIGS, and the associated trace metals, from bottom samples collected within Sydney Harbour indicate the degree to which the sediment may be subject to reworking. This is critical because reworking of the sediment results in the transport and re-distribution of contaminants within the harbour.

METHODS

STATION LOCATIONS AND SAMPLE COLLECTION

On October 19 and 20, 1999, 104 stations within Sydney Harbour, its approaches, and the Sydney River were surveyed (Fig. 1). Surficial sediment samples were collected at 94 sample sites using a 0.1m^2 Eckman grab, hand-deployed from a Boston Whaler. Samples were not obtained at 10 stations due to hard bottom or recovery of sediment that was deemed to be too coarse for analysis. The station locations and sample information are given in Table 1. The top 1 cm of the grab was subsampled using a modified 10 ml plastic syringe as a corer. The sediment subsamples were placed in 25 ml plastic Bitran bags to be analyzed for percentage water and grain size. A second 50 ml subsample, for trace metal analysis, was taken from the top 1cm of the sediment using a plastic spoon, placed in 125 ml plastic specimen containers, and stored at -15°C. All 94 samples were returned to the laboratory for analysis. With the exception of 5 samples that were very coarse, the 50 ml subsamples were subsequently sent out for trace metal analysis. Salinity and temperature profiles were obtained at or adjacent to 24 of the 104 stations using a Seabird 25 CTD probe and will be presented in a separate report.

ANALYTICAL METHODS

Grain-size

The DIGS of each sample was determined through electro-particle sizing techniques described by Milligan and Kranck (1991). Sediment samples were placed in 20 ml Pyrex beakers, weighed wet, air-dried, and subsequently re-weighed. The samples were then digested in an excess of 35% H_2O_2, weighed again, re-suspended in 1% NaCl, and finally disaggregated with a sapphire tipped sonic probe. The DIGS distributions were determined using the Coulter Multisizer IIe over a size range from 0.87 to 500 μm. Results are presented as frequency distribution plots of $\log_{10}$ equivalent weight percentage of sediment versus $\log_{10}$ diameter. Percentage weight of the sediment was calculated using a specific gravity of 2.65 Kg m^{-3} to convert sediment volume to weight, which was then normalized to total sediment weight in the size range analyzed. Diameters are reported as the midpoint of the size class based on a 1/5 ϕ interval (i.e. the diameter doubles every 5 channels).

The percentage of sediment, by weight, < 63 μm and < 5 μm was calculated. The < 63 μm fraction of the sediment represents the silt/clay size limit. This fraction can be used to correlate trace metal concentration with fine sediment (Loring et al., 1998). The < 5 μm fraction represents the very fine particulate fraction of the sediment, associated with floc deposition.

Trace Metals

Sediment samples were dried at 60°C prior to homogenization with a mortar and pestle. Samples were analyzed by Chemex Labs using geochemical procedure T127, total metals package. Samples are triple acid digested, subjected to Inductively Coupled Plasma - Atomic Emission Spectroscopy (ICP-AES) to ensure low base metal concentrations, prior to final Inductively Coupled Plasma - Mass Spectrometry (ICP-MS). Arsenic and mercury were analyzed independently through optimized geochemical methods. NRCC-certified marine sediment reference materials (MESS-2, PACS-2) were included in the analysis to ensure quality control.

Statistical analyses and their interpretation were based on methods described by Loring et al. (1996). Correlation matrices were constructed to clarify the relationships between metals and their association with the grain size of the sediment. Trace metals are generally introduced into sediments as constituents or in association with naturally and anthropogenically derived organic and inorganic particles. Due to the correlation of trace metal concentration with grain size, it is necessary to compensate for the effects of grain size when comparing samples.

RESULTS AND DISCUSSION

Figure 1 shows the distribution of all station locations grouped by area for trace metal analyses. The delineation of trace metal areas was based on the physical characteristics of the harbour and grain size. Figures 2 and 3 give the station numbers of the grab samples taken in the North West Arm and South Arm respectively. The raw DIGS data for each diameter are given in Appendix I. The depositional history of the sediment can be determined through the analysis of the DIGS (Kranck et al., 1996a,b). The inorganic fraction of the sediment can be divided into the 3 components from which it was formed: material settled as flocs, material settled from suspension with no subsequent re-working (termed one-round), and material that has been re-worked, usually under high energy conditions, and has become well-sorted. The DIGS analysis from Sydney Harbour indicated mainly floc-deposited and single-grain sediment with well-sorted, high-energy sediments located at the mouth of the harbour (Appendix II). The majority of the sediment was silt/clay (< 63 μm) and very fine-grained (< 5 μm) as indicated in Table 2.

Estimations of the critical erosion shear stresses (Table 2), based on DIGS data, were made using the expression of Wiberg and Smith (1987). Areas of low shear stress correspond to regions dominated by floc deposition. The distribution of critical erosion shear stress indicated that Sydney Harbour is dominated by fine sediment deposited as flocs (Fig. 4). This is important because trace metals and other contaminants are primarily associated with fine particulate matter in suspension (Muller, 1996). Previous studies have shown that dredging operations can increase particle flux (Kranck and Milligan, 1989). Dredging in depositional areas such as Sydney Harbour therefore has the potential to enhance the flux of trace metals to the sediment through increased flocculation.

Based on the grain size of the surficial sediment and the geographic relationship between stations, the area sampled was sub-divided into 4 sections (Fig. 1). Areas 1 and 2 comprised Sydney River and the South Arm of the harbour, respectively. Areas 3 and 4 represented the Outer Harbour and North West Arm of the harbour, respectively. Trace metal data are not available for stations 70, 71, or 80. The relative accuracies of the trace metal analyses were within the standard deviations of the certified reference materials, except for Mercury. However, the precision of the Mercury analysis provides a relative indication of its surficial distribution. Trace metal results from each station are given in Table 3. Mean trace metal concentrations and their interpretation were compared to data collected in other geologically similar Nova Scotia estuaries and inlets for baseline values shown in Table 4 (Loring et al., 1998; Loring et al., 1996). Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Nickel (Ni), Mercury (Hg), and Zinc (Zn) are of particular concern as they are potentially hazardous to both humans and aquatic biota if present in significant concentrations. Trace metal statistics for the Sydney River and South Arm areas, and the Outer Harbour and North West Arm areas, are provided in Tables 5 and 7 respectively.

Interpretation matrices were constructed for the sub-divided sections (Tables 6 and 8). An explanation of the interpretation matrices is provided below. Trace metal concentrations within the harbour showed significant levels of enrichment in some areas (Figs. 5a to 5h). Values were generally higher within Sydney River and the South Arm compared to the Outer Harbour and North West Arm, with highest concentrations being found in the region of Muggah Creek. The majority of trace metal concentrations in the Outer Harbour and North West Arm were at or below baseline levels. As, Cr, Ni, and Zn, were at or slightly above baseline levels throughout the harbour. Cd, Cu, and Pb were elevated in the South Arm, especially adjacent to Muggah Creek. The majority of Hg levels within the harbour were below baseline, with the exception of Muggah Creek and station 64, which is adjacent to the North Sydney ferry terminal. High values of Hg at this station appear to be anomalous. There were no replicate samples or trends in the Hg data, therefore this result must be interpreted with caution.

METAL STATISTICAL ANALYSES

GB-stat ™ (Dynamic Microsystems Inc., Silver Springs, MD) statistical software package was used for the statistical analyses of trace metal concentration and grain size. A varimax rotated factor matrix was generated to interpret the relationship between trace metal concentration and grain size. The matrix is generated by factor analysis of all the variables, which is then rotated to obtain a greater interpretation of the factors by making large loadings larger and small loadings smaller.

Interpretation of Varimax matrices

Sydney River (area 1) and South Arm (area 2) - see Table 6

Factor 1 is the sedimentation factor and represents the accumulation of fine-grained aluminosilicates with their accompanying lattice trace metals in response to the present depositional conditions. This factor accounts for 47.7% of the total variance and has significant loadings on Al, Ba, Be. Ce, Cs, Cr, Co, Ga, Ge, Fe, La, Li, Mg, Mn, Ni, Nb, K, Rb, Sr, Th, Ti, U, V, and Y. Factor 2 can be identified as the anthropogenic or contamination factor. It represents the enrichment of these metals from anthropogenic sources above background levels. It is likely that the carriers of these metals are authigenic sulphides. Factor 2 accounts for 24.2% of the total problem variance, with significant loadings on As, Sb, Bi, Cd, Cu, Fe, Hg, Pb, Mo, Ag, Te, Tl, W, Y and Zn. Factor 3 (3.64%. of the total variance) has small but significant loadings on As and Mn. It reflects the diagenetic enrichment of As with Mn at the sediment water interface. Factor 4 (3.74% of the total variance) has significant loadings on Ca and Sr. It is identified as the carbonate factor and reflects the contribution from calcareous material. Factor 5 (6.62% of the total variance) has significant negative loadings on Na and Mg, most likely reflecting the contribution of sea salts to the samples. Factor 6 (5.06% of the total variance) has significant loadings on Pb and Tl. It most likely reflects the association of these two metals in the sediments.

Outer Harbour (area 3) and North West Arm (area 4) - see Table 7

Factor 1, the sedimentation factor, accounts for 50.5% of the total variance. Factor 1 has significant loadings on Al, Ba, Be. Ce, Cs, Cr, Co, Ga, Ge, Fe, La, Li, Mg, Mn, Ni, Nb, K, Rb, Sr, Ta, Th, Ti, W, U, V, and Y as well as on material < 63µm. Factor 2, the anthropogenic or contamination factor, accounts for 24.51% of the total problem variance. This factor has significant loadings on As, Bi, Cd, Cr, Cu, Pb, Mo, Ag, Te, Tl, U, Y and Zn. Factor 3 (4.59%. of the total variance) has small but significant loadings on As and Mn. It reflects the diagenetic enrichment of As with Mn at the sediment water interface. Factor 4 (3.41% of the total variance) has significant loadings on Hg alone. It is identified as the Hg factor and reflects the contribution of small but significant amounts of Hg dispersed in the sediments. Factor 5 (3.41%% of the total variance) has significant loadings on Ca, most likely reflecting the contribution of calcareous shell material to the sediments. Factor 6 (3.82% of the total variance) has significant loadings on Sb and Te and Tl. It most likely reflects the association of these three metals in the sediments.

CONCLUSION

The results indicate that Sydney Harbour is a depositional area. Due to the dominance of fine-grained sediment, there is a potential for accumulation of contaminants within the Harbour. This is evidenced by elevated levels of various trace metals compared to other coastal embayments in Nova Scotia. Consequently, it is essential that linkages be made between the sedimentation of flocculated material, its associated contaminants, and accumulation in the sediments. The data presented in this report are preliminary as results are based on a single replicate. Consequently, sample sites must be revisited to provide further support for our results. The analysis of DIGS and subsequent calculation of shear stress will provide an important additional parameter in modelling sediment transport within Sydney Harbour.

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Table 1: Station locations and sample information.

Station	Latitude	Longitude	Depth (m)	ID Number
1	46 06.19 N	60 14.63 W	5.3	991019001
2	46 06.30 N	60 14.34 W	3.6	991019002
3	46 06.34 N	60 14.21 W	2.1	991019003
4	46 06.30 N	60 14.22 W	4.3	991019004
5	46 06.25 N	60 14.14 W	1.7	991019005
6	46 06.50 N	60 13.97 W	7.2	991019006
7	46 06.81 N	60 13.78 W	8.0	991019007
8	46 06.84 N	60 13.50 W	4.1	No Sample
9	46 06.82 N	60 13.47 W	9.6	No Sample
10	46 06.93 N	60 13.02 W	9.4	991019008
11	46 06.97 N	60 13.07 W	3.3	991019009
12	46 07.01 N	60 13.11 W	2.9	991019010
13	46 07.23 N	60 12.78 W	9.3	991019011
13	46 07.23 N	60 12.78 W	9.3	991019012
14	46 07.65 N	60 12.39 W	11.1	991019013
15	46 07.75 N	60 12.54 W	6.5	991019014
16	46 07.71 N	60 12.43 W	10.7	991019015
17	46 07.57 N	60 12.19 W	5.9	991019016
18	46 07.61 N	60 12.23 W	7.3	991019017
19	46 08.19 N	60 12.08 W	11.3	991019018
20	46 08.21 N	60 11.87 W	10.4	991019019
21	46 08.19 N	60 11.99 W	7.8	991019020
22	46 08.18 N	60 12.10 W	14.4	991019021
23	46 08.18 N	60 12.20 W	12.6	991019022
24	46 09.06 N	60 12.00 W	1.3	991019023
25	46 09.09 N	60 12.19 W	2.7	991019024
26	46 09.14 N	60 12.33 W	9.3	991019025
27	46 08.49 N	60 11.93 W	6.1	991020026
28	46 08.45 N	60 12.00 W	13.6	No Sample
29	46 08.42 N	60 12.07 W	14.6	991020027
30	46 08.39 N	60 12.12 W	15.7	991020028
31	46 08.36 N	60 12.19 W	10.4	991020029
32	46 08.35 N	60 12.26 W	17.9	991020030
33	46 08.32 N	60 12.31 W	3.7	991020031
34	46 08.68 N	60 12.69 W	6.7	991020032
35	46 08.74 N	60 12.62 W	11.6	991020033
36	46 08.80 N	60 12.57 W	16.9	991020034
37	46 08.87 N	60 12.49 W	16.1	991020035
38	46 08.97 N	60 12.32 W	7.4	991020036
39	46 09.49 N	60 12.25 W	14.9	991020037
40	46 09.47 N	60 12.40 W	17.0	991020038
41	46 09.40 N	60 12.64 W	16.8	991020039

Table 1 (cont.): Station locations and sample information.

Station	Latitude	Longitude	Depth (m)	ID Number
42	46 09.32 N	60 12.30 W	16.0	991020040
43	46 09.26 N	60 12.96 W	14.2	991020041
44	46 09.10 N	60 13.22 W	3.8	991020042
45	46 09.28 N	60 13.11 W	8.4	991020043
46	46 10.08 N	60 13.10 W	4.9	991020044
47	46 10.12 N	60 12.99 W	10.7	991020045
48	46 10.27 N	60 12.85 W	18.3	991020046
49	46 10.26 N	60 12.54 W	19.4	991020047
50	46 10.26 N	60 11.97 W	9.3	991020048
51	46 10.83 N	60 12.12 W	11.0	991020049
52	46 10.79 N	60 12.39 W	18.6	991020050
53	46 10.77 N	60 12.68 W	19.5	991020051
54	46 10.74 N	60 13.01 W	17.0	991020052
55	46 10.70 N	60 13.37 W	5.0	No Sample
56	46 10.71 N	60 13.29 W	7.1	No Sample
57	46 10.73 N	60 13.22 W	8.1	991020053
58	46 11.28 N	60 13.53 W	8.9	991020054
59	46 11.37 N	60 13.28 W	17.5	991020055
60	46 11.49 N	60 13.04 W	17.8	991020056
61	46 11.56 N	60 12.81 W	17.5	991020057
62	46 11.68 N	60 12.36 W	11.7	991020058
63	46 12.40 N	60 14.66 W	12.0	991020059
64	46 12.36 N	60 14.32 W	13.1	991020060
65	46 12.30 N	60 13.72 W	15.7	No Sample
66	46 12.32 N	60 13.70 W	15.6	991020061
67	46 12.23 N	60 13.27 W	15.7	991020062
68	46 12.05 N	60 12.65 W	13.4	991020063
69	46 13.19 N	60 11.64 W	8.7	No Sample
70	46 13.31 N	60 11.88 W	10.2	991020064
71	46 13.51 N	60 12.28 W	13.4	991020065
72	46 13.62 N	60 12.56 W	12.5	991020066
73	46 13.74 N	60 12.84 W	9.1	991020067
74	46 10.09 N	60 18.52 W	5.0	No Sample
75	46 10.11 N	60 18.23 W	3.4	991020068
76	46 09.44 N	60 17.99 W	5.0	991020069
77	46 09.76 N	60 17.66 W	7.3	991020070
78	46 10.16 N	60 17.09 W	10.5	991020071
79	46 10.04 N	60 16.90 W	11.6	991020072
80	46 09.98 N	60 16.63 W	7.4	991020073
81	46 10.26 N	60 17.27 W	11.5	991020074
82	46 10.35 N	60 17.54 W	9.9	991020075
83	46 10.50 N	60 16.73 W	13.6	991020076

Table 1 (cont.): Station locations and sample information.

Station	Latitude	Longitude	Depth (m)	ID Number
84	46 10.42 N	60 16.43 W	14.1	991020077
85	46 10.35 N	60 16.19 W	9.5	991020078
86	46 10.62 N	60 16.93 W	12.6	991020079
87	46 10.65 N	60 17.12 W	10.1	991020080
88	46 10.90 N	60 16.01 W	15.1	991020081
89	46 10.84 N	60 15.76 W	16.5	991020082
90	46 10.78 N	60 15.53 W	11.0	No Sample
91	46 10.79 N	60 15.54 W	14.8	991020083
92	46 10.97 N	60 16.11 W	14.7	991020084
93	46 11.08 N	60 16.46 W	12.4	991020085
94	46 11.31 N	60 15.05 W	13.6	No Sample
95	46 11.21 N	60 14.80 W	24.2	991020086
96	46 11.15 N	60 14.63 W	10.2	No Sample
97	46 11.18 N	60 14.64 W	12.8	991020087
98	46 11.39 N	60 15.44 W	14.8	991020088
99	46 11.45 N	60 15.80 W	12.9	991020089
100	46 11.65 N	60 14.45 W	15.1	991020090
101	46 11.51 N	60 14.18 W	17.5	991020091
102	46 11.43 N	60 14.02 W	15.8	991020092
103	46 11.74 N	60 14.84 W	14.4	991020093
104	46 11.82 N	60 15.08 W	13.2	991020094

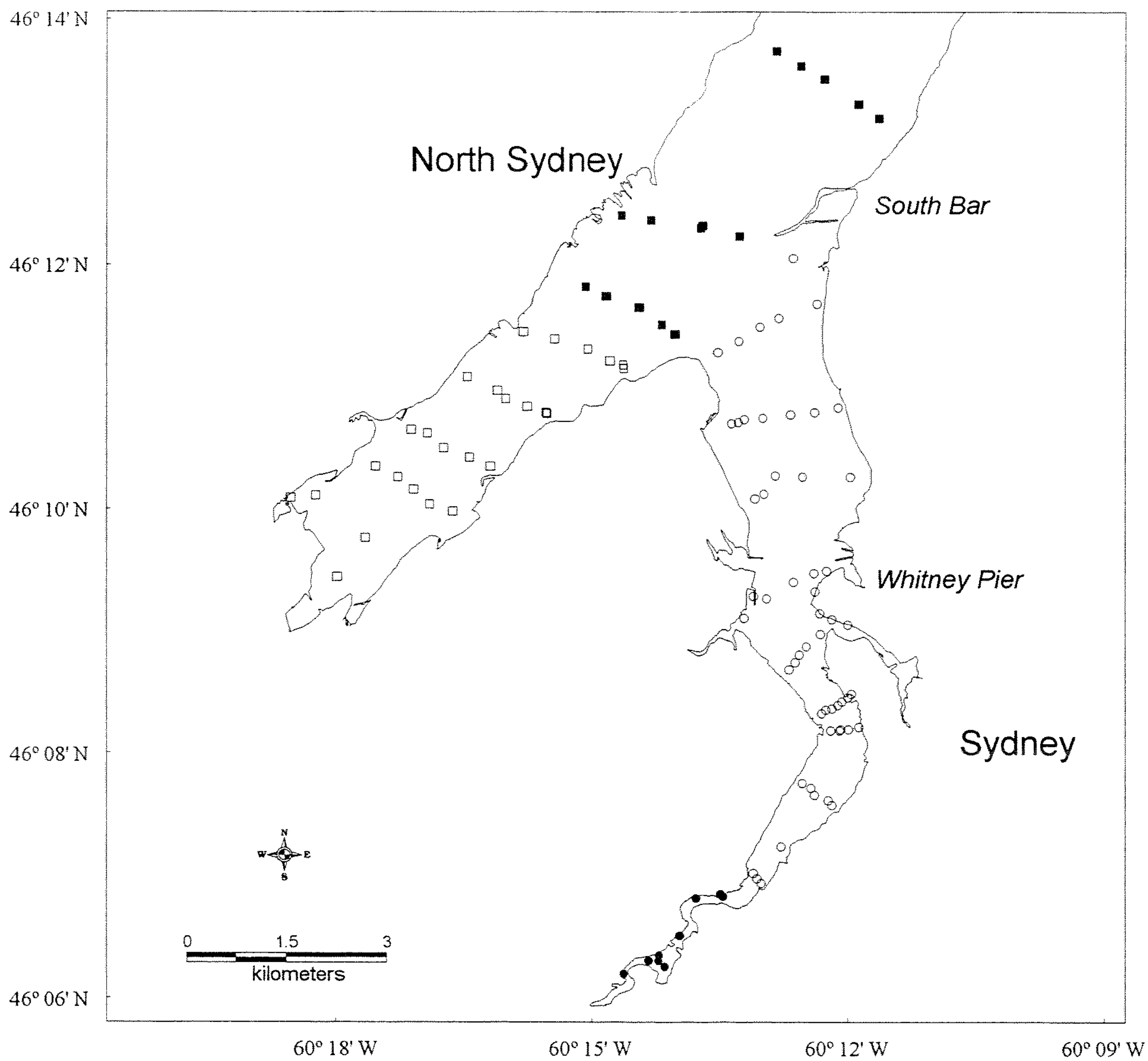


Figure 1: Station locations (N=104) of grab samples collected within Sydney Harbour, Nova Scotia. Symbols represent arbitrary areas created for sample sites grouped by area used for trace metal analyses. Area 1 = closed circles, area 2 = open circles, area 3 = closed squares, and area 4 = open squares.

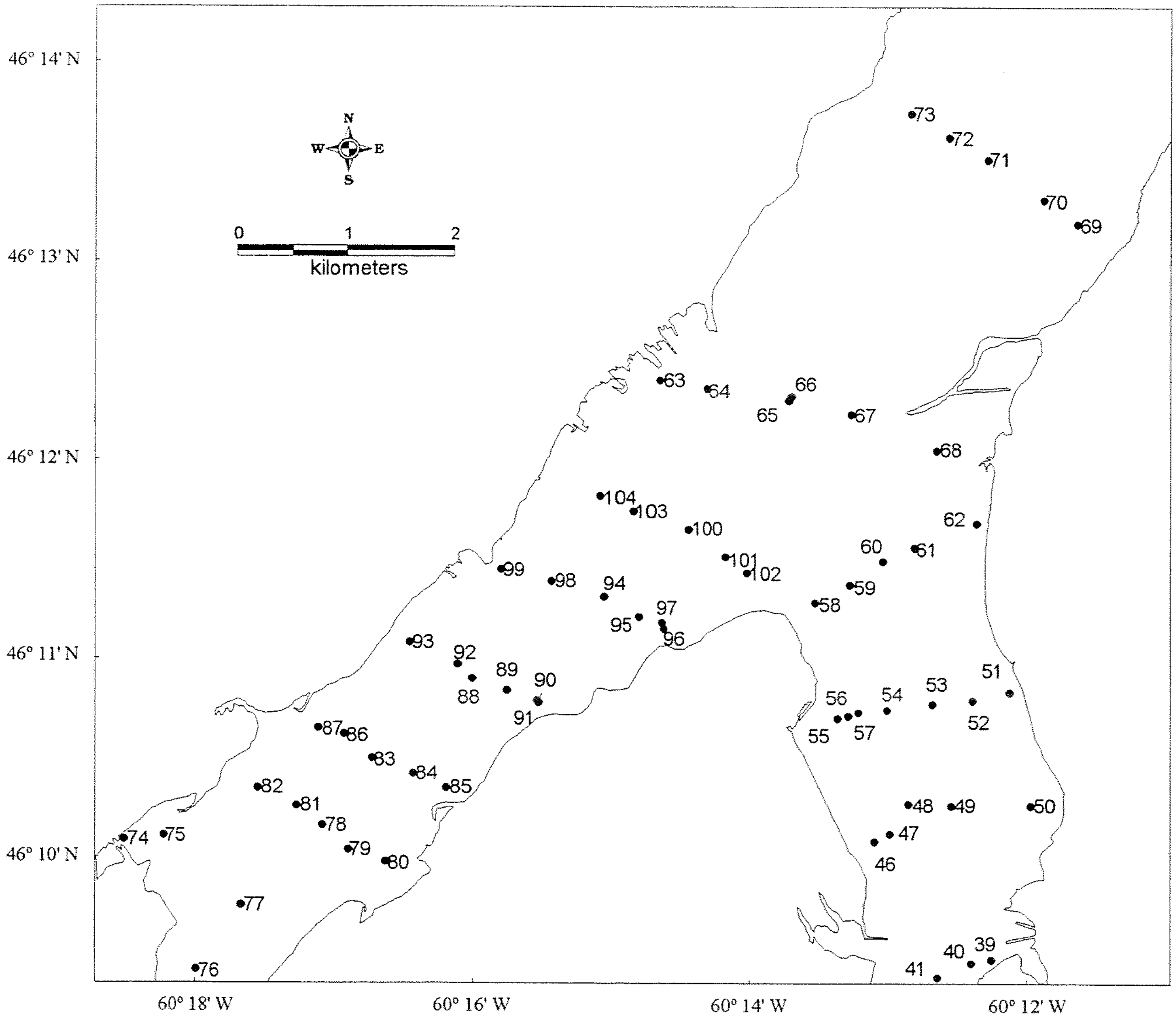


Figure 2: Station numbers for bottom sediment samples collected in the North West Arm of Sydney Harbour, NS, October, 1999.

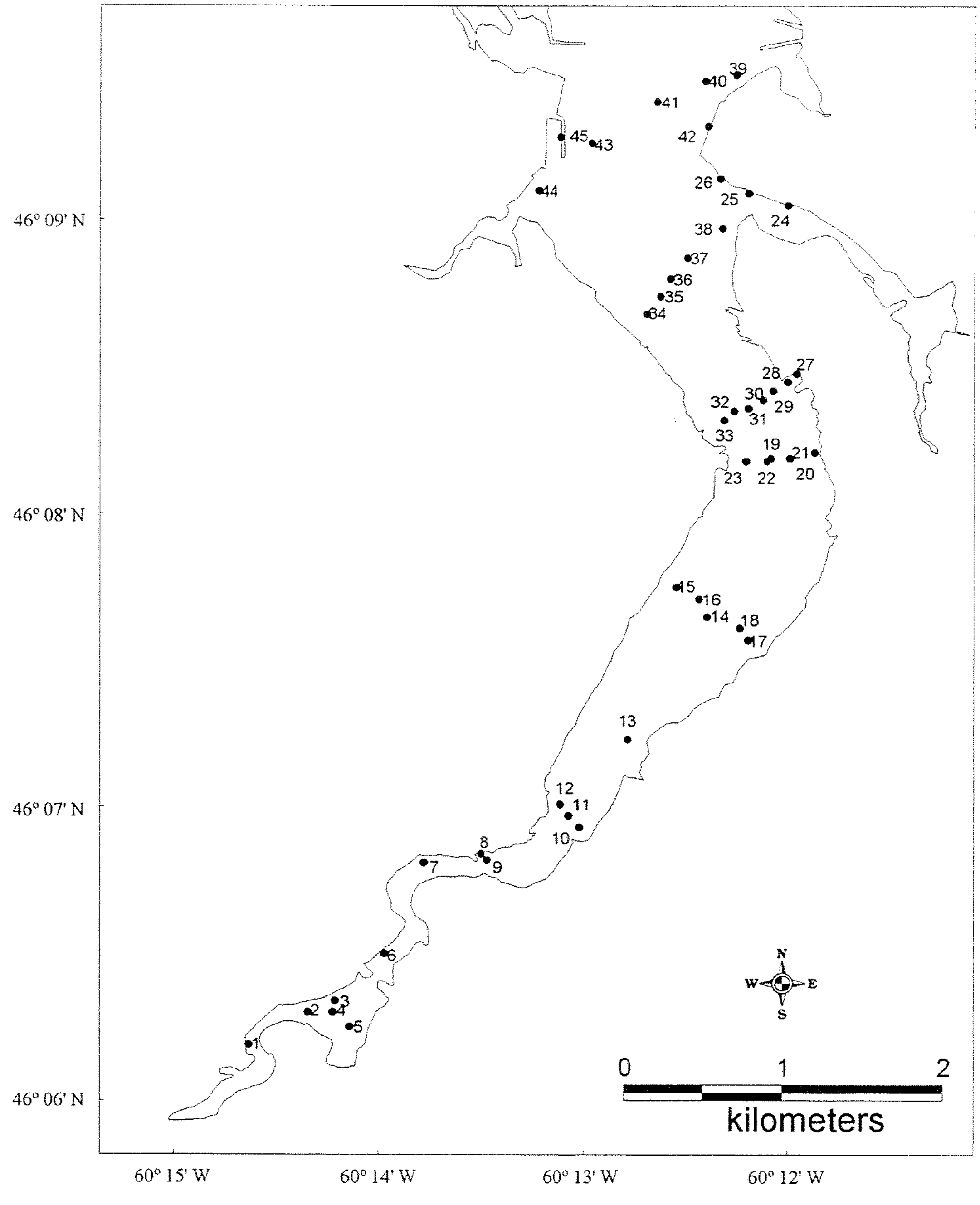


Figure 3: Station numbers for bottom sediment samples collected in the South Arm of Sydney Harbour, NS, October, 1999.

Table 2: Calculated values for the < 63 μm and < 5 μm fractions of the sediment, and estimated critical erosion shear stress.

Station	% < 63 μm	% < 5 μm	Shear Stress (Pa)
1	93.63	22.25	0.0662
2	98.38	37.02	0.0568
3	83.15	36.09	0.1158
4	92.20	34.37	0.0993
5	94.60	41.06	0.0875
6	71.04	22.12	0.1739
7	99.02	46.95	0.0993
10	78.36	42.89	0.1739
11	100.00	47.88	0.0993
12	98.22	39.86	0.0662
13	100.00	55.22	0.0568
13	98.22	50.56	0.1321
14	100.00	52.90	0.0662
15	98.66	46.97	0.0993
16	98.26	16.98	0.0662
17	93.02	39.60	0.1507
18	97.62	40.57	0.1158
19	91.71	31.19	0.0662
20	100.00	40.07	0.0757
21	99.13	35.40	0.1739
22	94.11	37.31	0.1739
23	93.70	34.23	0.1321
24	29.89	9.34	0.3300
25	90.95	33.72	0.1739
26	89.40	30.98	0.0993
27	95.12	30.69	0.1158
29	97.54	40.18	0.1158
30	96.77	40.43	0.1321
31	92.41	35.74	0.1739
32	93.39	35.95	0.1739
33	5.69	0.99	0.3500
34	18.43	3.81	0.3464
35	96.70	37.58	0.0875
36	98.36	47.09	0.1158
37	97.27	40.93	0.1321
38	90.33	31.90	0.1961
39	88.56	32.91	0.2314
40	96.21	41.66	0.1321
41	97.54	42.51	0.1321
42	98.27	41.46	0.0993
43	99.26	45.71	0.0757
44	98.26	31.11	0.0568

Table 2 (cont.): Calculated values for the < 63 μm and < 5 μm fractions of the sediment, and estimated critical erosion shear stress.

Station	% < 63 μm	% < 5 μm	Shear Stress (Pa)
45	99.32	37.07	0.0662
46	98.95	19.01	0.0662
47	99.53	46.81	0.0875
48	99.41	43.52	0.0875
49	99.56	41.40	0.0757
50	96.89	37.73	0.1158
51	98.07	40.75	0.1158
52	99.05	46.96	0.0993
53	100.00	39.91	0.0662
54	98.73	37.63	0.0993
57	34.38	35.66	0.3500
58	92.00	18.85	0.0875
59	97.58	32.57	0.0875
60	98.46	29.46	0.0875
61	98.96	32.14	0.0757
62	97.09	37.47	0.1158
63	96.90	22.08	0.0875
64	97.58	23.83	0.0662
66	98.01	19.65	0.0757
67	95.98	19.65	0.0875
68	97.79	29.51	0.0662
70	14.71	2.65	0.2531
71	0.96	0.25	0.3464
72	100.00	52.38	0.0662
73	16.37	3.05	0.2849
75	99.53	35.25	0.0497
76	96.41	26.36	0.0993
77	99.56	41.01	0.0757
78	99.09	35.04	0.0662
79	100.00	43.54	0.1158
80	89.93	26.68	0.1321
81	97.63	38.72	0.0993
82	99.64	43.19	0.0662
83	100.00	40.68	0.0497
84	98.81	39.57	0.0993
85	63.35	23.61	0.1961
86	100.00	45.04	0.0424
87	98.03	39.64	0.0875
88	99.69	39.08	0.0662
89	98.74	35.29	0.0875
91	85.78	33.38	0.1739
92	99.00	35.59	0.0993

Table 2 (cont.): Calculated values for the < 63 μm and < 5 μm fractions of the sediment, and estimated critical erosion shear stress.

Station	% < 63 μm	% < 5 μm	Shear Stress (Pa)
93	98.33	30.00	0.0568
95	98.14	34.87	0.0993
97	21.87	5.11	0.2926
98	89.33	28.86	0.1321
99	72.90	23.30	0.1961
100	68.58	16.39	0.2314
101	98.38	26.18	0.0757
102	95.10	25.89	0.0875
103	97.68	26.11	0.0568
104	90.96	29.73	0.1961

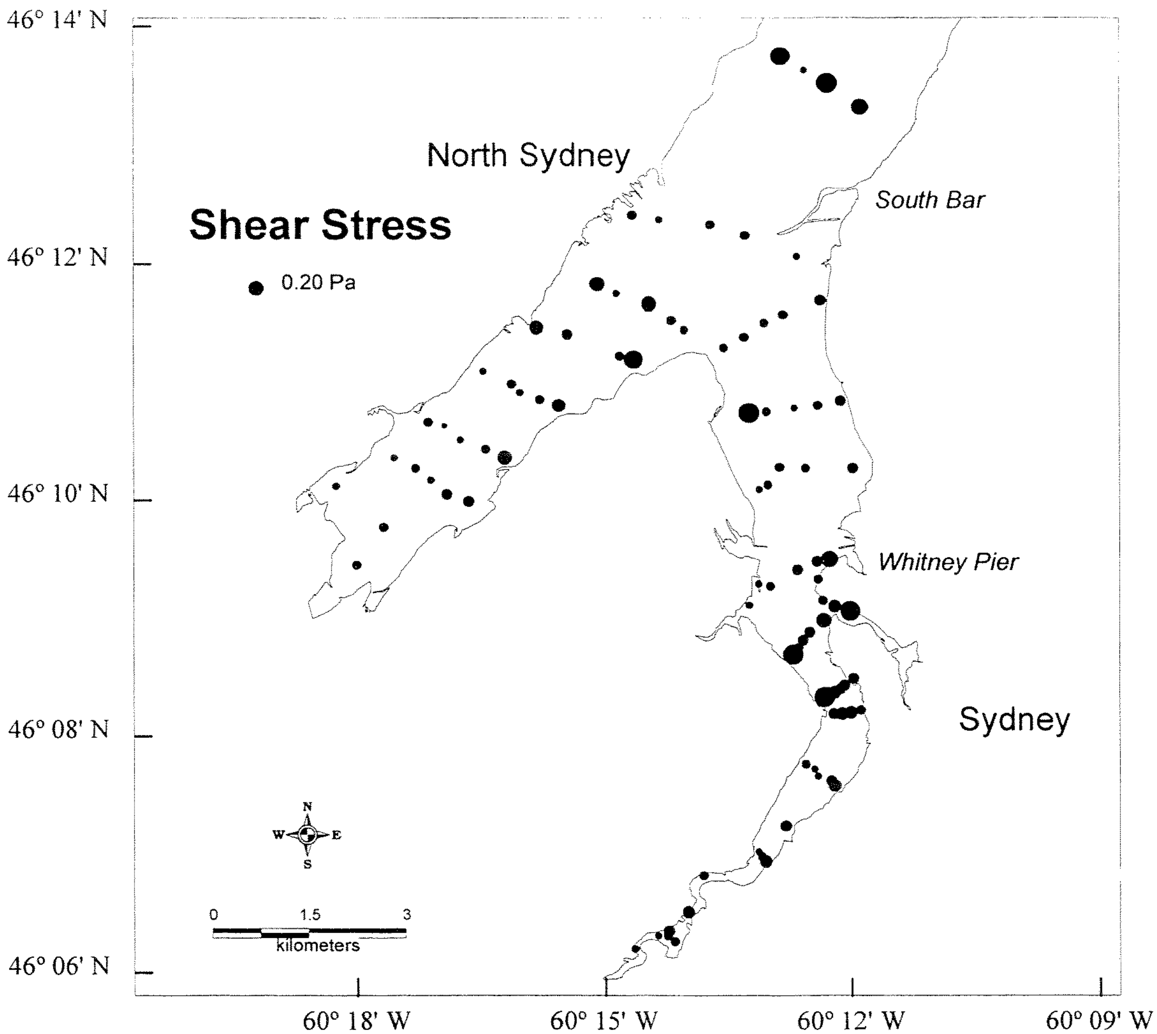


Figure 4: Estimated critical erosion shear stress from surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the shear stress.

Table 3: Trace metal concentrations in Sydney Harbour.

	Station Number								
Analysis	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**10**	**11**
As (ppm)	11	23	22	13	14	8	24	14	17
Hg (ppb)	40	100	240	110	100	50	140	100	130
Al (%)	5.6	5.92	5.04	4.99	5.32	3.76	4.62	5.27	6.36
Sb (ppm)	0.9	1.1	1	0.9	0.9	0.6	1	0.9	1.1
Ba (ppm)	280	250	260	260	270	260	280	300	320
Be (ppm)	1.45	1.85	1.5	1.55	1.7	1	1.15	1.4	1.85
Bi (ppm)	0.22	0.71	0.55	0.58	0.62	0.24	0.56	0.51	0.76
Cd (ppm)	0.48	1.12	1.14	1	1.22	0.48	0.78	0.76	1.22
Ca (%)	5.4	1.01	0.58	0.84	1.18	2.38	1.9	0.51	0.64
Ce (ppm)	54.8	59.5	59.1	52.5	61.1	44.2	51.4	66.4	59
Cs (ppm)	4.3	5.6	5.1	4.6	5.25	2.75	3.85	4.95	5.75
Cr (ppm)	48	56	47	48	49	26	39	45	61
Co (ppm)	10.6	12	10.8	10.4	11.4	7.2	9.4	10.8	12
Cu (ppm)	19	58	46	48	45	19	41	39	67
Ga (ppm)	12.5	14.2	13.2	12.1	13.3	8.8	11.5	13.9	15.5
Ge (ppm)	1.3	1.6	1.7	1.4	1.7	1.2	1.5	1.6	1.6
Fe (%)	2.87	3.91	3.4	3.26	3.4	2.03	2.67	2.82	3.56
La (ppm)	27	27	27	24	28	20.5	24	31	27
Pb (ppm)	45.5	102	101	101	100	44.5	103	77	117
Li (ppm)	40.6	55	50.2	45.8	50	27.8	38	47.8	56
Mg (%)	1.01	1.32	0.95	1.05	1.09	0.58	0.8	0.95	1.28
Mn (ppm)	405	535	385	395	420	315	315	330	370
Mo (ppm)	3.6	4.2	5	6.6	4.4	1.4	3.4	5.8	8
Ni (ppm)	22.2	24.2	22.6	21.2	23.4	13.2	19	22.2	27.6
Nb (ppm)	7.2	6.6	7.4	6	7	5.8	7	7.2	6.2
P (ppm)	870	1290	1150	950	1210	600	710	660	1050
K (%)	1.96	1.75	1.5	1.5	1.59	1.29	1.5	1.64	1.72
Rb (ppm)	77	80.8	78.2	70.2	80.6	58.8	71.4	84.6	86.2
Ag (ppm)	0.45	1.05	1	0.85	1	0.45	0.85	1.05	1.3
Na (ppm)	1.24	3.81	2.21	2.92	2.58	1.23	1.75	2.49	3.35
Sr (ppm)	220	144	109.5	114.5	150	137.5	137.5	115.5	127
Ta (ppm)	0.3	0.25	0.3	0.2	0.3	0.25	0.3	0.3	0.25
Te (ppm)	0.05	0.1	0.1	0.05	0.1	0.05	0.1	0.1	0.05
Tl (ppm)	0.58	0.68	0.64	0.6	0.66	0.48	0.56	0.66	0.76
Th (ppm)	8.2	9	8.8	8	9	6.4	9	9.6	9.6
Ti (%)	0.26	0.23	0.23	0.21	0.22	0.18	0.23	0.23	0.21
W (ppm)	0.8	1.3	1.2	1	1.3	0.7	1.1	1	1.1
U (ppm)	3.6	3	3.2	3.4	3.2	1.8	2.6	3.4	4.2
V (ppm)	81	93	79	86	83	57	73	79	101
Y (ppm)	17.1	21.3	20.3	18.7	21.4	13.4	16.4	19.5	21.2
Zn (ppm)	142	222	190	198	200	104	156	134	220

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

	Station Number								
Analysis	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
As (ppm)	15	13	28	16	22	23	31	21	12
Hg (ppb)	130	50	200	170	20	310	230	310	190
Al (%)	5.34	6.91	6.67	4.37	4.81	5.94	6.27	5.49	6.76
Sb (ppm)	1	0.8	1.8	1.3	0.8	2.4	2.3	1.8	2.8
Ba (ppm)	280	250	230	250	370	350	380	340	400
Be (ppm)	1.4	1.9	2.1	1.2	1.65	2.3	2.35	2	2.1
Bi (ppm)	0.75	0.39	1.2	0.75	0.17	1.54	1.37	0.94	1.1
Cd (ppm)	1.2	0.68	1.08	0.6	0.14	1.3	0.9	0.8	0.8
Ca (%)	0.6	0.4	0.48	0.42	1.32	0.59	1.08	1.42	0.63
Ce (ppm)	55.1	62.9	68.9	45.4	58.3	72.1	72.8	60.3	102
Cs (ppm)	4.95	6.3	6.4	4	3.45	5.5	5.75	4.65	6.35
Cr (ppm)	53	64	70	50	40	68	63	51	66
Co (ppm)	10.2	13	13.6	8.2	11	12.8	13.4	12.8	14
Cu (ppm)	62	34	92	59	16	117	82	68	93
Ga (ppm)	13.1	18	17.5	11	13.1	16	17.1	13.7	18
Ge (ppm)	1.6	1.6	1.9	1.4	2	2.4	2.3	1.8	2.1
Fe (%)	3.24	3.77	4.22	2.8	2.85	4.66	4.6	4.3	4
La (ppm)	25	29.5	32.5	21	28	33	34	29	39
Pb (ppm)	122	66	199.5	134.5	25	261	241	192.5	196.5
Li (ppm)	48.6	59.2	55.6	38	36.4	57.2	55.8	44.8	55.8
Mg (%)	1.08	1.2	1.28	0.86	0.64	1.14	1.14	1.2	1.4
Mn (ppm)	330	425	355	245	785	375	390	405	380
Mo (ppm)	6.2	8	9.2	8.4	1.2	14	9	6	9.4
Ni (ppm)	22.4	30	30.8	19.6	21	31.2	29.4	25.8	31.4
Nb (ppm)	6.4	8	8.8	5.8	7	8.8	8.8	8.6	9.4
P (ppm)	1030	740	1160	720	770	1350	1040	870	1060
K (%)	1.6	2.08	2	1.24	1.28	1.74	1.89	1.66	1.99
Rb (ppm)	76.2	101	99.2	62	67.4	91.4	100.5	80.2	101
Ag (ppm)	1.25	0.7	2.2	1.25	0.3	3.3	2.55	1.35	1.95
Na (ppm)	2.64	2.96	3.51	1.67	1.08	2.8	2.43	1.89	2.59
Sr (ppm)	107.5	118	126	79.6	134.5	134	150	122.5	120.5
Ta (ppm)	0.25	0.3	0.35	0.2	0.3	0.4	0.35	0.35	0.35
Te (ppm)	0.05	0.1	0.2	0.05	0.05	0.2	0.25	0.2	0.15
Tl (ppm)	0.72	0.68	0.82	0.46	0.38	0.82	0.78	0.62	0.76
Th (ppm)	8.6	10	10	6.6	9.2	10.2	10.6	9	11.6
Ti (%)	0.22	0.26	0.27	0.18	0.21	0.27	0.25	0.26	0.29
W (ppm)	1.1	0.9	1.3	0.8	0.8	1.5	1.4	1.1	1.3
U (ppm)	3.2	3.8	4.4	4	2.2	5.6	4.6	3.6	4.6
V (ppm)	87	105	132	84	67	121	127	100	116
Y (ppm)	18.9	19.5	23.4	15.7	15.9	25.6	25	21.9	25.6
Zn (ppm)	218	134	272	202	70	314	318	284	232

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

	Station Number								
Analysis	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**29**	**30**
As (ppm)	20	14	16	23	29	10	17	23	37
Hg (ppb)	10	180	100	1350	1240	80	150	280	320
Al (%)	8.21	4.71	6.19	1.17	4.97	5.09	6.16	7.14	6.23
Sb (ppm)	1.1	1.4	1.9	0.8	4.3	1	2.2	1.8	2.5
Ba (ppm)	490	290	370	120	300	260	380	420	370
Be (ppm)	2.4	1.6	1.9	0.9	2	1.3	1.95	2.7	2.25
Bi (ppm)	0.38	0.68	0.88	0.42	2.91	0.35	0.77	0.77	1.25
Cd (ppm)	0.22	0.74	0.98	0.76	4.18	1.36	0.82	0.62	1.2
Ca (%)	0.6	0.75	1.45	0.3	0.87	0.58	1.31	0.92	0.75
Ce (ppm)	75.7	51.1	70.6	17.95	57.5	51.8	68.8	71	64.5
Cs (ppm)	7.2	4.35	6.1	0.8	4.3	4.65	5.55	6.15	6.1
Cr (ppm)	75	53	63	25	103	50	59	68	65
Co (ppm)	15.6	9.6	12.8	4.6	12.4	10	12.2	16.2	13.6
Cu (ppm)	34	62	77	84	375	47	80	126	93
Ga (ppm)	22.2	12.7	16.4	3.2	11.9	12.6	16.3	18.8	16.5
Ge (ppm)	2	1.6	1.8	1	2.2	1.4	1.8	2.1	2.2
Fe (%)	4.27	3.28	3.5	2.38	5.43	2.87	4.01	4.9	4.58
La (ppm)	36.5	24	33	8.5	27	24	36	33.5	30
Pb (ppm)	56	176.5	189	64	279	107	193	185	266
Li (ppm)	63	39.2	51.2	14.4	44.4	43.6	50	57	52
Mg (%)	1.19	1.01	1.49	0.27	1.11	1.1	1.35	1.27	1.25
Mn (ppm)	555	330	445	170	390	285	425	510	410
Mo (ppm)	2	5.4	9.2	3	13.6	18.4	4.8	9.2	9
Ni (ppm)	34.4	22.4	29.8	10.4	37.2	25.2	28.4	37.4	31
Nb (ppm)	11	6.6	9.4	1.2	6.6	6.8	8	8.8	7.8
P (ppm)	1000	730	990	960	3310	760	1060	900	1050
K (%)	2.29	1.42	1.95	0.2	1.2	1.63	1.88	1.97	1.85
Rb (ppm)	120.5	71.8	99.2	9.4	60	79.2	89.4	100	93.4
Ag (ppm)	0.7	1.25	1.7	1.65	8.7	1	1.55	1	1.75
Na (ppm)	2.22	1.62	2.56	0.61	2.12	2.35	2.95	2.56	2.86
Sr (ppm)	142	90.5	131.5	69.6	176.5	104.5	140	148	130
Ta (ppm)	0.45	0.25	0.4	<0.05	0.2	0.25	0.3	0.35	0.3
Te (ppm)	0.1	0.15	0.15	0.05	0.3	0.05	0.05	0.15	0.3
Tl (ppm)	0.7	0.56	0.78	0.22	1.38	0.64	0.72	0.68	0.74
Th (ppm)	12.4	7.6	10.6	2.2	8	8.4	10.4	10.8	9.8
Ti (%)	0.32	0.2	0.28	0.07	0.23	0.22	0.26	0.26	0.24
W (ppm)	1.3	0.9	1.3	0.5	2.7	0.9	1.2	1.2	1.2
U (ppm)	3.4	3	4.6	1	3.4	6	3.4	3.8	4.4
V (ppm)	128	89	112	28	97	84	100	117	123
Y (ppm)	21.1	17	23.3	9.2	28.2	18.3	21.6	22.8	22.8
Zn (ppm)	118	214	236	238	874	174	274	290	390

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

	Station Number								
Analysis	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**
As (ppm)	23	19	<1	9	22	21	33	39	36
Hg (ppb)	180	190	30	60	200	110	240	570	270
Al (%)	6.44	6.27	2.24	2.7	7.26	6.33	7.07	5.85	5.75
Sb (ppm)	2.7	1.6	0.5	0.6	2	1.5	2.2	3.2	1.9
Ba (ppm)	390	380	190	220	420	360	380	340	360
Be (ppm)	2.95	2.1	0.65	0.75	2.35	2	2.3	2.3	2.1
Bi (ppm)	1.18	0.83	0.08	0.17	0.88	0.74	0.86	1.45	0.75
Cd (ppm)	1.1	0.8	0.18	0.42	0.82	0.58	1.02	1.74	1.26
Ca (%)	1.36	1.15	0.76	3.19	0.8	0.74	0.54	1.03	0.87
Ce (ppm)	99.7	66.8	29.9	32.8	71.6	60.5	83.1	63.3	59.6
Cs (ppm)	8.35	5.9	1.35	1.6	6.6	6.05	6.8	5.55	5
Cr (ppm)	72	62	14	19	83	64	80	88	82
Co (ppm)	18.8	12.6	4.2	6	14.4	12.4	13.2	12.8	12.4
Cu (ppm)	80	75	8	13	81	67	88	140	70
Ga (ppm)	24	16.8	5.2	6.3	19.1	16.6	18.4	15.2	15.4
Ge (ppm)	2.9	1.8	1.3	1	2.2	1.6	2.1	2.4	2
Fe (%)	4.35	3.74	1.15	1.65	4.94	3.88	4.59	6.26	5.91
La (ppm)	47	35.5	13.5	14.5	34	29	37.5	33	32
Pb (ppm)	180	153.5	26.5	47	203	114.5	213	290	153
Li (ppm)	74.6	54	16.8	18.2	59.2	49.4	58	58.4	48.4
Mg (%)	1.27	1.43	0.59	0.96	1.31	1.31	1.31	1.37	1.18
Mn (ppm)	450	435	210	360	450	425	430	490	545
Mo (ppm)	7.4	5.6	0.8	0.8	7	4.8	7.2	9.6	7
Ni (ppm)	44.6	29.2	6.8	12.2	34.4	29.8	31.4	31.6	28.4
Nb (ppm)	13.4	8	3.2	3.4	10	7.6	9.2	7.2	7.8
P (ppm)	970	1020	270	390	1100	1740	1260	2070	1280
K (%)	1.95	1.89	0.89	0.99	2.11	1.9	2.1	1.66	1.59
Rb (ppm)	140.5	92.2	39.2	42.4	106	96.2	101	80.4	77.6
Ag (ppm)	2.35	1.65	0.25	0.35	1.75	1.5	1.8	2.8	1.3
Na (ppm)	1.98	3.02	0.66	0.8	2.37	3.57	2.98	2.39	2.39
Sr (ppm)	140	136	45.4	78.3	137.5	136	129.5	140.5	125
Ta (ppm)	0.55	0.3	0.05	0.05	0.4	0.3	0.4	0.25	0.1
Te (ppm)	0.25	0.15	<0.05	0.05	0.2	0.1	0.15	0.3	0.2
Tl (ppm)	1.04	0.74	0.3	0.34	0.78	0.64	0.88	0.88	0.84
Th (ppm)	15	10.2	4	4.4	11.2	9.4	10.8	9.4	9
Ti (%)	0.28	0.25	0.11	0.11	0.3	0.23	0.29	0.23	0.24
W (ppm)	1.8	1.3	0.3	0.4	1.4	1.1	1.5	1.6	1.4
U (ppm)	5.2	3.6	1.2	1.4	4.6	3.2	4	5	3.6
V (ppm)	115	113	30	43	133	116	128	126	129
Y (ppm)	32.2	21.4	7.9	9.8	24.1	19.7	22.7	26.5	21.3
Zn (ppm)	270	232	116	150	300	184	274	494	300

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

	Station Number								
Analysis	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
As (ppm)	28	22	20	20	13	8	7	21	27
Hg (ppb)	250	140	90	90	100	50	20	70	60
Al (%)	6.72	7.34	7.35	8.51	5.54	6.7	6.11	6.76	8.45
Sb (ppm)	2	1.6	1.6	1.3	Minrlzd	0.9	1	1.1	1.4
Ba (ppm)	380	400	420	480	590	380	550	400	480
Be (ppm)	2.25	2.25	2.35	2.1	1.5	1.7	1.85	1.95	2.3
Bi (ppm)	0.88	0.69	0.73	0.66	<2.00	0.27	0.25	0.5	0.51
Cd (ppm)	1.3	0.94	0.82	0.7	1	0.86	0.24	0.28	0.4
Ca (%)	0.51	0.54	0.51	0.79	1.64	0.53	1.28	1.21	0.42
Ce (ppm)	62.9	67.4	73.6	66.6	Minrlzd	64.5	62.8	65.3	73.9
Cs (ppm)	6.25	6.4	6.85	6.15	Minrlzd	5.95	4.65	5.25	7
Cr (ppm)	80	77	74	82	53	63	61	69	85
Co (ppm)	14.2	14	15.4	14.2	10	14.4	13.8	13.8	15
Cu (ppm)	71	63	57	65	7	29	12	30	44
Ga (ppm)	18.7	19.7	20.4	18.8	Minrlzd	17.9	16	17.3	21.1
Ge (ppm)	2.1	2	1.9	1.8	Minrlzd	1.7	1.6	1.8	2
Fe (%)	4.76	4.46	4.17	4.83	3.22	3.35	3.29	4.1	4.67
La (ppm)	33	36	35.5	31.5	Minrlzd	31	29	31	36
Pb (ppm)	186.5	124	110.5	135.5	620	64.5	33.5	80	95.5
Li (ppm)	57.6	58.8	59.2	55.6	Minrlzd	54.6	41.2	51	61.4
Mg (%)	1.29	1.29	1.33	1.53	1.42	1.23	1.06	1.26	1.28
Mn (ppm)	440	405	375	480	405	375	265	475	450
Mo (ppm)	9.2	6.2	10.4	5.6	7	15.4	1.4	2	4.8
Ni (ppm)	33.4	33.8	36.6	34.2	29	34.6	36.2	36.4	34.2
Nb (ppm)	7.8	9.2	10.6	9.2	Minrlzd	8.6	8.6	9.4	10.6
P (ppm)	990	880	910	1100	780	670	1030	1060	1520
K (%)	1.95	2.13	2.19	2.4	1.7	2.06	1.92	1.93	2.39
Rb (ppm)	98.6	102	112	103	Minrlzd	103	86.2	93.4	117
Ag (ppm)	1.4	1.2	1.25	1	0.6	0.45	0.4	0.7	0.9
Na (ppm)	3.79	3.16	3.42	3.1	2.19	2.39	1.15	1.89	3.2
Sr (ppm)	136	127.5	134.5	141.5	>10000	118	131.5	135.5	148
Ta (ppm)	0.2	0.4	0.45	0.35	Minrlzd	0.35	0.35	0.4	0.45
Te (ppm)	0.2	0.15	0.15	0.15	Minrlzd	<0.05	0.05	0.1	0.05
Tl (ppm)	0.92	0.86	0.82	0.72	Minrlzd	0.72	0.52	0.58	0.74
Th (ppm)	10.2	10.8	11.6	10.8	Minrlzd	10.6	10	10	11.8
Ti (%)	0.24	0.29	0.3	0.33	0.24	0.26	0.27	0.29	0.33
W (ppm)	1.3	1.4	1.4	1.2	<10.0	0.9	1	1.2	1.4
U (ppm)	4.2	4	4.8	3.6	Minrlzd	5	2.6	2.8	3.8
V (ppm)	128	126	127	143	95	99	85	110	145
Y (ppm)	21.6	21	22.6	21.5	Minrlzd	20	19.8	19.5	21.3
Zn (ppm)	302	216	186	226	330	128	88	156	150

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

Analysis	Station Number 49	50	51	53	54	57	58	59	60
As (ppm)	25	12	31	20	14	11	8	14	14
Hg (ppb)	40	200	190	50	50	60	40	10	30
Al (%)	7.67	6.29	6.97	7.86	7.93	5.69	6.01	7.83	6.41
Sb (ppm)	1.4	1.9	1.8	1.2	1.2	1.1	0.9	1.2	3.2
Ba (ppm)	430	370	400	470	480	420	370	490	400
Be (ppm)	2.3	2	2.2	2.45	2.25	1.7	2.2	2.35	1.95
Bi (ppm)	0.57	1.31	1.18	0.46	0.45	0.36	0.31	0.37	0.31
Cd (ppm)	0.6	0.66	0.58	0.42	0.46	0.3	0.24	0.3	0.22
Ca (%)	0.43	0.51	0.47	0.65	0.56	1.34	0.93	0.73	0.58
Ce (ppm)	80.6	66.2	71.5	70.1	70.3	75.5	61.1	73.9	64.6
Cs (ppm)	6.75	5.35	6	6.65	6.55	4.25	4.8	6.45	5.6
Cr (ppm)	73	73	74	74	77	58	55	72	59
Co (ppm)	14.6	13	13.8	14.6	15	13.8	15	15	12.4
Cu (ppm)	46	61	54	39	40	21	25	33	27
Ga (ppm)	20.5	17	18.6	21.3	20.7	15.1	15.6	20.6	17.3
Ge (ppm)	1.8	2.5	2.5	1.8	2	2	2.1	2	1.5
Fe (%)	4.02	5.86	5.15	4.24	4.25	3.84	4.8	3.99	3.26
La (ppm)	34	31	34.5	37.5	34	32.5	30	35.5	31.5
Pb (ppm)	79	189.5	166.5	65.5	74	88	53	49	45.5
Li (ppm)	57.4	50.2	53.4	62.4	59.6	41.6	51.2	58.6	48.4
Mg (%)	1.24	0.99	1.06	1.3	1.13	0.84	0.83	1.17	0.91
Mn (ppm)	395	425	430	565	550	345	410	645	525
Mo (ppm)	12.2	4.2	5.2	5.8	5.4	2.6	6	3	2
Ni (ppm)	33.8	29.8	30.8	33.2	33.4	31.8	29.6	33.4	27.6
Nb (ppm)	8.8	8.8	10.4	9.6	10	7.6	8.6	10.4	10
P (ppm)	940	1240	1150	1170	850	1780	800	940	680
K (%)	2.09	1.68	1.94	2.28	2.13	1.51	1.47	2.15	1.76
Rb (ppm)	110.5	86.8	99	112	109.5	76	79.8	112	95.4
Ag (ppm)	1	1.2	1.15	0.8	0.8	0.5	0.55	0.6	0.65
Na (ppm)	3.43	1.91	2.1	3.3	1.81	1.43	1.23	2.13	1.46
Sr (ppm)	135	110.5	122.5	144.5	131.5	143.5	174.5	151	117.5
Ta (ppm)	0.35	0.35	0.4	0.4	0.4	0.3	0.35	0.45	0.4
Te (ppm)	0.05	0.35	0.3	0.1	0.1	0.15	0.05	0.05	0.05
Tl (ppm)	0.76	0.62	0.68	0.76	0.7	0.56	0.46	0.68	0.56
Th (ppm)	11.2	10	11	11.2	11.2	9.2	10.8	11.8	10
Ti (%)	0.27	0.27	0.31	0.3	0.31	0.24	0.26	0.3	0.28
W (ppm)	1.2	1.2	1.4	1.4	1.3	0.9	1	1.2	1.2
U (ppm)	5	3.8	4.6	4	4	3.4	2.6	3.6	3
V (ppm)	139	132	139	137	134	108	99	124	102
Y (ppm)	21	22.6	23	19.3	20.4	35.8	19.3	20.1	17
Zn (ppm)	150	318	292	136	150	128	112	116	92

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

	Station Number								
Analysis	**61**	**62**	**63**	**64**	**66**	**67**	**68**	**72**	**73**
As (ppm)	12	17	16	17	14	15	10	28	14
Hg (ppb)	30	80	30	1160	60	10	40	130	<10
Al (%)	8.08	7.47	6.93	5.68	5.6	5.78	6.94	6.41	3.3
Sb (ppm)	1.1	1.4	0.9	1	0.9	0.7	1	1.5	0.4
Ba (ppm)	490	440	470	440	420	410	440	310	360
Be (ppm)	2.3	2.2	2.1	2.05	1.45	1.55	2.05	1.75	1.05
Bi (ppm)	0.41	0.73	0.28	0.26	0.19	0.21	0.34	1.03	0.1
Cd (ppm)	0.34	0.42	0.26	0.16	0.14	0.18	0.36	0.96	0.02
Ca (%)	0.78	0.58	0.86	0.38	0.57	0.9	0.64	0.53	0.51
Ce (ppm)	74.4	74.4	68.1	66.2	68.7	66.1	81.1	66.1	43.7
Cs (ppm)	6.75	6.2	5.7	4.55	4.25	4.35	5.35	5.95	1.85
Cr (ppm)	74	75	64	48	49	51	64	66	24
Co (ppm)	15.4	14.6	14	12.2	12	12	13.6	12.4	7
Cu (ppm)	36	45	32	22	19	21	32	83	8
Ga (ppm)	21.4	19.6	18.4	15.7	15	15.5	19.1	16.3	8
Ge (ppm)	2	2.3	2	2.4	2.1	1.8	1.9	1.8	1.3
Fe (%)	4.07	4.85	3.77	2.96	3	3.1	3.79	3.85	2.18
La (ppm)	36	35.5	33	31.5	33	31.5	37	31	22.5
Pb (ppm)	54.5	113	39	38.5	27.5	26.5	54.5	139	15.5
Li (ppm)	61	59	52	45.8	41.6	41.2	53.2	50.2	21.8
Mg (%)	1.22	1.1	0.98	0.66	0.7	0.76	1.05	1.43	0.38
Mn (ppm)	605	545	605	460	575	640	595	320	765
Mo (ppm)	5.2	4.4	2	2.6	1.4	2	3.2	12	0.6
Ni (ppm)	33.8	32.4	32.8	23.6	23.6	24.6	29	29	11
Nb (ppm)	10.8	10	11.4	9.6	10	10	9.2	8.6	4.4
P (ppm)	800	1090	820	490	650	660	850	1200	520
K (%)	2.29	2.02	1.91	1.43	1.53	1.71	2.05	2.02	0.92
Rb (ppm)	116.5	105	101	81	81.4	86.6	96.6	94	40.4
Ag (ppm)	0.75	0.95	0.65	0.45	0.45	0.45	0.65	2.1	0.15
Na (ppm)	2.73	1.9	1.56	1.09	1.04	1.21	2.24	5.06	0.8
Sr (ppm)	146	130	137	120	112.5	116.5	124.5	137	84.6
Ta (ppm)	0.45	0.4	0.5	0.4	0.45	0.4	0.4	0.35	0.15
Te (ppm)	0.05	0.15	0.05	0.05	0.05	0.05	0.05	0.15	<0.05
Tl (ppm)	0.7	0.68	0.6	0.52	0.48	0.5	0.64	0.74	0.24
Th (ppm)	11.8	11.6	11	9.8	10.2	9.8	10.8	9.8	6
Ti (%)	0.32	0.3	0.33	0.27	0.28	0.28	0.28	0.27	0.15
W (ppm)	1.3	1.2	1.3	1.2	1.1	1.2	1.1	1.4	0.6
U (ppm)	4	4	2.8	2.6	2.6	2.6	3.4	4.6	1.4
V (ppm)	129	131	102	78	79	81	108	124	44
Y (ppm)	20.6	22.1	18.2	17	17.2	17.2	18.9	21.9	11.9
Zn (ppm)	122	212	104	82	76	80	124	228	46

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

	Station Number								
Analysis	**75**	**76**	**77**	**78**	**79**	**81**	**82**	**83**	**84**
As (ppm)	7	12	13	14	22	16	15	16	15
Hg (ppb)	20	20	20	10	50	30	30	30	40
Al (%)	5.68	6.08	7.18	5.18	7.58	7.61	8.03	8.11	8.1
Sb (ppm)	0.5	0.7	1	0.7	1.1	1.1	1.1	1.1	1.1
Ba (ppm)	340	340	380	340	420	430	430	470	480
Be (ppm)	1.55	1.7	2.1	1.4	2.2	2.25	2.45	2.1	2.05
Bi (ppm)	0.19	0.23	0.38	0.2	0.47	0.41	0.45	0.42	0.42
Cd (ppm)	0.46	0.66	0.56	0.28	0.66	0.44	0.6	0.44	0.5
Ca (%)	1.04	0.65	0.71	0.78	0.79	0.71	0.67	0.73	0.47
Ce (ppm)	48.2	54.9	65.9	50.4	73.1	69.2	77	75.8	70.9
Cs (ppm)	3.7	5.3	6.65	3.75	7.05	6.9	7.6	7.3	7.15
Cr (ppm)	41	44	61	42	70	70	73	74	75
Co (ppm)	9	11.2	13.2	10	14	14	15	14.8	14.6
Cu (ppm)	32	23	31	20	37	35	36	37	39
Ga (ppm)	13.3	14.7	18.5	12.9	20.1	20	21.4	21.3	20.8
Ge (ppm)	1.5	1.6	1.9	1.5	1.9	1.9	2	1.9	1.9
Fe (%)	2.4	2.91	3.53	2.57	4.35	3.89	4.1	4.07	3.97
La (ppm)	23	26	31.5	27.5	34.5	33	36.5	37	34
Pb (ppm)	34.5	43.5	72.5	40.5	89.5	73	82	73	75
Li (ppm)	36.4	54	64	35.2	63	61.2	66.8	64	63.6
Mg (%)	0.97	1.31	1.41	0.79	1.32	1.35	1.4	1.31	1.32
Mn (ppm)	295	300	385	965	415	410	405	465	445
Mo (ppm)	2.2	4.8	3.2	1.8	7	4.8	5	5	7.4
Ni (ppm)	18.8	21.6	29.2	22.4	31.8	32.6	34	34	33
Nb (ppm)	6.6	9.2	9.4	6	11.4	9.6	11.6	12	9.8
P (ppm)	840	840	1260	700	880	1130	1130	880	880
K (%)	1.58	1.8	2.08	1.5	2.22	2.14	2.3	2.36	2.21
Rb (ppm)	74.6	83	105.5	76.8	112	110	121	121	114
Ag (ppm)	0.35	0.55	0.65	0.3	0.7	0.65	0.75	0.75	0.7
Na (ppm)	2.24	1.93	2.39	1.27	2.61	2.66	2.84	2.66	2.37
Sr (ppm)	137	107	141	105	142	143	143	146	133.5
Ta (ppm)	0.25	0.4	0.4	0.25	0.45	0.4	0.5	0.5	0.4
Te (ppm)	<0.05	0.05	0.1	0.05	0.15	0.15	0.1	0.1	0.1
Tl (ppm)	0.58	0.62	0.74	0.48	0.76	0.74	0.82	0.76	0.78
Th (ppm)	7.8	9.2	11	9.2	11.6	11.2	12.4	12	11.8
Ti (%)	0.25	0.31	0.3	0.18	0.34	0.29	0.34	0.35	0.3
W (ppm)	0.7	1	1.1	0.6	1.3	1.2	1.3	1.4	1.2
U (ppm)	2.2	3.2	4	2.2	4.2	4.2	4.2	4	4.6
V (ppm)	69	90	118	68	126	123	129	133	139
Y (ppm)	16.4	18.5	21.9	17.7	21.6	21.4	23	21.4	21.3
Zn (ppm)	88	122	150	92	172	144	154	140	154

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

	Station Number								
Analysis	**85**	**86**	**87**	**88**	**89**	**91**	**92**	**93**	**95**
As (ppm)	5	15	19	11	23	18	7	12	23
Hg (ppb)	20	30	30	40	40	40	40	50	40
Al (%)	5.74	8.06	8.31	8.09	8.3	7.06	8.24	8.07	7.74
Sb (ppm)	0.8	1.1	1.1	1	1.3	1.1	1	1.1	1.1
Ba (ppm)	380	470	480	480	520	440	480	480	490
Be (ppm)	1.5	2.5	2.05	2.35	2.35	2.2	2.5	2	2.35
Bi (ppm)	0.24	0.43	0.43	0.38	0.4	0.35	0.4	0.43	0.35
Cd (ppm)	0.44	0.46	0.46	0.36	0.42	0.48	0.34	0.52	0.42
Ca (%)	0.54	0.86	0.55	0.77	0.56	0.66	0.46	0.7	0.51
Ce (ppm)	53.5	74	74.1	73	78.9	70.8	75	73.5	68.9
Cs (ppm)	4.5	7.35	6.9	7.1	7.4	6.35	7.3	7.1	6.6
Cr (ppm)	48	74	75	74	76	63	77	76	69
Co (ppm)	10.4	15	14.2	15.2	16	14.2	15.4	14.6	14.6
Cu (ppm)	24	37	38	34	36	31	36	39	34
Ga (ppm)	14.1	21.7	20.4	21.7	22.6	19.1	22.5	21.1	20.2
Ge (ppm)	1.6	2.1	2	2	2.1	1.9	2.1	2.1	2
Fe (%)	2.62	4.04	4.26	3.99	4.14	3.58	4.24	4.27	4
La (ppm)	25	36	35.5	35.5	38.5	33.5	36.5	35.5	33
Pb (ppm)	58	74	76.5	58.5	68.5	67.5	67	78	63.5
Li (ppm)	43.4	67.2	62.8	63.6	65.8	55.4	65	62.8	57.2
Mg (%)	1.09	1.36	1.37	1.25	1.22	1.18	1.18	1.25	1.07
Mn (ppm)	285	460	460	515	505	420	480	485	540
Mo (ppm)	5.6	4.8	3.2	3.8	5.8	6	2.2	6	5.4
Ni (ppm)	23	34.2	31.8	34.2	36.2	32.2	35	33.4	32.4
Nb (ppm)	8	11.2	11.2	11	12.6	11	10.8	10.6	9.6
P (ppm)	770	940	1350	950	820	770	1050	870	840
K (%)	1.74	2.3	2.38	2.31	2.34	2.06	2.21	2.22	2.1
Rb (ppm)	80.2	123	116	123.5	127	109	119	113.5	110
Ag (ppm)	0.5	0.75	0.75	0.7	0.75	0.65	0.75	0.75	0.65
Na (ppm)	2.29	2.64	2.72	2.55	2.27	2.29	2.02	2.25	2.09
Sr (ppm)	107	150.5	142.5	149	139	130.5	141.5	143.5	144
Ta (ppm)	0.35	0.45	0.45	0.45	0.5	0.45	0.45	0.45	0.4
Te (ppm)	0.05	0.1	0.15	0.05	0.05	0.1	0.05	0.05	0.05
Tl (ppm)	0.52	0.76	0.72	0.7	0.78	0.68	0.74	0.76	0.7
Th (ppm)	9	11.6	12	11.6	12.4	11.2	12.2	11.6	11.4
Ti (%)	0.26	0.33	0.36	0.32	0.35	0.32	0.31	0.32	0.28
W (ppm)	0.9	1.3	1.3	1.3	1.4	1.3	1.3	1.3	1.2
U (ppm)	3.6	4	4	3.6	4.2	3.8	3.4	4.2	3.4
V (ppm)	94	132	136	135	133	117	133	130	121
Y (ppm)	17.1	22.1	21.9	20.9	22.3	20.9	21.5	21	20.4
Zn (ppm)	114	142	156	122	138	130	130	154	134

Table 3 (cont.): Trace metal concentrations in Sydney Harbour.

	Station Number							
Analysis	**97**	**98**	**99**	**100**	**101**	**102**	**103**	**104**
As (ppm)	8	22	14	18	16	11	17	16
Hg (ppb)	20	130	30	30	20	40	20	30
Al (%)	4.27	6.11	6.18	7.76	7.53	7.67	7.88	7.99
Sb (ppm)	0.7	2.4	1	1	0.9	2.9	0.9	1.1
Ba (ppm)	400	380	460	490	500	490	490	510
Be (ppm)	1	1.8	1.6	2.2	2.1	2.4	2.25	2.55
Bi (ppm)	0.17	0.84	0.26	0.34	0.32	0.34	0.35	0.37
Cd (ppm)	0.18	0.6	0.34	0.24	0.22	0.24	0.22	0.2
Ca (%)	0.63	1.06	0.82	0.65	0.81	0.61	0.66	0.54
Ce (ppm)	46.6	66.6	64.5	76	71.5	75.9	78.5	79
Cs (ppm)	2.8	5.4	4.6	6.4	6.1	6.2	6.65	6.65
Cr (ppm)	35	63	50	70	70	72	72	74
Co (ppm)	9.8	12.6	11.6	15.2	14.6	14.4	15.2	15.2
Cu (ppm)	12	80	26	38	30	32	33	36
Ga (ppm)	10.5	15.9	16	20.8	20	19.8	21	21.2
Ge (ppm)	1.5	2	1.8	2	1.9	2	2.1	2
Fe (%)	2.61	4.07	3.21	3.97	4.04	3.99	4.15	4.13
La (ppm)	22	31	31	37	34.5	36	38	38
Pb (ppm)	26	195	45	46.5	41	55	48	52
Li (ppm)	29	51	45.8	56.8	56	56.4	60	61.4
Mg (%)	0.65	1.26	0.97	1.08	1.12	1.07	1.09	1.16
Mn (ppm)	335	430	435	615	695	590	610	600
Mo (ppm)	1	4.4	2	2.4	1.6	2.6	1.8	2.4
Ni (ppm)	16.6	27.8	23.6	31.8	31.8	32	33.2	33.2
Nb (ppm)	5.6	9	9.4	11.4	10.6	11.6	12	12.8
P (ppm)	590	1030	910	760	1410	850	930	890
K (%)	1.21	1.88	1.8	2.07	2.07	2.09	2.14	2.2
Rb (ppm)	58.4	92.8	89	111.5	106	106.5	115	114.5
Ag (ppm)	0.3	1.7	0.6	0.65	0.55	0.7	0.6	0.75
Na (ppm)	1.14	2.19	1.45	1.99	2.06	1.51	1.83	2.16
Sr (ppm)	93.1	129	122	144.5	143.5	134.5	142	143.5
Ta (ppm)	0.2	0.35	0.4	0.5	0.4	0.5	0.5	0.55
Te (ppm)	0.05	0.15	0.1	0.1	0.05	0.15	0.1	0.15
Tl (ppm)	0.5	0.76	0.62	0.64	0.62	0.62	0.66	0.68
Th (ppm)	7.2	10	9.4	12	11.4	11.8	12.4	12.2
Ti (%)	0.2	0.28	0.29	0.34	0.31	0.35	0.34	0.37
W (ppm)	0.7	1.2	1.1	1.3	1.2	1.3	1.3	1.5
U (ppm)	1.8	3.6	2.6	3.4	3	3.6	3.2	3.6
V (ppm)	81	109	92	121	119	121	120	124
Y (ppm)	13.8	22.2	17.9	19.9	18.9	20.2	20.1	20.8
Zn (ppm)	66	238	102	112	104	132	116	128

Table 4: Mean trace metal concentrations in Sydney Harbour, all areas (n=89).

Analysis	Background Level	Mean	Min	Max
As (ppm)	20*	17.55	1.00	39.00
Hg (ppb)	100*	136.74	10.00	1350.00
Al (%)		6.41	1.17	8.51
Sb (ppm)		1.35	0.40	4.30
Ba (ppm)		389.10	120.00	590.00
Be (ppm)		1.94	0.65	2.95
Bi (ppm)		0.60	0.08	2.91
Cd (ppm)	0.3*	0.66	0.02	4.18
Ca (%)		0.86	0.30	5.40
Ce (ppm)		65.54	17.95	102.00
Cs (ppm)		5.55	0.80	8.35
Cr (ppm)	60**	62.15	14.00	103.00
Co (ppm)		12.77	4.20	18.80
Cu (ppm)	40*	50.71	7.00	375.00
Ga (ppm)		16.79	3.20	24.00
Ge (ppm)		1.86	1.00	2.90
Fe (%)		3.81	1.15	6.26
La (ppm)		31.24	8.50	47.00
Pb (ppm)	40*	107.83	15.50	620.00
Li (ppm)		51.48	14.40	74.60
Mg (%)		1.12	0.27	1.53
Mn (ppm)		450.45	170.00	965.00
Mo (ppm)		5.42	0.60	18.40
Ni (ppm)	20**	28.69	6.80	44.60
Nb (ppm)		8.80	1.20	13.40
P (ppm)		987.98	270.00	3310.00
K (%)		1.85	0.20	2.40
Rb (ppm)		93.14	9.40	140.50
Ag (ppm)		1.07	0.15	8.70
Na (ppm)		2.25	0.61	5.06
Sr (ppm)		241.09	45.40	10000.00
Ta (ppm)		0.36	0.05	0.55
Te (ppm)		0.11	0.05	0.35
Tl (ppm)		0.67	0.22	1.38
Th (ppm)		10.06	2.20	15.00
Ti (%)		0.27	0.07	0.37
W (ppm)		1.27	0.30	10.00
U (ppm)		3.57	1.00	6.00
V (ppm)		107.22	28.00	145.00
Y (ppm)		20.30	7.90	35.80
Zn (ppm)	150*	185.64	46.00	874.00

* estimated from Loring et al., 1996

** estimated from Loring et al., 1998

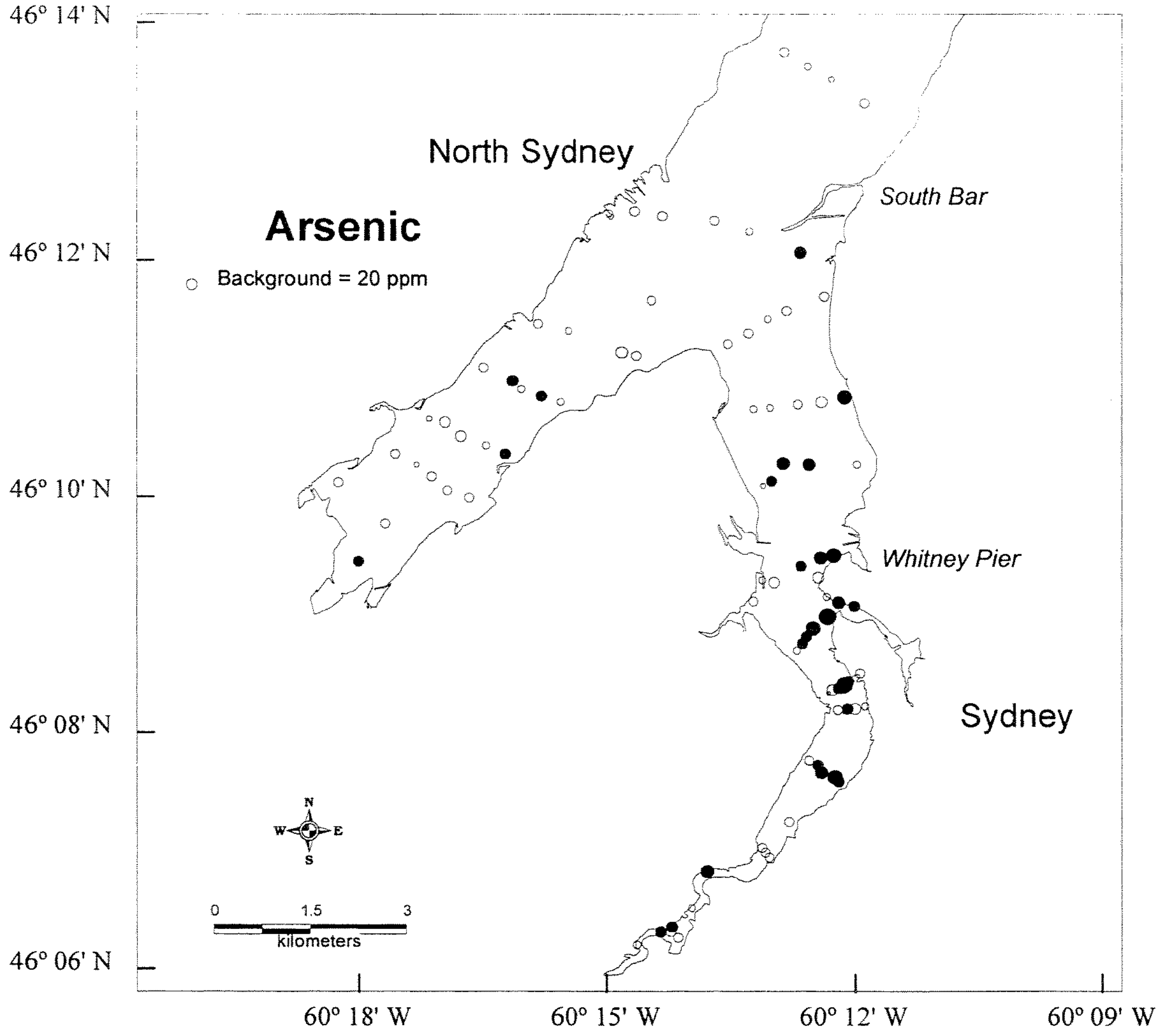


Figure 5a: Concentration of Arsenic (ppm) within surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the concentration - open circles represent concentrations at or below baseline values and closed circles represent concentrations above baseline values.

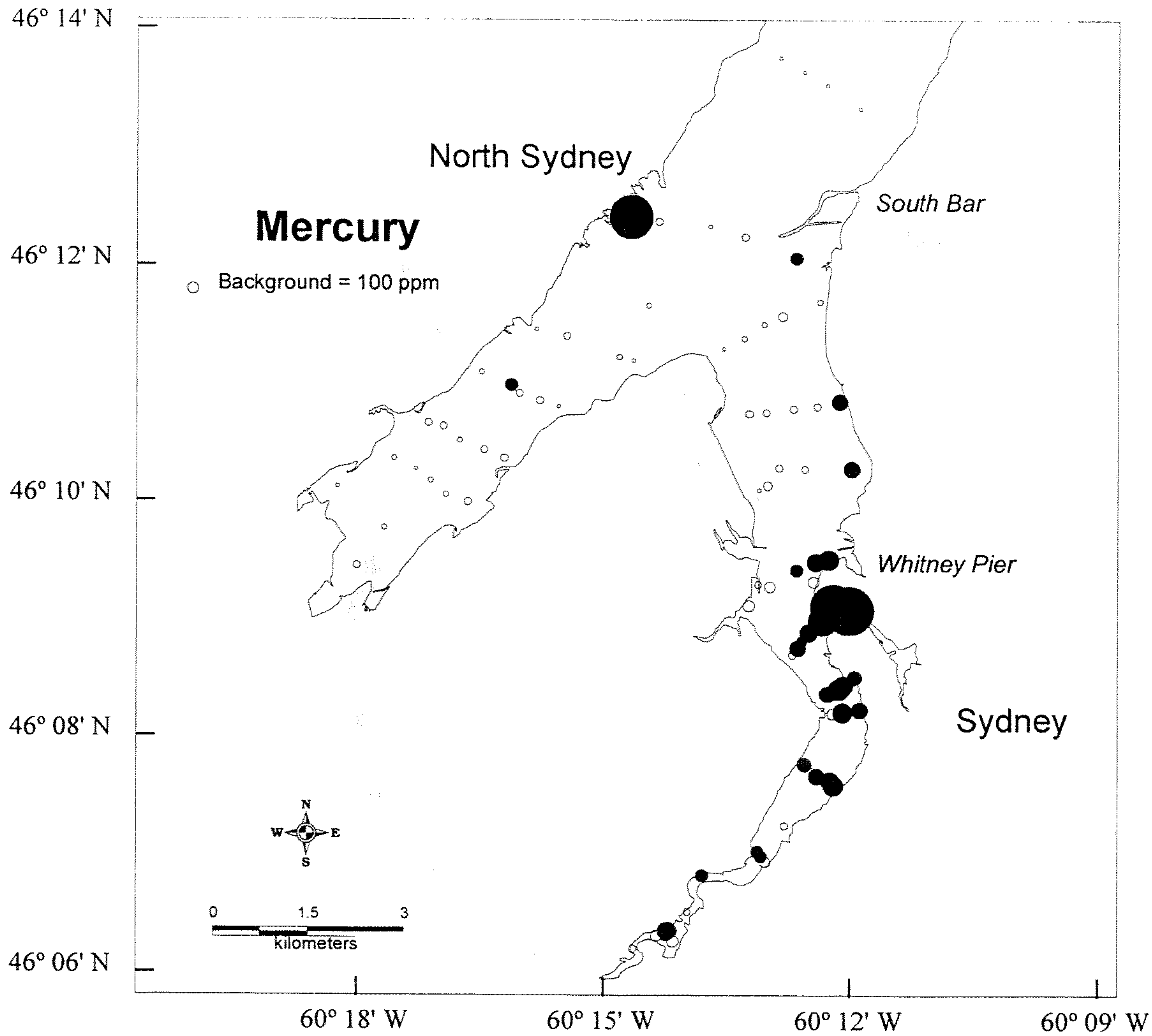


Figure 5b: Concentration of Mercury (ppm) within surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the concentration - open circles represent concentrations at or below baseline values and closed circles represent concentrations above baseline values.

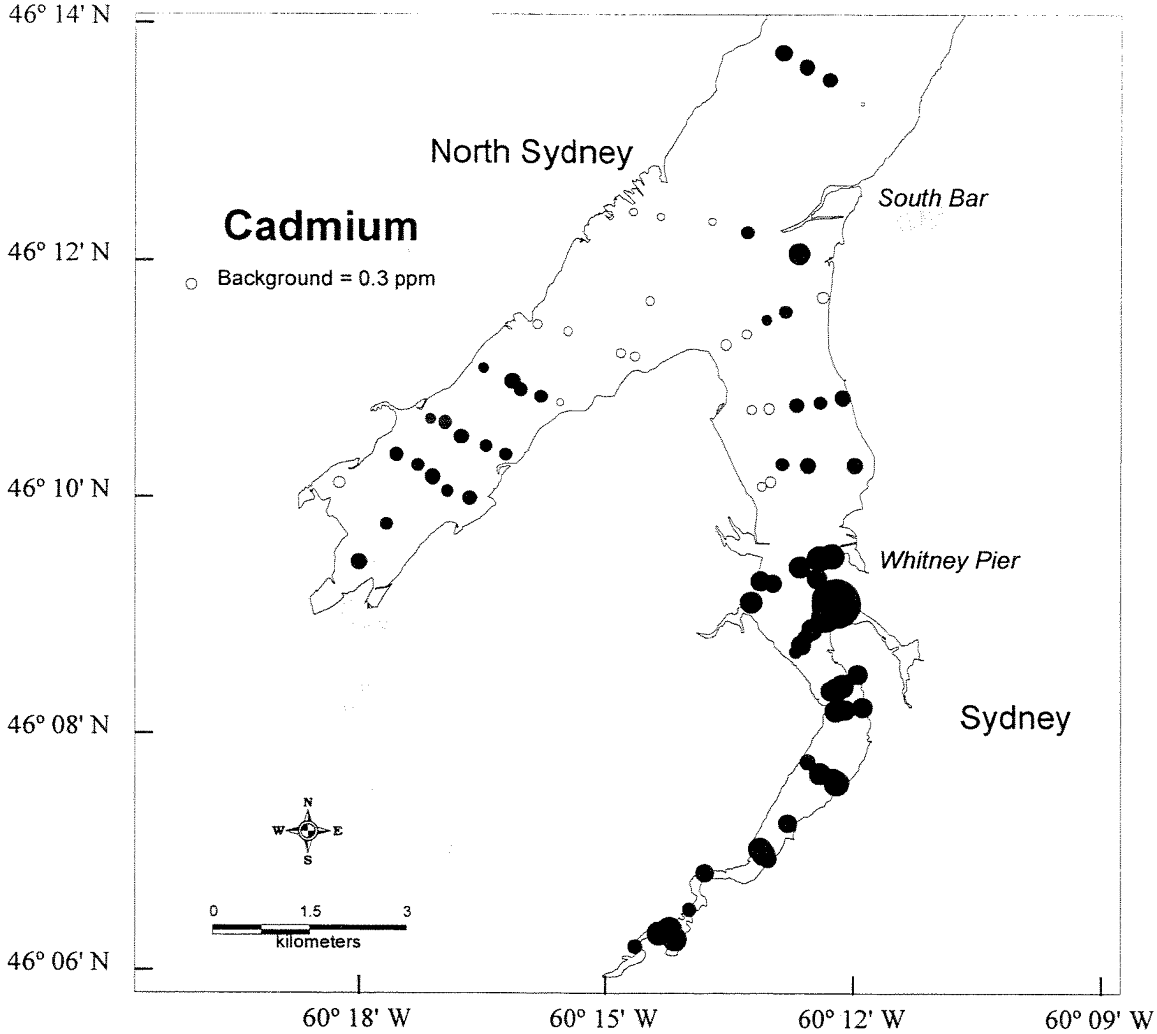


Figure 5c: Concentration of Cadmium (ppm) within surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the concentration - open circles represent concentrations at or below baseline values and closed circles represent concentrations above baseline values.

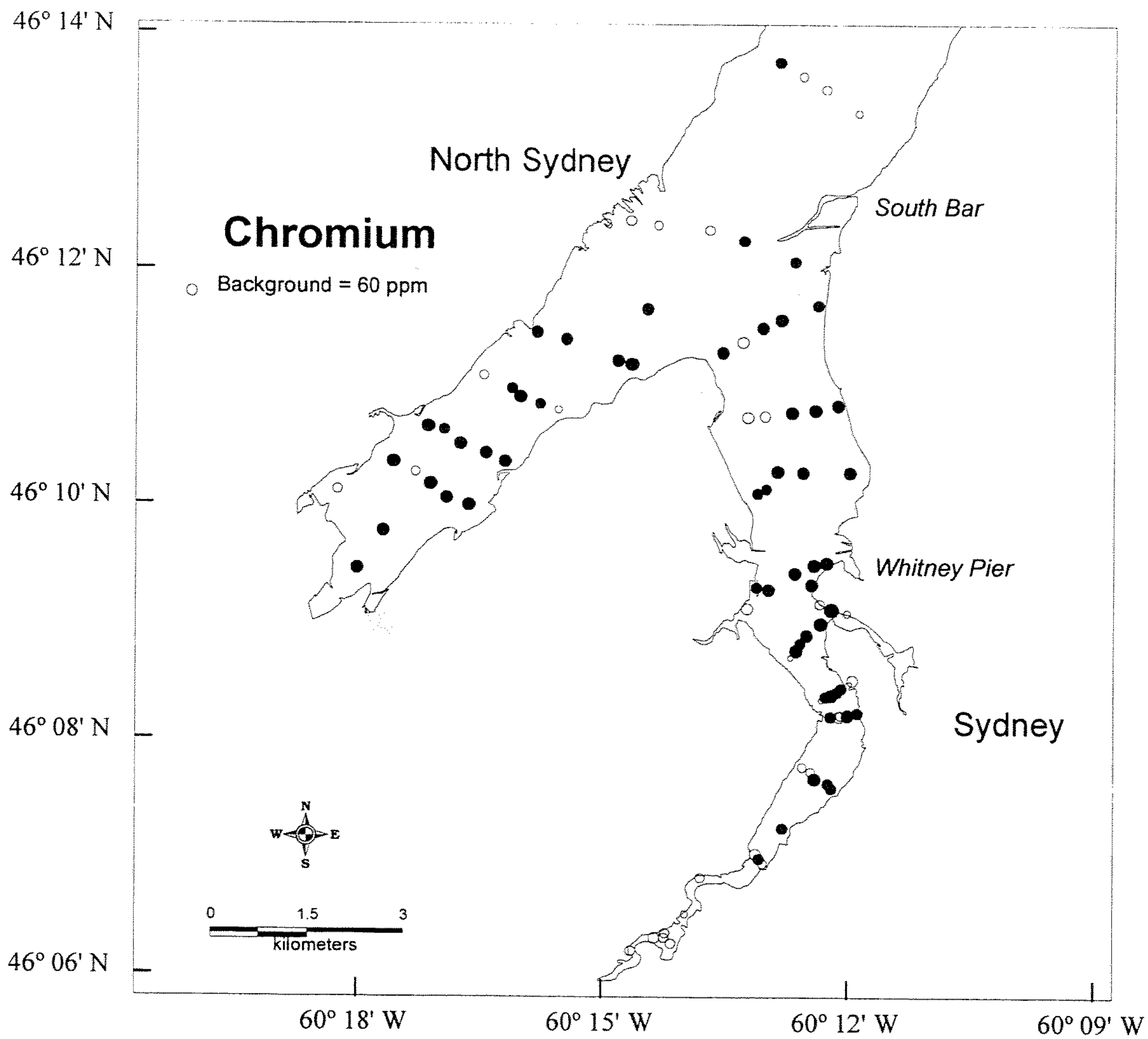


Figure 5d: Concentration of Chromium (ppm) within surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the concentration - open circles represent concentrations at or below baseline values and closed circles represent concentrations above baseline values.

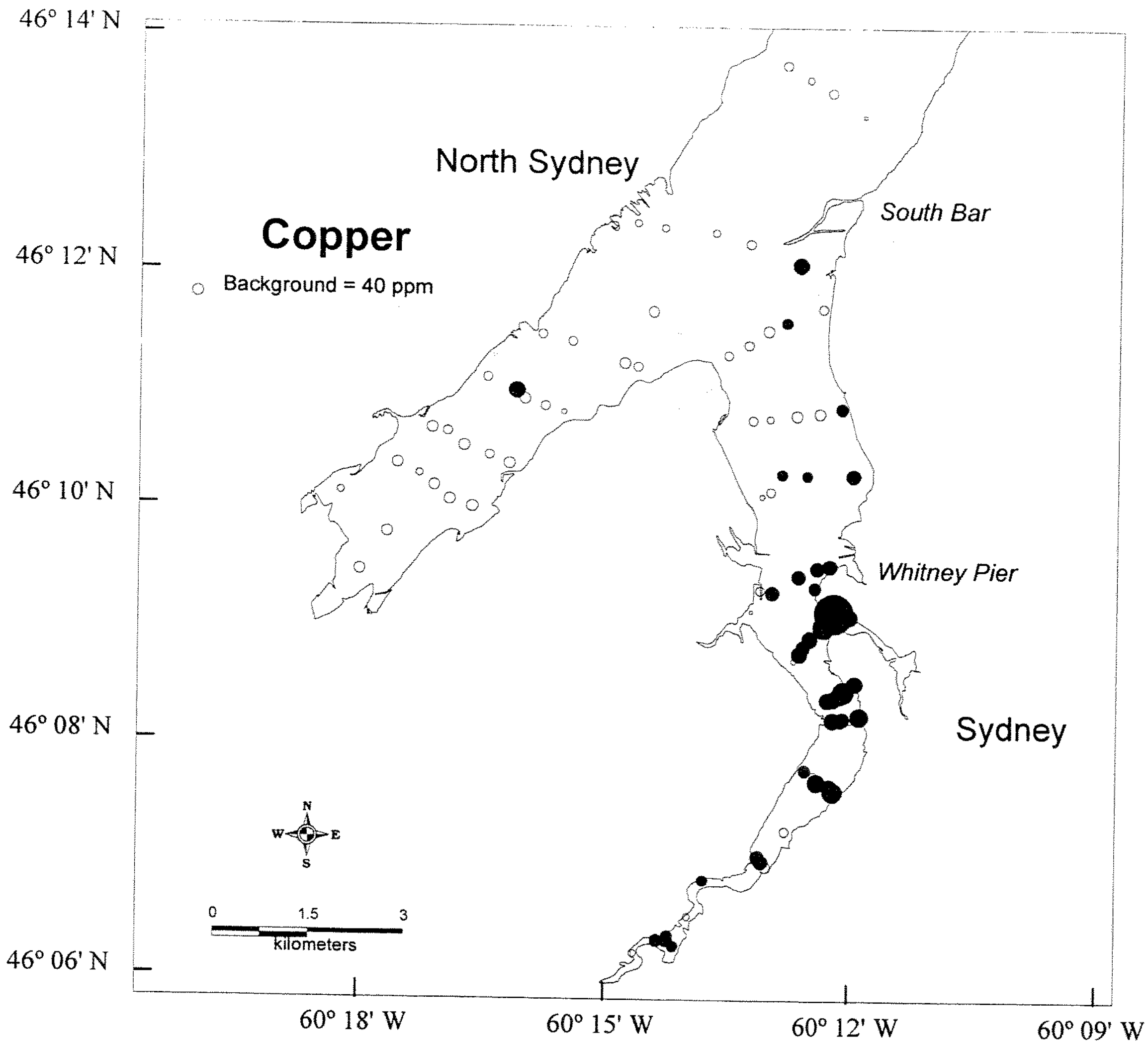


Figure 5e: Concentration of Copper (ppm) within surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the concentration - open circles represent concentrations at or below baseline values and closed circles represent concentrations above baseline values.

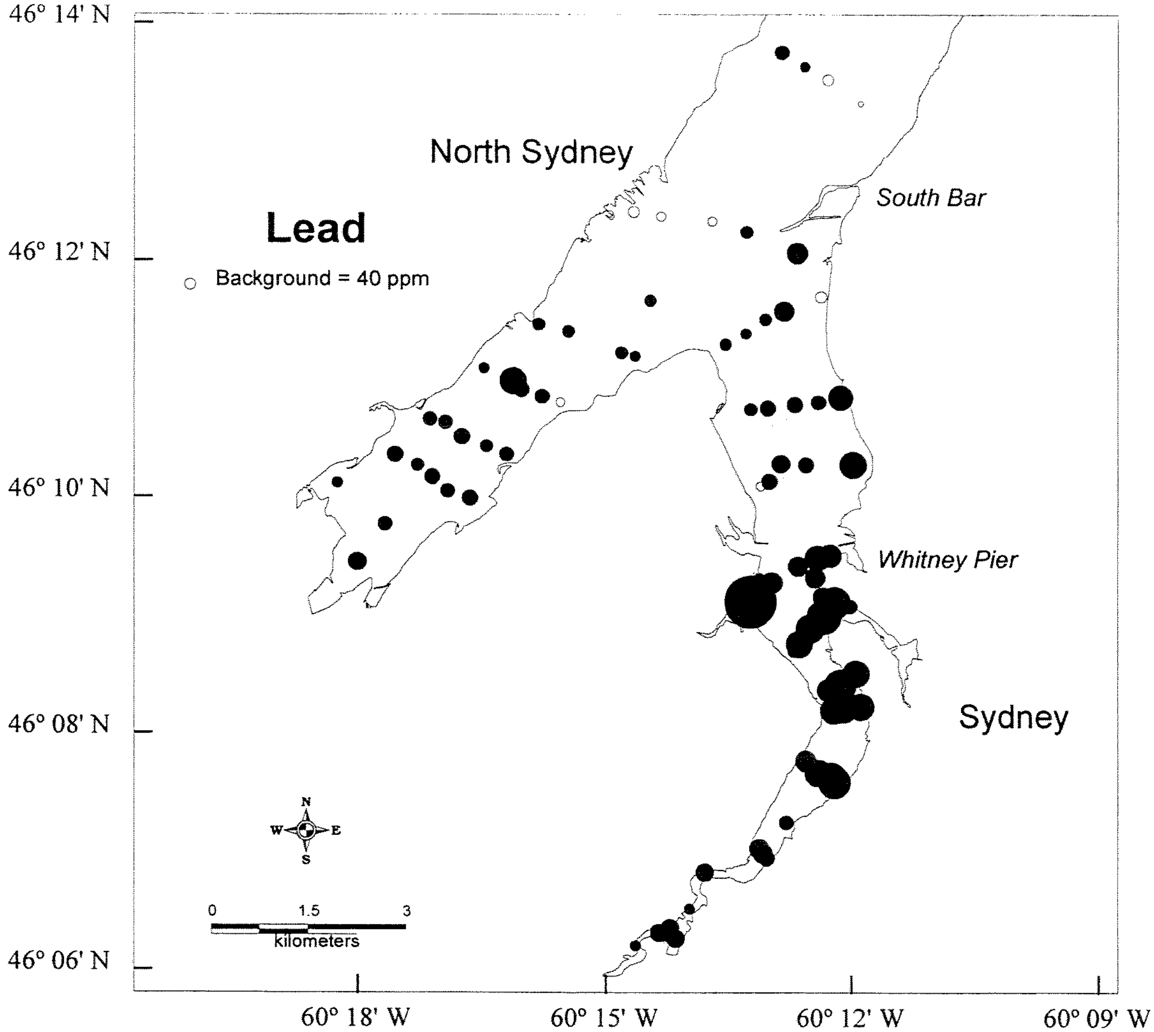


Figure 5f: Concentration of Lead (ppm) within surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the concentration - open circles represent concentrations at or below baseline values and closed circles represent concentrations above baseline values.

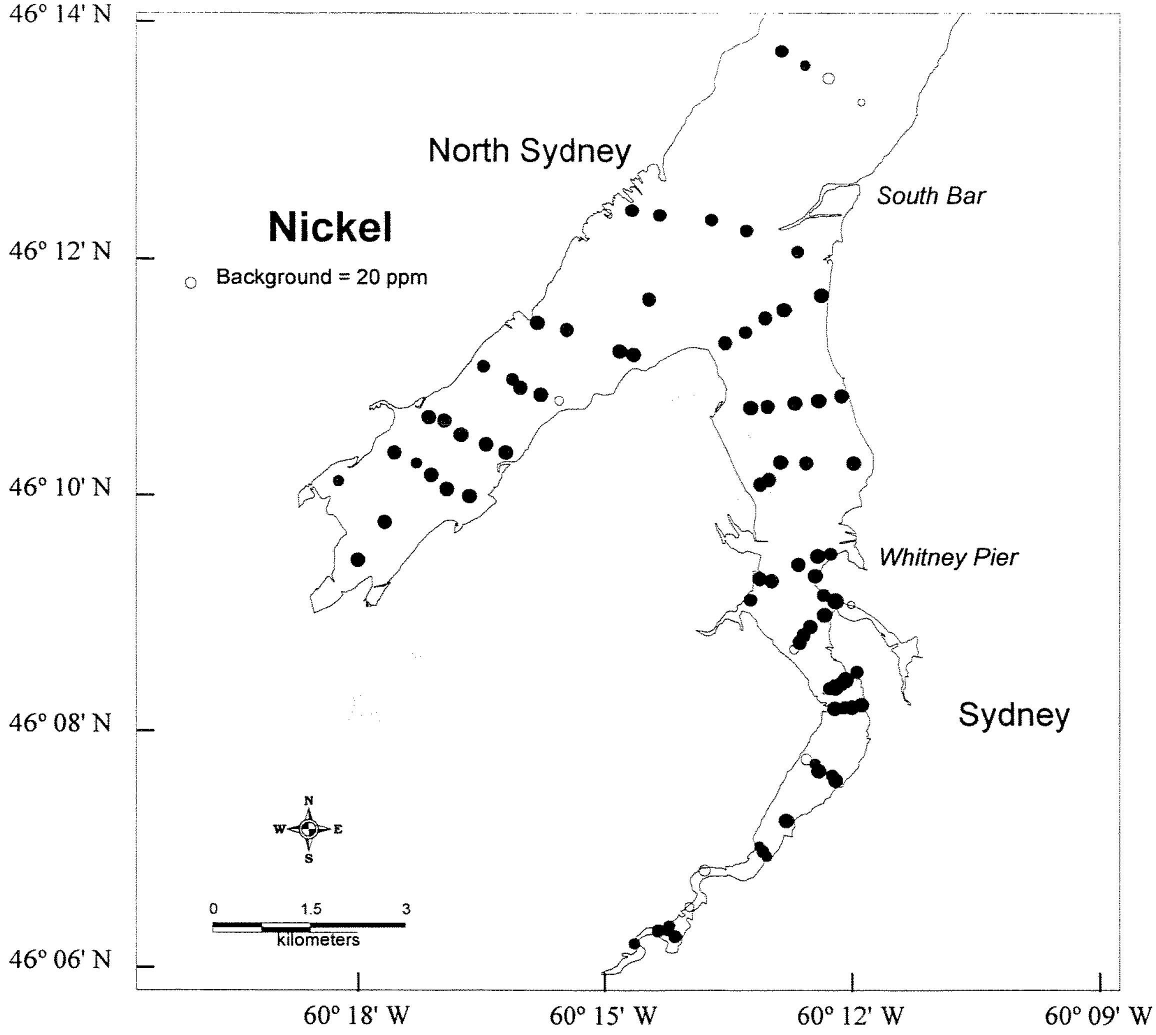


Figure 5g: Concentration of Nickel (ppm) within surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the concentration - open circles represent concentrations at or below baseline values and closed circles represent concentrations above baseline values.

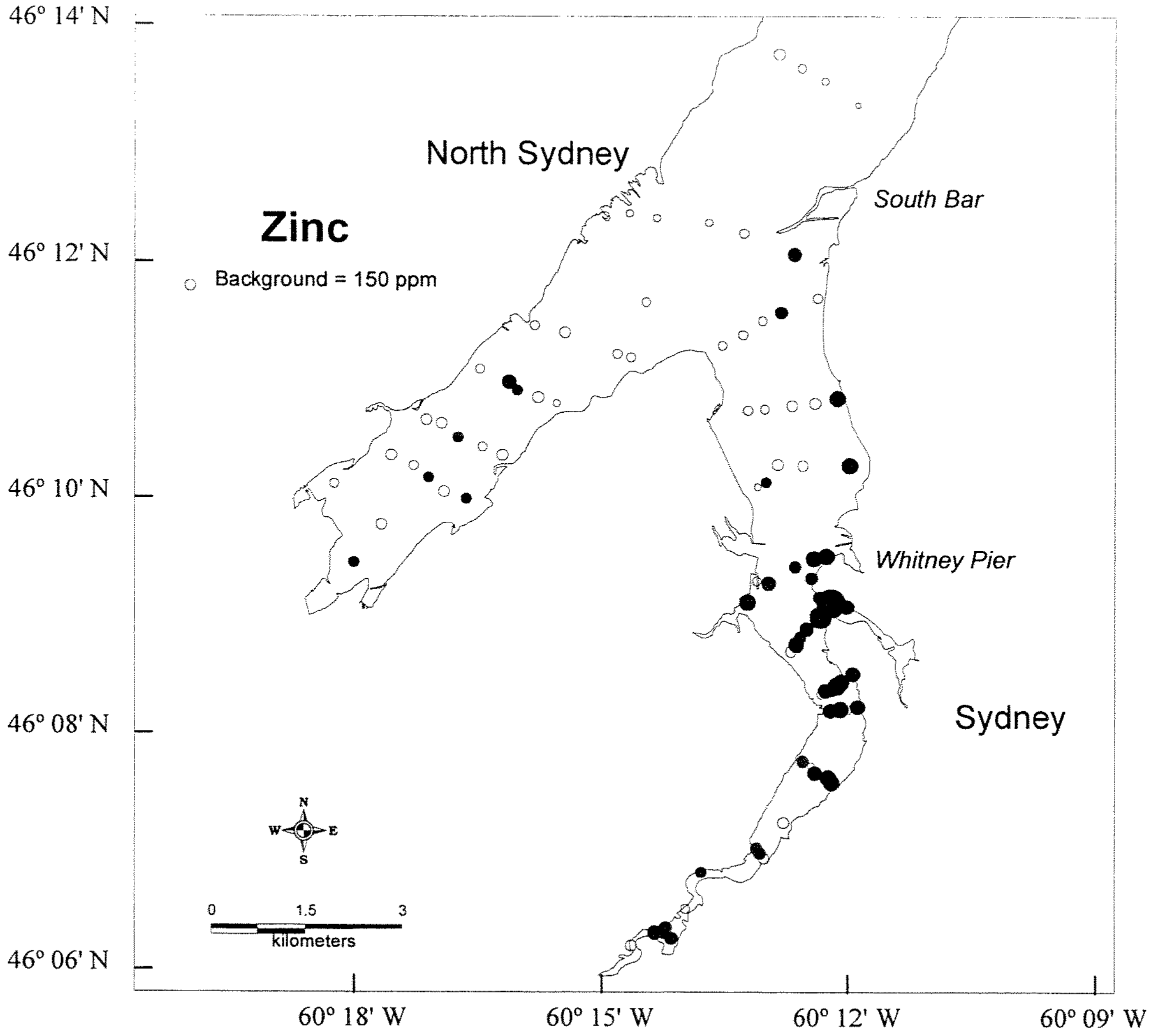


Figure 5h: Concentration of Zinc (ppm) within surficial sediments collected in Sydney harbour, Nova Scotia, October 1999. The size of the symbol is scaled proportionally to the concentration - open circles represent concentrations at or below baseline values and closed circles represent concentrations above baseline values.

Table 5: Statistical analysis of trace metal concentrations for Sydney River and South Arm (areas 1 and 2), Sydney Harbour, NS.

Variable Name	Sample Size	Mean	Sample Std Dev	Sample Variance	Coeff. of Variation
< 63	53	89.76	20.50	420.07	0.23
As	53	18.98	8.18	66.94	0.43
Hg (ppb)	53	176.60	247.56	61288.24	1.40
Al (%)	53	6.12	1.47	2.17	0.24
Sb	53	1.52	0.76	0.58	0.50
Ba	53	361.13	86.79	7533.31	0.24
Be	53	1.93	0.48	0.23	0.25
Bi	53	0.70	0.46	0.22	0.66
Cd	53	0.81	0.60	0.36	0.74
Ca (%)	53	0.98	0.80	0.65	0.82
Ce	53	64.29	14.04	197.05	0.22
Cs	53	5.38	1.45	2.10	0.27
Cr	53	62.34	17.64	311.27	0.28
Co	53	12.60	2.75	7.58	0.22
Cu	53	61.36	52.50	2755.89	0.86
Ga	53	16.02	4.21	17.68	0.26
Ge	53	1.85	0.38	0.15	0.21
Fe (%)	53	3.94	1.02	1.04	0.26
La	53	30.50	6.53	42.65	0.21
Pb	53	124.50	70.57	4979.55	0.57
Li	53	50.25	11.61	134.68	0.23
Mg (%)	53	1.13	0.24	0.06	0.21
Mn	53	426.04	104.83	10988.81	0.25
Mo	53	6.26	3.76	14.11	0.60
Ni	53	28.69	7.31	53.50	0.25
Nb	53	8.16	2.06	4.25	0.25
P	53	1053.02	443.81	196971.50	0.42
K (%)	53	1.78	0.40	0.16	0.23
Rb	53	89.09	22.05	486.32	0.25
Ag	53	1.30	1.21	1.47	0.94
Na (%)	53	2.33	0.81	0.65	0.35
Sr	53	130.61	25.60	655.22	0.20
Ta	53	0.32	0.11	0.01	0.34
Te	53	0.13	0.08	0.01	0.68
Tl	53	0.68	0.18	0.03	0.26
Th	53	9.74	2.09	4.37	0.21
Ti (%)	53	0.25	0.05	0.00	0.21
W	53	1.18	0.35	0.13	0.30
U	53	3.65	1.03	1.06	0.28
V	53	105.72	27.83	774.32	0.26
Y	53	20.76	4.69	21.97	0.23
Zn	53	217.81	124.39	15473.43	0.57

Note: concentrations are ppm unless otherwise indicated.

Table 6: Geochemical interpretation of metal data from Sydney River and South Arm (areas 1 and 2), Sydney Harbour, NS (n=53, p≤0.001).

Varimax Matrix For Area 1+2			88.96%			
Factor	1	2	3	4	5	6
	45.70%	24.20%	3.64%	3.74%	6.62%	5.06%
< 63	0.67	*	*	*	*	*
As	*	0.48	0.44	*	*	*
Hg (ppb)	*	0.76	*	*	*	*
Al (%)	0.92		*	*	*	*
Sb	*	0.76	*	*	*	*
Ba	0.87	*	*	*	*	*
Be	0.86	*	*	*	*	*
Bi	*	0.90	*	*	*	*
Cd	*	0.91	*	*	*	*
Ca (%)	*	*	*	0.91	*	*
Ce	0.91	*	*	*	*	*
Cs	0.91	*	*	*	*	*
Cr	0.74	0.51	*	*	*	*
Co	0.95	*	*	*	*	*
Cu	*	0.97	*	*	*	*
Ga	0.97	*	*	*	*	*
Ge	0.7	*	*	*	*	*
Fe (%)	0.6	0.5	*	*	*	*
La	0.94	*	*	*	*	*
Pb	*	0.68	*	*	*	0.61
Li	0.89	*	*	*	*	*
Mg (%)	0.63	*	*	*	-0.59	*
Mn	0.55	*	0.58	*		*
Mo	*	0.46	-0.52	*	-0.49	*
Ni	0.89	*	*	*	*	*
Nb	0.97	*	*	*	*	*
P	*	0.86	*	*	*	*
K	0.88	*	*	*	*	*
Rb	0.95	*	*	*	*	*
Ag	*	0.97	*	*	*	*
Na (%)	0.41	*	*	*	-0.81	*
Sr	0.52	*	*	0.67	*	*
Ta	0.92	*	*	*	*	*
Te	*	0.58	*	*	*	0.70
Tl	0.51	0.73	*	*	*	*
Th	0.97	*	*	*	*	*
Ti (%)	0.94	*	*	*	*	*
W	0.54	0.78	*	*	*	*
U	0.62	*	*	*	*	*
V	0.84	*	*	*	*	*
Y	0.65	0.50	*	*	*	*
Zn	*	0.94	*	*	*	*

Note: concentrations are ppm unless otherwise indicated.

Table 7: Statistical analysis of trace metal concentrations for the Outer Harbour and North West Arm (areas 3 and 4), Sydney Harbour, NS.

Variable Name	Sample Size	Mean	Sample Std Dev	Sample Variance	Coeff. of Variation
< 63	33	89.9	20.43	417.21	0.23
As	33	15.1	5.00	25.05	0.33
Hg (ppb)	33	70.6	197.44	38980.87	2.80
Al (%)	33	6.9	1.27	1.62	0.18
Sb	33	1.0	0.46	0.22	0.43
Ba	33	436.9	56.82	3228.03	0.13
Be	33	1.9	0.41	0.17	0.21
Bi	33	0.3	0.18	0.03	0.49
Cd	33	0.3	0.19	0.04	0.49
Ca (%)	33	0.6	0.16	0.03	0.24
Ce	33	68.0	9.98	99.55	0.15
Cs	33	5.8	1.46	2.14	0.25
Cr	33	62.2	14.08	198.31	0.23
Co	33	13.2	2.15	4.63	0.16
Cu	33	33.4	14.64	214.44	0.44
Ga	33	18.1	3.65	13.32	0.20
Ge	33	1.9	0.23	0.05	0.12
Fe (%)	33	3.6	0.63	0.40	0.17
La	33	32.7	4.63	21.42	0.14
Pb	33	61.9	33.52	1123.62	0.54
Li	33	53.7	11.60	134.57	0.22
Mg (%)	33	1.1	0.26	0.07	0.23
Mn	33	500.1	144.23	20802.32	0.29
Mo	33	3.8	2.34	5.49	0.61
Ni	33	28.8	6.06	36.76	0.21
Nb	33	9.9	2.00	3.98	0.20
P	33	892.7	215.32	46364.20	0.24
K	33	1.9	0.35	0.12	0.18
Rb	33	100.4	20.18	407.43	0.20
Ag	33	0.6	0.35	0.13	0.52
Na (%)	33	2.1	0.77	0.59	0.36
Sr	33	131.1	16.80	282.17	0.13
Ta	33	0.4	0.09	0.01	0.22
Te	33	0.0	0.04	0.00	0.55
Tl	33	0.6	0.12	0.02	0.19
Th	33	10.7	1.59	2.52	0.15
Ti (%)	33	0.3	0.05	0.00	0.17
W	33	1.1	0.23	0.05	0.20
U	33	3.3	0.80	0.64	0.24
V	33	109.9	24.34	592.66	0.22
Y	33	19.6	2.57	6.60	0.13
Zn	33	126.4	39.97	1597.26	0.32

Note: concentrations are ppm unless otherwise indicated.

Table 6: Geochemical interpretation of metal data from Sydney River and South Arm (areas 1 and 2), Sydney Harbour, NS (n=53, p≤0.001).

Varimax Matrix For Area 1+2			88.96%			
Factor	1	2	3	4	5	6
	45.70%	24.20%	3.64%	3.74%	6.62%	5.06%
< 63	0.67	*	*	*	*	*
As	*	0.48	0.44	*	*	*
Hg (ppb)	*	0.76	*	*	*	*
Al (%)	0.92		*	*	*	*
Sb	*	0.76	*	*	*	*
Ba	0.87	*	*	*	*	*
Be	0.86	*	*	*	*	*
Bi	*	0.90	*	*	*	*
Cd	*	0.91	*	*	*	*
Ca (%)	*	*	*	0.91	*	*
Ce	0.91	*	*	*	*	*
Cs	0.91	*	*	*	*	*
Cr	0.74	0.51	*	*	*	*
Co	0.95	*	*	*	*	*
Cu	*	0.97	*	*	*	*
Ga	0.97	*	*	*	*	*
Ge	0.7	*	*	*	*	*
Fe (%)	0.6	0.5	*	*	*	*
La	0.94	*	*	*	*	*
Pb	*	0.68	*	*	*	0.61
Li	0.89	*	*	*	*	*
Mg (%)	0.63	*	*	*	-0.59	*
Mn	0.55	*	0.58	*		*
Mo	*	0.46	-0.52	*	-0.49	*
Ni	0.89	*	*	*	*	*
Nb	0.97	*	*	*	*	*
P	*	0.86	*	*	*	*
K	0.88	*	*	*	*	*
Rb	0.95	*	*	*	*	*
Ag	*	0.97	*	*	*	*
Na (%)	0.41	*	*	*	-0.81	*
Sr	0.52	*	*	0.67	*	*
Ta	0.92	*	*	*	*	*
Te	*	0.58	*	*	*	0.70
Tl	0.51	0.73	*	*	*	*
Th	0.97	*	*	*	*	*
Ti (%)	0.94	*	*	*	*	*
W	0.54	0.78	*	*	*	*
U	0.62	*	*	*	*	*
V	0.84	*	*	*	*	*
Y	0.65	0.50	*	*	*	*
Zn	*	0.94	*	*	*	*

Note: concentrations are ppm unless otherwise indicated.

Table 7: Statistical analysis of trace metal concentrations for the Outer Harbour and North West Arm (areas 3 and 4), Sydney Harbour, NS.

Variable Name	Sample Size	Mean	Sample Std Dev	Sample Variance	Coeff. of Variation
< 63	33	89.9	20.43	417.21	0.23
As	33	15.1	5.00	25.05	0.33
Hg (ppb)	33	70.6	197.44	38980.87	2.80
Al (%)	33	6.9	1.27	1.62	0.18
Sb	33	1.0	0.46	0.22	0.43
Ba	33	436.9	56.82	3228.03	0.13
Be	33	1.9	0.41	0.17	0.21
Bi	33	0.3	0.18	0.03	0.49
Cd	33	0.3	0.19	0.04	0.49
Ca (%)	33	0.6	0.16	0.03	0.24
Ce	33	68.0	9.98	99.55	0.15
Cs	33	5.8	1.46	2.14	0.25
Cr	33	62.2	14.08	198.31	0.23
Co	33	13.2	2.15	4.63	0.16
Cu	33	33.4	14.64	214.44	0.44
Ga	33	18.1	3.65	13.32	0.20
Ge	33	1.9	0.23	0.05	0.12
Fe (%)	33	3.6	0.63	0.40	0.17
La	33	32.7	4.63	21.42	0.14
Pb	33	61.9	33.52	1123.62	0.54
Li	33	53.7	11.60	134.57	0.22
Mg (%)	33	1.1	0.26	0.07	0.23
Mn	33	500.1	144.23	20802.32	0.29
Mo	33	3.8	2.34	5.49	0.61
Ni	33	28.8	6.06	36.76	0.21
Nb	33	9.9	2.00	3.98	0.20
P	33	892.7	215.32	46364.20	0.24
K	33	1.9	0.35	0.12	0.18
Rb	33	100.4	20.18	407.43	0.20
Ag	33	0.6	0.35	0.13	0.52
Na (%)	33	2.1	0.77	0.59	0.36
Sr	33	131.1	16.80	282.17	0.13
Ta	33	0.4	0.09	0.01	0.22
Te	33	0.0	0.04	0.00	0.55
Tl	33	0.6	0.12	0.02	0.19
Th	33	10.7	1.59	2.52	0.15
Ti (%)	33	0.3	0.05	0.00	0.17
W	33	1.1	0.23	0.05	0.20
U	33	3.3	0.80	0.64	0.24
V	33	109.9	24.34	592.66	0.22
Y	33	19.6	2.57	6.60	0.13
Zn	33	126.4	39.97	1597.26	0.32

Note: concentrations are ppm unless otherwise indicated.

Table 8: Geochemical interpretation of metal data from the Outer Harbour and North West Arm (areas 3 and 4), Sydney Harbour, NS (n=33, p≤0.001).

Varimax Matrix For Area 3+4		91.17%				
Factor	1	2	3	4	5	6
	50.5%	24.51%	4.59%	4.34%	3.41%	3.82%
< 63	0.63	*	*	*	*	*
As	*	0.64	0.46	*	*	*
Hg (ppb)	*		*	-0.92*	*	*
Al (%)	0.95		*	*	*	*
Sb	*	*	*	*	*	-0.73
Ba	0.83	*	*	*	*	*
Be	0.92	*	*	*	*	*
Bi	*	0.93	*	*	*	*
Cd	*	0.84	*	*	*	*
Ca (%)	*	*	*	*	0.90	*
Ce	0.92	*	*	*	*	*
Cs	0.91	*	*	*	*	*
Cr	0.92	0.51	*	*	*	*
Co	0.97	*	*	*	*	*
Cu	*	0.89	*	*	*	*
Ga	0.97	*	*	*	*	*
Ge	0.77	*	*	*	*	*
Fe (%)	0.87	*	*	*	*	*
La	0.94	*	*	*	*	*
Pb	*	0.87	*	*	*	*
Li	0.91	*	*	*	*	*
Mg (%)	0.60	0.61	*	*	*	*
Mn		*	0.87	*		*
Mo	*	0.82	*	*	*	*
Ni	0.94	*	*	*	*	*
Nb	0.94	*	*	*	*	*
P	*	0.49	*	*	*	*
K	0.89	*	*	*	*	*
Rb	0.95	*	*	*	*	*
Ag	*	0.90	*	*	*	*
Na (%)		*	*	*	*	*
Sr	0.84	*	*	*	*	*
Ta	0.91	*	*	*	*	*
Te	*	0.53	*	*	*	-0.52
Tl	0.72	0.55	*	*	*	*
Th	0.97	*	*	*	*	*
Ti (%)	0.90	*	*	*	*	*
W	0.84	*	*	*	*	*
U	0.65	0.62	*	*	*	*
V	0.85	*	*	*	*	*
Y	0.76	0.57	*	*	*	*
Zn	*	0.87	*	*	*	*

Note: concentrations are ppm unless otherwise indicated.

APPENDIX I. Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (μm)	1	2	3	4	5	6	7	10	11
0.87	1.40	2.62	1.93	2.49	2.96	1.53	3.44	2.12	3.33
1.00	1.42	2.62	1.91	2.46	2.96	1.50	3.35	2.04	3.17
1.15	1.45	2.68	2.19	2.52	3.01	1.52	3.50	2.13	3.24
1.32	1.49	2.71	2.14	2.56	3.08	1.56	3.48	2.20	3.34
1.52	1.50	2.79	2.01	2.57	3.16	1.55	3.40	2.30	3.46
1.74	1.52	2.81	2.01	2.54	3.16	1.53	3.59	2.42	3.50
2.00	1.59	2.91	2.15	2.58	3.25	1.68	3.58	2.59	3.62
2.30	1.70	2.93	2.10	2.74	3.20	1.74	3.66	2.67	3.75
2.64	1.79	2.91	2.15	2.81	3.34	1.82	3.67	2.87	3.92
3.03	1.93	3.07	2.20	2.69	3.25	1.90	3.87	2.93	3.87
3.48	2.04	2.99	2.13	2.73	3.30	1.89	3.82	2.91	4.28
4.00	2.21	2.70	2.22	2.88	3.21	2.01	3.91	2.92	4.40
4.59	2.22	3.29	2.14	2.79	3.18	1.90	3.69	2.80	4.00
5.28	2.31	3.44	2.16	2.87	2.94	1.86	3.55	2.69	3.85
6.06	2.50	3.38	2.16	2.82	2.94	1.94	3.52	2.67	3.70
6.96	2.68	3.32	2.21	2.78	2.85	1.85	3.39	2.67	3.59
8.00	2.88	3.26	2.31	2.66	2.75	1.98	3.42	2.53	3.48
9.19	3.11	3.28	2.35	2.53	2.81	1.92	3.23	2.44	3.34
10.56	3.52	3.20	2.42	2.62	2.72	1.93	3.27	2.38	3.29
12.13	4.01	3.43	2.58	2.61	2.66	2.07	3.27	2.28	3.02
13.93	4.18	3.35	2.76	2.80	2.77	2.56	3.18	2.30	2.93
16.00	4.46	3.34	3.03	2.73	2.82	2.22	3.41	2.15	2.83
18.38	5.03	3.73	2.95	2.77	2.82	2.54	3.22	2.41	2.87
21.11	5.43	4.39	3.27	3.16	3.03	2.80	3.31	2.08	2.85
24.25	5.85	4.70	3.67	3.60	3.12	3.03	3.17	1.89	2.99
27.86	5.94	4.39	3.46	3.74	3.31	3.17	3.04	2.31	3.23
32.00	5.37	4.17	3.76	4.03	3.32	3.51	2.73	2.68	4.33
36.76	4.71	3.48	4.30	4.16	3.47	3.64	2.14	2.80	2.02
42.22	3.78	2.91	4.10	4.29	3.34	3.82	1.82	2.92	2.52
48.50	3.40	2.06	4.53	3.77	3.02	4.16	1.46	3.07	1.27
55.72	2.21	1.53	3.86	3.89	2.85	3.92	0.94	3.19	--
64.00	1.86	0.78	4.06	2.91	2.16	4.54	0.57	3.63	--
73.52	1.54	0.44	4.31	2.40	1.53	4.71	0.41	4.08	--
84.45	1.10	0.39	3.81	1.45	0.74	4.61	--	3.98	--
97.01	1.87	--	2.22	1.03	0.72	4.62	--	3.75	--
111.43	--	--	2.45	--	0.25	3.76	--	2.91	--
128.00	--	--	--	--	--	2.99	--	2.16	--
147.03	--	--	--	--	--	2.11	--	1.12	--
168.90	--	--	--	--	--	1.62	--	--	--
194.01	--	--	--	--	--	--	--	--	--
222.86	--	--	--	--	--	--	--	--	--
256.00	--	--	--	--	--	--	--	--	--
294.07	--	--	--	--	--	--	--	--	--
337.79	--	--	--	--	--	--	--	--	--
388.02	--	--	--	--	--	--	--	--	--
445.72	--	--	--	--	--	--	--	--	--
512.00	--	--	--	--	--	--	--	--	--

APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # / Diameter (μm)	12	13	13	14	15	16	17	18	19
0.87	2.62	3.16	2.53	3.54	3.21	0.93	2.54	2.47	1.87
1.00	2.50	3.16	2.52	3.44	3.00	0.88	2.35	2.37	1.79
1.15	2.53	3.28	2.72	3.54	3.00	0.92	2.45	2.44	1.86
1.32	2.65	3.56	2.98	3.67	3.05	1.00	2.56	2.54	1.96
1.52	2.76	3.78	3.24	3.78	3.09	1.07	2.68	2.62	2.08
1.74	2.85	4.02	3.47	3.86	3.30	1.15	2.78	2.81	2.23
2.00	2.99	4.26	3.77	4.03	3.43	1.22	2.95	2.98	2.31
2.30	3.19	4.47	4.15	4.28	3.76	1.32	3.08	3.03	2.46
2.64	3.23	4.77	4.59	4.39	4.12	1.38	3.31	3.25	2.60
3.03	3.55	5.19	4.93	4.77	4.05	1.57	3.47	3.62	2.87
3.48	3.69	5.23	5.19	4.48	4.30	1.70	3.68	3.84	2.99
4.00	3.58	5.38	5.52	4.66	4.41	1.74	3.98	4.38	3.15
4.59	3.71	4.96	5.31	4.47	4.24	2.09	3.77	4.21	3.02
5.28	3.61	4.67	5.07	4.42	4.17	2.29	3.63	4.21	3.16
6.06	3.61	4.53	4.97	4.33	4.21	2.60	3.55	4.21	3.19
6.96	3.48	4.34	4.84	4.23	4.12	2.88	3.53	4.11	3.11
8.00	3.45	3.97	4.35	4.12	4.09	3.13	3.45	4.15	3.23
9.19	3.54	3.75	3.97	3.75	3.99	3.55	3.24	3.82	3.15
10.56	3.35	3.54	3.74	3.48	3.70	4.00	3.32	3.90	3.31
12.13	3.24	3.08	3.22	3.44	3.60	4.35	3.31	3.79	3.23
13.93	3.34	3.12	2.90	3.14	3.51	4.90	3.19	3.89	3.43
16.00	3.31	2.89	2.44	2.95	3.23	5.38	2.78	3.66	3.58
18.38	3.36	2.46	1.78	2.62	3.06	6.21	2.69	3.52	3.92
21.11	3.37	2.05	2.20	2.75	2.77	7.05	2.71	3.05	4.09
24.25	3.74	1.86	1.42	2.41	2.57	7.13	2.71	2.96	4.09
27.86	3.74	2.08	1.24	1.85	2.16	7.21	2.66	2.89	3.96
32.00	3.23	1.55	1.25	1.04	1.98	7.03	2.67	2.35	3.90
36.76	3.05	0.90	1.14	1.24	1.46	5.40	2.56	2.12	3.34
42.22	3.00	--	1.03	1.33	1.29	3.82	2.56	1.72	3.07
48.50	1.91	--	0.96	--	1.04	2.56	2.33	1.55	2.41
55.72	2.00	--	0.77	--	0.77	1.80	2.53	1.17	2.34
64.00	1.78	--	0.60	--	0.61	1.13	2.22	1.00	2.02
73.52	--	--	0.46	--	0.42	0.60	1.67	0.72	1.59
84.45	--	--	0.34	--	0.31	--	1.59	0.42	1.34
97.01	--	--	0.17	--	--	--	1.07	0.25	1.09
111.43	--	--	0.20	--	--	--	0.42	--	1.20
128.00	--	--	--	--	--	--	--	--	1.04
147.03	--	--	--	--	--	--	--	--	--
168.90	--	--	--	--	--	--	--	--	--
194.01	--	--	--	--	--	--	--	--	--
222.86	--	--	--	--	--	--	--	--	--
256.00	--	--	--	--	--	--	--	--	--
294.07	--	--	--	--	--	--	--	--	--
337.79	--	--	--	--	--	--	--	--	--
388.02	--	--	--	--	--	--	--	--	--
445.72	--	--	--	--	--	--	--	--	--
512.00	--	--	--	--	--	--	--	--	--

APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (µm)	20	21	22	23	24	25	26	27	29
0.87	2.29	1.90	2.38	2.15	0.53	2.04	1.97	1.83	2.10
1.00	2.21	1.83	2.28	2.05	0.53	2.06	1.99	1.81	2.08
1.15	2.33	1.97	2.35	2.09	0.58	2.16	2.12	1.95	2.29
1.32	2.49	2.07	2.43	2.17	0.63	2.18	2.22	2.03	2.42
1.52	2.66	2.23	2.52	2.25	0.66	2.37	2.31	2.17	2.62
1.74	2.86	2.37	2.63	2.37	0.69	2.42	2.46	2.28	2.89
2.00	2.99	2.46	2.69	2.51	0.70	2.59	2.38	2.36	3.00
2.30	3.18	2.71	2.90	2.63	0.76	2.69	2.39	2.51	3.29
2.64	3.37	3.05	3.08	2.79	0.80	2.75	2.53	2.51	3.47
3.03	3.61	3.26	3.34	3.03	0.83	2.93	2.58	2.69	3.71
3.48	3.76	3.57	3.38	3.26	0.87	2.89	2.74	2.87	3.92
4.00	4.17	3.93	3.72	3.55	0.89	3.39	2.69	2.88	4.19
4.59	4.16	4.06	3.62	3.39	0.87	3.25	2.59	2.79	4.19
5.28	4.28	4.32	3.54	3.41	0.85	3.31	2.52	2.92	4.17
6.06	4.46	4.60	3.65	3.38	0.89	3.37	2.53	2.93	4.07
6.96	4.66	4.84	3.60	3.32	0.89	3.51	2.47	2.93	4.20
8.00	4.56	4.98	3.54	3.26	0.88	3.43	2.55	3.03	4.26
9.19	4.58	5.05	3.48	3.17	0.94	3.50	2.53	3.28	3.96
10.56	4.57	4.93	3.24	2.99	0.96	3.47	2.68	3.27	3.96
12.13	4.37	4.91	3.34	3.02	1.03	3.46	2.74	3.40	3.62
13.93	4.21	4.78	3.21	3.25	1.02	3.11	2.78	3.49	3.86
16.00	4.35	4.53	3.19	3.14	1.02	3.46	2.89	3.24	3.50
18.38	3.87	4.34	3.57	3.05	1.27	3.28	3.23	3.66	3.17
21.11	3.72	3.56	3.49	3.43	1.01	3.16	3.09	3.76	3.11
24.25	3.36	3.28	3.59	3.68	1.08	3.32	3.33	4.30	3.81
27.86	2.74	2.70	3.41	3.78	1.15	3.20	3.46	4.42	2.56
32.00	2.22	2.16	3.22	3.85	1.26	3.19	3.95	4.63	2.37
36.76	1.56	1.75	2.75	3.71	1.39	3.08	4.02	4.54	2.00
42.22	0.98	1.34	2.48	3.59	1.52	2.49	4.33	4.00	1.83
48.50	0.94	0.96	1.86	2.73	1.63	2.65	4.13	3.27	1.68
55.72	0.50	0.70	1.62	2.71	1.75	2.24	5.19	3.36	1.22
64.00	--	0.60	1.38	2.05	2.13	2.09	4.72	2.25	1.12
73.52	--	0.27	1.16	2.17	2.41	2.13	3.79	1.06	0.90
84.45	--	--	1.31	0.97	2.85	1.94	2.09	1.09	0.44
97.01	--	--	0.77	1.11	2.95	0.81	--	0.48	--
111.43	--	--	0.77	--	3.07	2.08	--	--	--
128.00	--	--	0.50	--	3.38	--	--	--	--
147.03	--	--	--	--	4.09	--	--	--	--
168.90	--	--	--	--	3.68	--	--	--	--
194.01	--	--	--	--	4.80	--	--	--	--
222.86	--	--	--	--	7.13	--	--	--	--
256.00	--	--	--	--	5.47	--	--	--	--
294.07	--	--	--	--	6.31	--	--	--	--
337.79	--	--	--	--	6.39	--	--	--	--
388.02	--	--	--	--	8.80	--	--	--	--
445.72	--	--	--	--	7.27	--	--	--	--
512.00	--	--	--	--	--	--	--	--	--

APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (μm)	30	31	32	33	34	35	36	37	38
0.87	2.43	2.09	2.14	0.07	0.26	2.35	2.91	2.65	2.06
1.00	2.36	2.05	2.06	0.07	0.24	2.25	2.82	2.50	1.96
1.15	2.48	2.14	2.16	0.07	0.25	2.30	2.99	2.56	2.02
1.32	2.65	2.26	2.28	0.07	0.26	2.38	3.11	2.67	2.09
1.52	2.75	2.37	2.39	0.07	0.28	2.49	3.17	2.75	2.20
1.74	2.88	2.52	2.53	0.07	0.28	2.61	3.41	2.88	2.33
2.00	3.10	2.72	2.69	0.07	0.29	2.75	3.50	2.99	2.37
2.30	3.19	2.95	2.76	0.08	0.31	2.87	3.69	3.15	2.47
2.64	3.61	3.13	2.99	0.08	0.32	3.19	3.87	3.31	2.65
3.03	3.63	3.24	3.16	0.08	0.32	3.39	4.14	3.53	2.75
3.48	3.77	3.44	3.21	0.08	0.32	3.64	4.44	3.67	2.95
4.00	3.86	3.14	3.59	0.09	0.35	3.54	4.58	4.19	3.06
4.59	3.72	3.69	3.99	0.09	0.34	3.81	4.45	4.09	2.99
5.28	3.72	3.63	4.12	0.10	0.34	3.80	4.52	4.09	2.98
6.06	3.79	3.72	4.08	0.10	0.35	3.83	4.47	4.13	3.16
6.96	3.78	3.57	4.00	0.12	0.37	3.81	4.37	4.08	3.19
8.00	3.72	3.61	3.98	0.13	0.38	3.81	4.22	4.03	3.07
9.19	3.68	3.42	3.71	0.14	0.43	3.65	3.98	3.92	3.06
10.56	3.46	3.44	3.64	0.16	0.46	3.69	3.93	3.76	3.02
12.13	3.61	3.21	3.39	0.18	0.41	3.47	3.59	3.44	3.12
13.93	3.54	3.25	3.36	0.19	0.50	3.41	3.20	3.35	3.16
16.00	3.37	3.39	3.20	0.19	0.53	3.03	3.16	3.21	3.23
18.38	3.33	3.22	3.43	0.19	0.60	3.31	2.87	3.21	3.25
21.11	2.92	3.08	3.22	0.19	0.61	3.36	2.30	3.06	3.60
24.25	3.13	3.03	2.90	0.20	0.75	3.34	2.25	3.06	3.74
27.86	2.90	3.08	2.84	0.27	0.82	3.36	1.94	3.00	3.84
32.00	2.86	2.96	2.75	0.33	0.99	3.23	1.76	2.71	3.77
36.76	2.50	2.87	2.65	0.40	1.20	2.97	1.58	2.49	3.49
42.22	2.33	2.74	2.37	0.47	1.56	2.68	1.31	2.13	3.27
48.50	2.03	2.29	1.82	0.59	1.89	2.50	0.93	1.44	3.00
55.72	1.67	2.18	1.97	0.75	2.43	1.86	0.91	1.24	2.48
64.00	1.17	1.98	1.63	0.89	3.02	1.37	0.57	0.89	2.12
73.52	0.86	1.63	1.46	1.12	3.64	0.98	0.55	0.63	1.80
84.45	0.48	1.51	1.37	1.53	4.67	0.65	0.28	0.46	1.48
97.01	0.72	1.11	1.08	1.91	5.90	0.30	0.23	0.44	1.45
111.43	--	0.88	0.71	2.36	5.81	--	--	0.31	1.25
128.00	--	0.47	0.36	2.61	5.97	--	--	--	1.03
147.03	--	--	--	2.92	5.52	--	--	--	0.54
168.90	--	--	--	3.85	5.92	--	--	--	--
194.01	--	--	--	6.29	5.37	--	--	--	--
222.86	--	--	--	10.41	7.98	--	--	--	--
256.00	--	--	--	17.17	8.26	--	--	--	--
294.07	--	--	--	17.34	7.48	--	--	--	--
337.79	--	--	--	12.32	6.86	--	--	--	--
388.02	--	--	--	9.59	5.18	--	--	--	--
445.72	--	--	--	5.60	--	--	--	--	--
512.00	--	--	--	--	--	--	--	--	--

APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (μm)	39	40	41	42	43	44	45	46	47
0.87	2.08	2.65	2.71	2.56	3.06	2.39	2.47	1.17	2.98
1.00	2.01	2.53	2.57	2.46	2.87	2.14	2.25	1.14	2.85
1.15	2.10	2.60	2.62	2.53	2.91	2.09	2.24	1.22	2.95
1.32	2.15	2.67	2.72	2.62	3.03	2.12	2.26	1.32	3.15
1.52	2.23	2.84	2.88	2.76	3.21	2.15	2.39	1.38	3.38
1.74	2.34	2.90	2.89	2.96	3.30	2.25	2.55	1.37	3.55
2.00	2.39	3.07	3.15	3.17	3.42	2.21	2.60	1.34	3.63
2.30	2.64	3.27	3.25	3.15	3.70	2.31	2.90	1.42	3.65
2.64	2.69	3.46	3.50	3.61	3.86	2.46	3.05	1.54	3.80
3.03	2.79	3.74	3.72	3.58	4.12	2.57	3.16	1.61	3.87
3.48	3.06	3.95	3.96	3.88	4.12	2.58	3.50	1.70	4.23
4.00	3.27	4.02	4.35	4.11	4.09	2.99	3.77	1.82	4.43
4.59	3.19	3.94	4.22	4.07	4.01	2.86	3.93	1.98	4.34
5.28	3.23	4.00	4.28	4.12	4.06	2.98	3.88	2.23	4.34
6.06	3.31	3.94	4.38	4.19	4.01	3.05	3.97	2.57	4.45
6.96	3.32	3.93	4.36	4.16	4.03	3.09	4.04	3.02	4.50
8.00	3.34	3.81	4.11	4.19	3.97	3.17	3.94	3.51	4.49
9.19	3.30	3.69	4.11	4.02	3.89	3.27	4.00	4.26	4.32
10.56	3.14	3.63	3.97	4.02	3.87	3.55	4.20	5.10	4.14
12.13	3.20	3.46	3.57	3.84	3.58	3.70	3.97	6.09	4.12
13.93	3.13	3.51	3.41	3.69	3.40	3.83	4.25	6.97	3.98
16.00	3.34	3.39	3.42	3.49	3.18	4.42	4.24	7.18	3.77
18.38	2.98	3.01	3.28	3.12	3.44	4.44	4.35	7.29	3.54
21.11	3.01	2.95	2.90	3.01	3.17	4.96	4.09	7.57	2.81
24.25	3.24	2.72	2.78	2.91	3.09	5.01	4.16	6.63	2.16
27.86	3.29	2.67	2.33	2.69	2.69	4.92	3.66	5.58	1.82
32.00	3.34	2.47	2.09	2.53	2.26	4.94	3.24	4.50	1.43
36.76	3.13	2.31	1.93	2.21	1.73	4.23	2.44	3.24	1.12
42.22	2.84	2.06	1.72	2.02	1.33	3.28	1.85	1.95	0.78
48.50	2.25	1.65	1.23	1.48	1.05	2.58	1.21	1.32	0.56
55.72	2.26	1.35	1.15	1.11	0.80	1.73	0.75	0.94	0.35
64.00	2.05	1.65	0.90	0.89	0.34	0.73	0.40	0.55	0.24
73.52	1.78	1.16	0.68	0.51	0.40	1.00	0.28	0.50	0.23
84.45	1.69	0.99	0.28	0.33	--	--	--	--	--
97.01	1.96	--	0.22	--	--	--	--	--	--
111.43	1.60	--	0.37	--	--	--	--	--	--
128.00	1.07	--	--	--	--	--	--	--	--
147.03	1.28	--	--	--	--	--	--	--	--
168.90	--	--	--	--	--	--	--	--	--
194.01	--	--	--	--	--	--	--	--	--
222.86	--	--	--	--	--	--	--	--	--
256.00	--	--	--	--	--	--	--	--	--
294.07	--	--	--	--	--	--	--	--	--
337.79	--	--	--	--	--	--	--	--	--
388.02	--	--	--	--	--	--	--	--	--
445.72	--	--	--	--	--	--	--	--	--
512.00	--	--	--	--	--	--	--	--	--

APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (µm)	48	49	50	51	52	53	54	57	58
0.87	2.40	2.20	2.38	2.41	2.84	1.93	2.14	0.55	1.04
1.00	2.30	2.16	2.25	2.31	2.77	1.91	2.11	0.56	1.01
1.15	2.46	2.29	2.34	2.42	2.84	2.06	2.15	0.61	1.04
1.32	2.59	2.44	2.48	2.51	2.96	2.21	2.28	0.66	1.12
1.52	2.76	2.62	2.56	2.65	3.17	2.46	2.44	0.69	1.19
1.74	2.96	2.76	2.73	2.77	3.34	2.59	2.56	0.76	1.27
2.00	3.15	2.93	2.71	2.97	3.58	2.90	2.79	0.81	1.41
2.30	3.47	3.18	2.94	3.19	3.79	3.07	2.98	0.89	1.47
2.64	3.67	3.37	3.18	3.37	3.91	3.49	3.36	0.94	1.62
3.03	3.88	3.66	3.31	3.70	4.17	3.82	3.49	1.02	1.75
3.48	4.27	4.08	3.54	3.97	4.66	4.12	3.76	1.04	1.85
4.00	4.79	4.78	3.65	4.31	4.51	4.62	3.47	1.12	2.01
4.59	4.80	4.90	3.66	4.18	4.43	4.75	4.12	1.14	2.07
5.28	4.86	5.12	3.63	4.21	4.46	4.93	4.28	1.15	2.25
6.06	4.93	5.28	3.79	4.33	4.50	5.27	4.57	1.21	2.49
6.96	4.97	5.35	3.77	4.25	4.64	5.25	4.66	1.26	2.74
8.00	4.85	5.32	3.79	4.22	4.41	5.32	4.65	1.32	2.96
9.19	4.69	5.18	3.78	4.31	4.35	5.39	4.77	1.38	3.16
10.56	4.54	4.91	3.83	3.91	4.03	4.72	4.54	1.42	3.59
12.13	4.25	4.65	3.59	3.98	3.82	4.50	4.40	1.35	3.94
13.93	3.86	4.31	3.61	4.06	3.50	4.44	4.36	1.36	4.31
16.00	3.38	3.83	3.67	3.70	3.08	3.80	3.99	1.27	4.63
18.38	3.34	2.81	3.57	3.29	2.59	3.81	3.74	1.38	4.66
21.11	2.86	2.76	3.62	3.05	2.46	2.59	3.27	1.17	5.05
24.25	2.52	2.40	3.59	2.91	2.18	2.67	2.92	1.16	5.02
27.86	2.05	1.85	3.16	2.77	2.03	2.00	2.61	1.23	5.38
32.00	1.65	1.54	2.90	2.41	1.81	2.04	2.34	1.34	5.26
36.76	1.15	1.11	2.67	1.99	1.42	1.63	2.07	1.46	5.28
42.22	0.83	0.76	2.46	1.65	1.12	1.72	1.70	1.42	4.80
48.50	0.63	0.52	2.26	1.26	0.98	--	1.30	1.41	3.94
55.72	0.53	0.46	1.49	1.01	0.71	--	0.93	1.31	3.70
64.00	0.35	0.21	1.45	0.94	0.51	--	0.51	1.34	3.01
73.52	0.24	0.23	0.80	0.46	0.22	--	0.43	1.41	2.52
84.45	--	--	0.85	0.52	0.22	--	0.33	1.27	1.45
97.01	--	--	--	--	--	--	--	1.54	1.02
111.43	--	--	--	--	--	--	--	1.75	--
128.00	--	--	--	--	--	--	--	2.38	--
147.03	--	--	--	--	--	--	--	3.10	--
168.90	--	--	--	--	--	--	--	3.94	--
194.01	--	--	--	--	--	--	--	4.93	--
222.86	--	--	--	--	--	--	--	6.63	--
256.00	--	--	--	--	--	--	--	7.25	--
294.07	--	--	--	--	--	--	--	10.02	--
337.79	--	--	--	--	--	--	--	8.52	--
388.02	--	--	--	--	--	--	--	6.25	--
445.72	--	--	--	--	--	--	--	4.94	--
512.00	--	--	--	--	--	--	--	--	--

APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (μm)	59	60	61	62	63	64	66	67	68
0.87	1.86	1.59		2.24	1.09	1.47	1.24	1.12	1.77
1.00	1.78	1.53	1.86	2.17	1.11	1.40	1.15	1.07	1.63
1.15	1.86	1.55	1.88	2.31	1.18	1.45	1.18	1.14	1.69
1.32	1.93	1.67	1.95	2.49	1.29	1.49	1.21	1.21	1.78
1.52	2.00	1.78	2.04	2.65	1.38	1.51	1.27	1.32	1.88
1.74	2.11	1.90	2.18	2.76	1.50	1.59	1.30	1.33	1.99
2.00	2.33	2.13	2.38	2.97	1.70	1.69	1.35	1.40	2.08
2.30	2.52	2.24	2.55	3.16	1.73	1.81	1.42	1.46	2.26
2.64	2.80	2.46	2.84	3.25	1.91	1.90	1.64	1.56	2.51
3.03	2.77	2.57	3.10	3.41	2.06	2.09	1.67	1.81	2.66
3.48	3.25	3.07	3.22	3.39	2.23	2.15	1.86	1.88	2.82
4.00	3.41	3.36	4.04	3.35	2.39	2.51	2.10	2.02	3.19
4.59	3.96	3.61	4.11	3.32	2.51	2.77	2.24	2.32	3.27
5.28	4.08	3.83	4.34	3.38	2.71	3.05	2.48	2.53	3.48
6.06	4.01	4.24	4.74	3.52	2.97	3.32	2.76	2.84	3.73
6.96	4.16	4.55	4.88	3.55	3.29	3.58	3.08	3.16	3.93
8.00	4.36	4.73	5.12	3.53	3.57	3.98	3.46	3.54	4.20
9.19	4.19	5.13	5.10	3.55	3.83	4.16	3.83	3.87	4.36
10.56	4.20	5.06	5.15	3.65	4.12	4.46	4.06	4.23	4.56
12.13	4.28	5.06	4.99	3.65	4.39	4.76	4.67	4.44	4.72
13.93	4.49	4.78	4.81	3.76	4.67	4.87	5.06	4.83	4.81
16.00	4.29	4.76	4.66	3.79	5.03	5.02	5.37	4.97	4.68
18.38	3.94	4.69	3.89	3.58	4.25	5.23	5.62	4.74	4.82
21.11	3.99	4.02	3.84	3.63	5.16	5.17	6.24	5.27	4.61
24.25	3.92	3.86	3.45	3.78	5.17	5.11	6.16	5.33	4.29
27.86	3.65	3.54	3.15	3.56	5.46	4.92	5.72	5.41	3.83
32.00	3.32	3.08	2.72	3.34	4.98	4.53	5.90	5.13	3.54
36.76	2.80	2.73	2.15	2.99	4.79	3.80	4.86	5.03	2.96
42.22	2.55	2.11	1.64	2.53	4.49	3.22	3.99	4.14	2.22
48.50	1.56	1.69	1.34	2.03	3.12	2.54	3.14	3.83	2.20
55.72	1.23	1.12	0.84	1.80	2.83	2.01	1.97	3.04	1.33
64.00	1.12	0.75	0.64	1.29	1.71	1.32	1.25	1.88	1.06
73.52	0.86	0.39	0.39	0.95	0.65	1.10	0.74	1.16	1.16
84.45	0.44	0.23	--	0.67	0.74	--	--	0.98	--
97.01	--	0.18	--	--	--	--	--	--	--
111.43	--	--	--	--	--	--	--	--	--
128.00	--	--	--	--	--	--	--	--	--
147.03	--	--	--	--	--	--	--	--	--
168.90	--	--	--	--	--	--	--	--	--
194.01	--	--	--	--	--	--	--	--	--
222.86	--	--	--	--	--	--	--	--	--
256.00	--	--	--	--	--	--	--	--	--
294.07	--	--	--	--	--	--	--	--	--
337.79	--	--	--	--	--	--	--	--	--
388.02	--	--	--	--	--	--	--	--	--
445.72	--	--	--	--	--	--	--	--	--
512.00	--	--	--	--	--	--	--	--	--

APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (μm)	70	71	72	73	75	76	77	78	79
0.87	0.14	0.02	3.58	0.17	2.35	2.00	2.56	2.02	2.65
1.00	0.14	0.02	3.39	0.17	2.16	1.80	2.38	1.90	2.53
1.15	0.15	0.02	3.46	0.17	2.22	1.78	2.45	1.99	2.56
1.32	0.15	0.02	3.61	0.19	2.30	1.82	2.61	2.15	2.64
1.52	0.16	0.02	3.62	0.20	2.42	1.88	2.75	2.30	2.84
1.74	0.18	0.02	3.81	0.21	2.58	1.94	2.90	2.42	2.98
2.00	0.18	0.02	3.98	0.22	2.72	1.93	3.09	2.57	3.13
2.30	0.20	0.02	4.19	0.24	2.73	1.96	3.35	2.77	3.30
2.64	0.22	0.02	4.09	0.27	2.87	2.19	3.46	2.97	3.62
3.03	0.23	0.02	4.66	0.26	3.07	2.25	3.60	2.99	3.91
3.48	0.27	0.02	4.70	0.28	3.22	2.16	3.81	3.44	4.29
4.00	0.31	0.02	4.78	0.33	3.32	2.34	4.09	3.76	4.61
4.59	0.32	0.02	4.51	0.35	3.29	2.30	3.97	3.75	4.49
5.28	0.35	0.02	4.37	0.38	3.40	2.39	4.05	3.85	4.60
6.06	0.39	0.03	4.46	0.44	3.51	2.50	4.11	3.99	4.73
6.96	0.42	0.03	4.24	0.49	3.61	2.67	4.03	4.11	4.70
8.00	0.48	0.03	4.25	0.54	3.77	2.68	3.96	4.11	4.58
9.19	0.51	0.03	3.92	0.60	3.89	2.73	4.05	4.19	4.59
10.56	0.57	0.03	3.46	0.66	3.85	3.01	4.26	4.36	4.27
12.13	0.60	0.03	3.51	0.70	4.27	3.18	3.76	4.43	4.09
13.93	0.61	0.03	2.97	0.82	4.23	3.77	3.95	4.65	4.14
16.00	0.63	0.03	3.03	0.84	4.68	3.89	3.88	4.33	3.90
18.38	0.61	0.04	2.86	0.83	5.26	4.33	3.59	4.57	3.63
21.11	0.51	0.04	2.42	0.83	5.45	4.79	3.51	4.46	3.40
24.25	0.55	0.03	1.88	0.82	4.84	4.97	3.46	4.20	2.73
27.86	0.59	0.04	1.46	0.83	4.10	5.12	3.09	3.66	2.84
32.00	0.75	0.04	3.02	0.78	3.04	5.35	2.66	3.05	2.20
36.76	0.91	0.05	1.78	0.81	2.30	5.06	2.33	2.32	2.05
42.22	1.01	0.06	--	0.84	1.69	5.23	1.81	1.78	--
48.50	1.21	0.07	--	0.99	1.51	4.75	1.21	1.26	--
55.72	1.34	0.09	--	1.12	0.91	3.62	0.83	0.72	--
64.00	1.54	0.11	--	1.38	0.47	1.96	0.30	0.42	--
73.52	2.12	0.14	--	1.79	--	0.65	0.15	0.49	--
84.45	3.19	0.21	--	2.57	--	0.98	--	--	--
97.01	6.36	0.30	--	3.44	--	--	--	--	--
111.43	13.32	0.41	--	5.95	--	--	--	--	--
128.00	20.12	0.67	--	9.75	--	--	--	--	--
147.03	18.07	1.58	--	17.58	--	--	--	--	--
168.90	12.51	5.45	--	19.39	--	--	--	--	--
194.01	6.27	11.82	--	11.49	--	--	--	--	--
222.86	1.79	17.84	--	5.75	--	--	--	--	--
256.00	--	18.74	--	3.25	--	--	--	--	--
294.07	--	16.13	--	1.28	--	--	--	--	--
337.79	--	11.41	--	--	--	--	--	--	--
388.02	--	7.58	--	--	--	--	--	--	--
445.72	--	7.01	--	--	--	--	--	--	--
512.00	--	2.74	--	--	--	--	--	--	--

APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (μm)	80	81	82	83	84	85	86	87	88
0.87	1.56	2.29	2.67	2.13	2.32	0.93	2.67	2.53	2.15
1.00	1.48	2.21	2.54	2.02	2.22	0.90	2.51	2.32	2.11
1.15	1.53	2.25	2.54	2.16	2.34	0.93	2.62	2.34	2.19
1.32	1.63	2.35	2.63	2.23	2.41	1.00	2.76	2.47	2.30
1.52	1.69	2.53	2.81	2.42	2.52	1.08	2.87	2.59	2.45
1.74	1.82	2.66	2.95	2.66	2.63	1.17	3.08	2.74	2.62
2.00	1.92	2.84	3.22	2.85	2.91	1.23	3.29	2.89	2.81
2.30	2.07	3.03	3.37	3.13	3.01	1.30	3.45	3.13	3.00
2.64	2.31	3.31	3.61	3.32	3.23	1.37	3.87	3.36	3.25
3.03	2.43	3.62	3.74	3.87	3.46	1.51	4.41	3.59	3.59
3.48	2.57	3.64	4.11	4.16	3.72	1.54	4.35	3.71	3.84
4.00	2.78	4.05	4.46	4.75	4.34	1.79	4.52	3.61	4.11
4.59	2.89	3.95	4.54	4.96	4.46	1.81	4.63	4.35	4.68
5.28	2.93	4.06	4.62	5.13	4.64	1.89	4.81	4.43	4.93
6.06	3.04	4.07	4.66	5.40	4.75	2.00	4.94	4.48	5.02
6.96	3.15	4.08	4.76	5.34	4.93	2.02	5.03	4.50	5.15
8.00	3.28	4.13	4.64	5.31	5.00	2.11	5.12	4.43	5.30
9.19	3.29	3.92	4.54	5.25	4.71	2.13	4.98	4.33	5.19
10.56	3.34	3.80	4.47	5.11	4.69	1.99	4.91	4.21	4.88
12.13	3.47	3.64	4.22	4.47	4.55	2.24	4.37	3.92	4.66
13.93	3.59	3.65	4.17	4.52	4.03	2.11	4.22	3.70	4.49
16.00	3.85	3.57	3.92	3.68	3.75	2.28	3.69	3.42	4.01
18.38	3.95	3.48	3.53	3.68	3.27	2.34	3.61	3.40	3.61
21.11	3.60	3.42	2.75	3.39	3.18	2.17	2.56	2.81	3.32
24.25	4.05	3.17	2.25	2.54	2.51	2.17	2.70	2.91	2.49
27.86	3.89	3.13	2.15	2.43	2.31	2.46	2.07	2.76	2.26
32.00	3.89	2.94	1.85	1.87	2.13	2.73	1.08	2.56	1.83
36.76	3.65	2.60	1.54	1.21	1.64	3.16	0.89	2.13	1.40
42.22	3.53	2.20	1.22	--	1.33	3.70	--	1.82	0.99
48.50	3.59	1.71	0.69	--	0.96	4.34	--	1.49	0.67
55.72	3.16	1.34	0.47	--	0.86	4.96	--	1.10	0.41
64.00	3.11	0.98	0.25	--	0.57	5.88	--	0.70	0.31
73.52	2.85	0.63	0.11	--	0.31	7.17	--	0.64	--
84.45	2.52	0.55	--	--	0.30	8.35	--	0.44	--
97.01	1.60	0.21	--	--	--	6.31	--	0.19	--
111.43	--	--	--	--	--	4.83	--	--	--
128.00	--	--	--	--	--	2.98	--	--	--
147.03	--	--	--	--	--	1.15	--	--	--
168.90	--	--	--	--	--	--	--	--	--
194.01	--	--	--	--	--	--	--	--	--
222.86	--	--	--	--	--	--	--	--	--
256.00	--	--	--	--	--	--	--	--	--
294.07	--	--	--	--	--	--	--	--	--
337.79	--	--	--	--	--	--	--	--	--
388.02	--	--	--	--	--	--	--	--	--
445.72	--	--	--	--	--	--	--	--	--
512.00	--	--	--	--	--	--	--	--	--

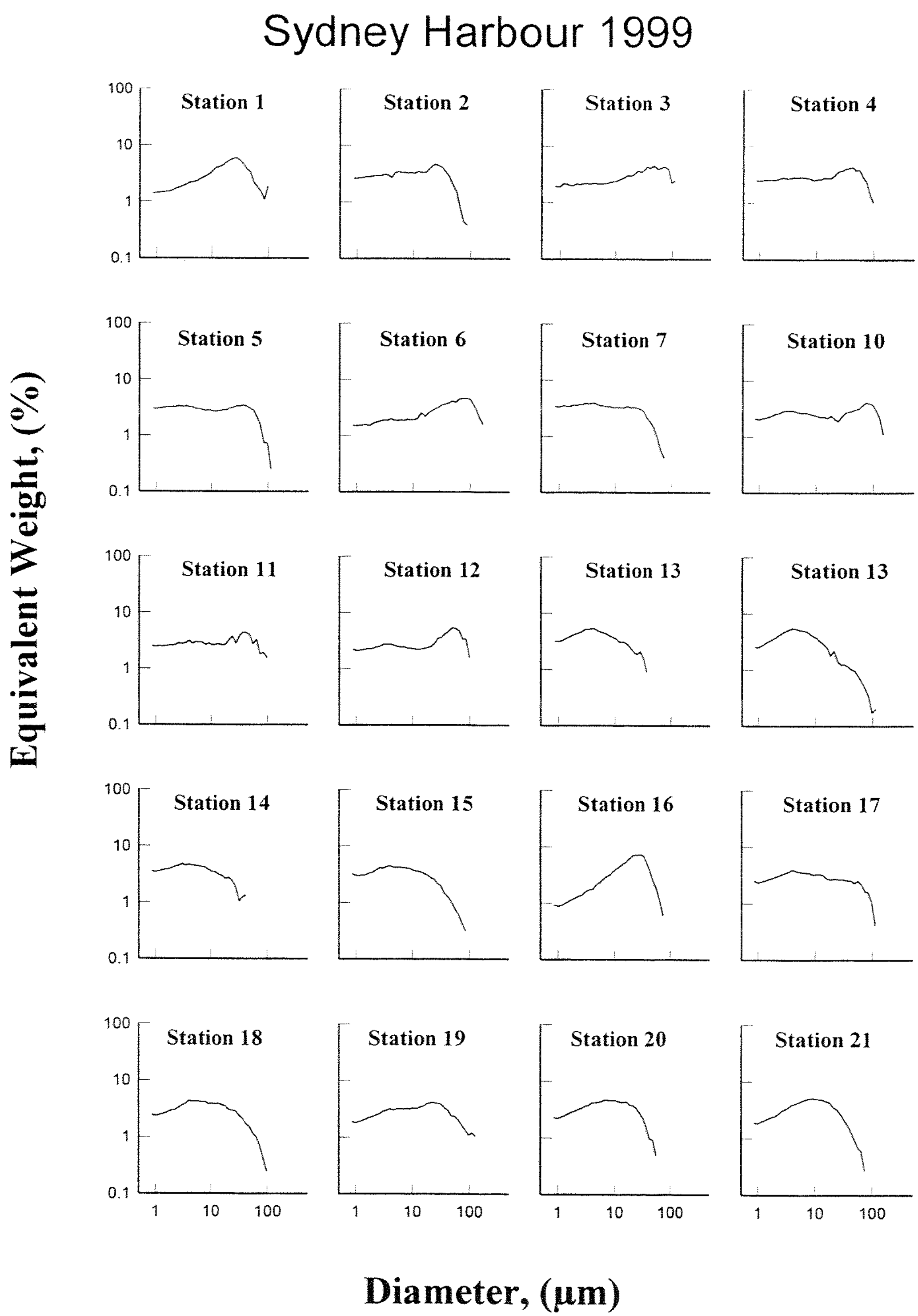
APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (μm)	89	91	92	93	95	97	98	99	100
0.87	2.03	1.55		1.69	1.84	0.32	1.92	1.44	
1.00	1.96	1.54	2.13	1.67	1.80	0.30	1.81	1.35	1.00
1.15	2.02	1.64	2.20	1.73	1.94	0.31	1.83	1.38	1.03
1.32	2.10	1.73	2.29	1.83	2.11	0.33	1.84	1.46	1.05
1.52	2.22	1.84	2.35	1.89	2.25	0.34	1.91	1.51	1.07
1.74	2.33	2.01	2.52	1.98	2.36	0.35	1.98	1.59	1.13
2.00	2.53	2.14	2.76	2.15	2.58	0.38	2.08	1.65	1.22
2.30	2.72	2.39	2.79	2.41	2.82	0.41	2.22	1.77	1.33
2.64	3.00	2.62	3.05	2.45	3.10	0.45	2.42	1.91	1.43
3.03	3.11	2.72	3.41	2.73	3.36	0.46	2.52	2.07	1.56
3.48	3.71	2.86	3.72	2.94	3.46	0.46	2.61	2.18	1.74
4.00	3.34	3.14	4.07	3.14	3.57	0.49	2.74	2.44	1.88
4.59	4.22	3.19	4.29	3.40	3.69	0.51	2.97	2.55	1.96
5.28	4.39	3.30	4.47	3.85	3.92	0.54	2.96	2.67	2.13
6.06	4.69	3.44	4.76	4.08	4.23	0.57	3.01	2.84	2.34
6.96	4.80	3.59	4.80	4.08	4.38	0.61	2.95	2.91	2.47
8.00	4.83	3.66	4.82	4.51	4.53	0.67	2.97	3.02	2.65
9.19	5.06	3.62	4.70	4.46	4.46	0.68	3.02	3.02	2.76
10.56	4.78	3.76	4.96	4.45	4.48	0.69	2.90	3.16	3.02
12.13	4.41	3.36	4.41	4.22	4.51	0.73	3.05	3.18	3.01
13.93	4.60	3.39	4.22	4.07	4.28	0.75	2.78	3.08	3.27
16.00	4.09	3.10	3.86	3.72	4.07	0.82	3.10	3.14	3.23
18.38	3.89	2.88	3.37	3.90	3.79	0.77	3.40	2.92	3.10
21.11	3.07	2.61	3.55	4.72	3.11	0.78	3.07	2.81	2.95
24.25	3.27	2.98	3.60	4.98	3.51	0.85	3.72	2.30	3.20
27.86	2.88	2.28	3.18	4.42	3.29	1.04	3.98	2.69	3.25
32.00	2.52	2.59	2.74	3.82	3.07	1.13	4.14	2.60	3.24
36.76	2.24	2.79	2.23	3.21	2.55	1.24	4.28	2.17	2.92
42.22	1.76	3.01	1.68	2.53	2.05	1.38	3.98	1.55	2.64
48.50	1.30	2.96	1.28	2.01	1.81	1.60	3.48	2.39	2.65
55.72	0.87	3.08	0.78	1.31	1.24	1.93	3.69	3.15	3.34
64.00	0.72	3.25	0.50	0.79	0.95	2.54	3.10	3.18	3.27
73.52	0.27	3.45	0.22	0.45	0.57	3.13	2.29	3.83	3.71
84.45	0.27	2.83	0.28	0.43	0.35	4.16	2.38	5.21	4.02
97.01	--	2.35	--	--	--	4.86	1.59	4.90	3.38
111.43	--	1.59	--	--	--	6.58	1.31	4.71	4.96
128.00	--	0.75	--	--	--	7.36	--	3.68	3.69
147.03	--	--	--	--	--	8.19	--	1.59	2.95
168.90	--	--	--	--	--	7.90	--	--	2.52
194.01	--	--	--	--	--	8.11	--	--	2.93
222.86	--	--	--	--	--	5.91	--	--	--
256.00	--	--	--	--	--	6.26	--	--	--
294.07	--	--	--	--	--	6.16	--	--	--
337.79	--	--	--	--	--	6.97	--	--	--
388.02	--	--	--	--	--	--	--	--	--
445.72	--	--	--	--	--	--	--	--	--
512.00	--	--	--	--	--	--	--	--	--

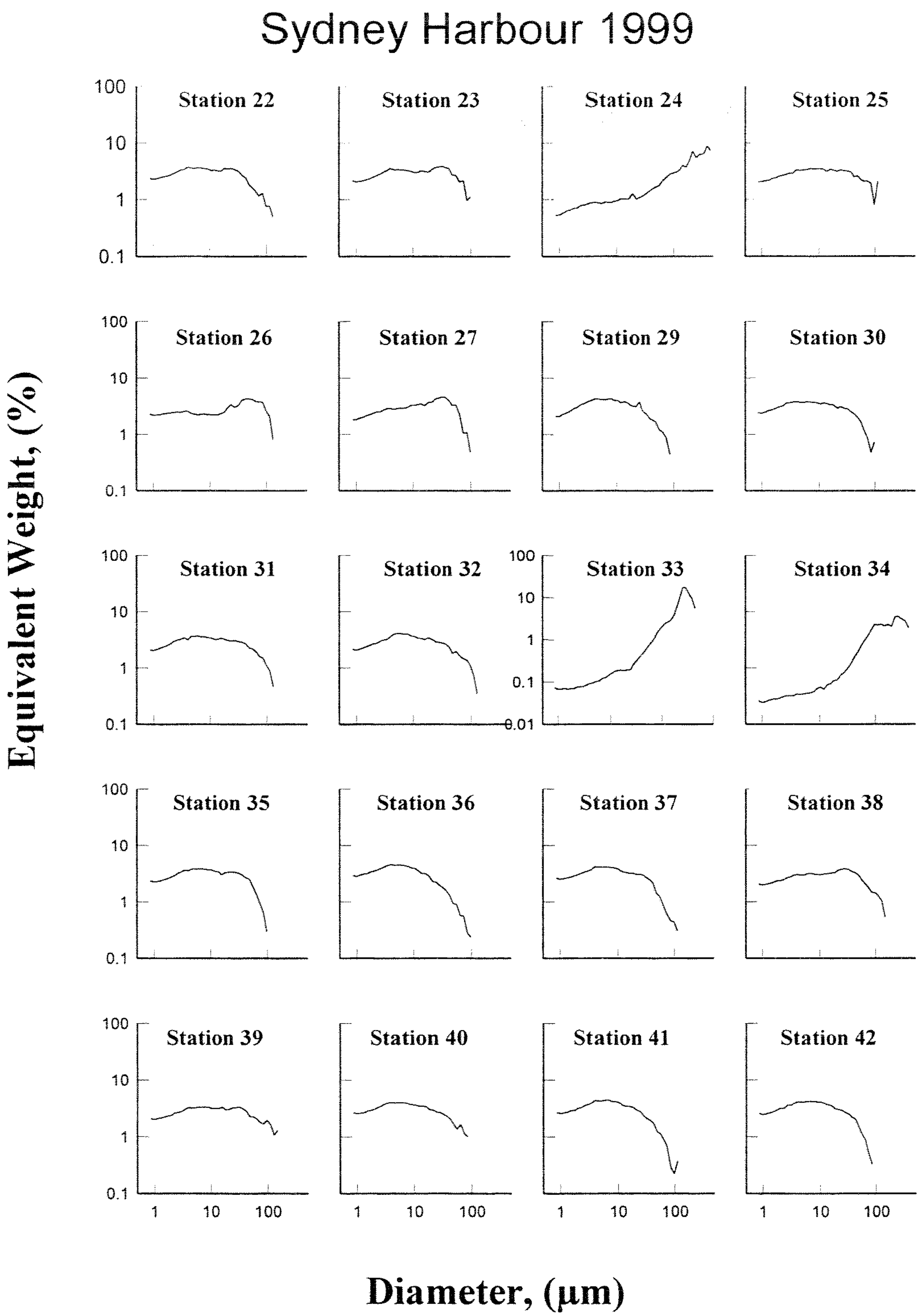
APPENDIX I (cont.). Normalized disaggregated inorganic grain size of bottom sediments.

Station # Diameter (μm)	101	102	103	104
0.87	1.39			1.73
1.00	1.37	1.53	1.56	1.65
1.15	1.45	1.58	1.62	1.72
1.32	1.56	1.66	1.64	1.81
1.52	1.63	1.74	1.74	1.92
1.74	1.76	1.82	1.82	2.03
2.00	1.83	1.96	1.95	2.05
2.30	2.09	2.15	2.11	2.27
2.64	2.27	2.32	2.26	2.40
3.03	2.28	2.56	2.39	2.58
3.48	2.60	2.62	2.71	2.89
4.00	2.93	2.95	3.13	3.28
4.59	3.03	3.00	3.18	3.41
5.28	3.30	3.18	3.38	3.64
6.06	3.62	3.38	3.58	3.88
6.96	3.86	3.54	3.76	4.10
8.00	4.13	3.80	4.03	4.20
9.19	4.36	3.84	4.08	4.48
10.56	4.43	3.92	4.16	4.30
12.13	4.83	4.04	4.28	4.44
13.93	4.74	4.32	4.58	4.14
16.00	4.82	3.94	4.18	4.25
18.38	4.86	3.97	4.21	3.80
21.11	4.44	4.40	4.57	3.41
24.25	4.73	4.49	5.09	3.44
27.86	4.58	4.59	4.85	2.62
32.00	4.37	4.40	4.58	2.20
36.76	3.67	4.12	4.19	2.16
42.22	3.22	3.70	3.35	2.16
48.50	2.72	3.08	2.66	2.11
55.72	1.51	2.51	2.06	1.90
64.00	1.09	2.00	1.35	1.77
73.52	0.53	1.42	0.44	1.74
84.45	--	0.95	0.53	1.45
97.01	--	0.53	--	1.37
111.43	--	--	--	1.22
128.00	--	--	--	0.77
147.03	--	--	--	0.46
168.90	--	--	--	0.27
194.01	--	--	--	--
222.86	--	--	--	--
256.00	--	--	--	--
294.07	--	--	--	--
337.79	--	--	--	--
388.02	--	--	--	--
445.72	--	--	--	--
512.00	--	--	--	--

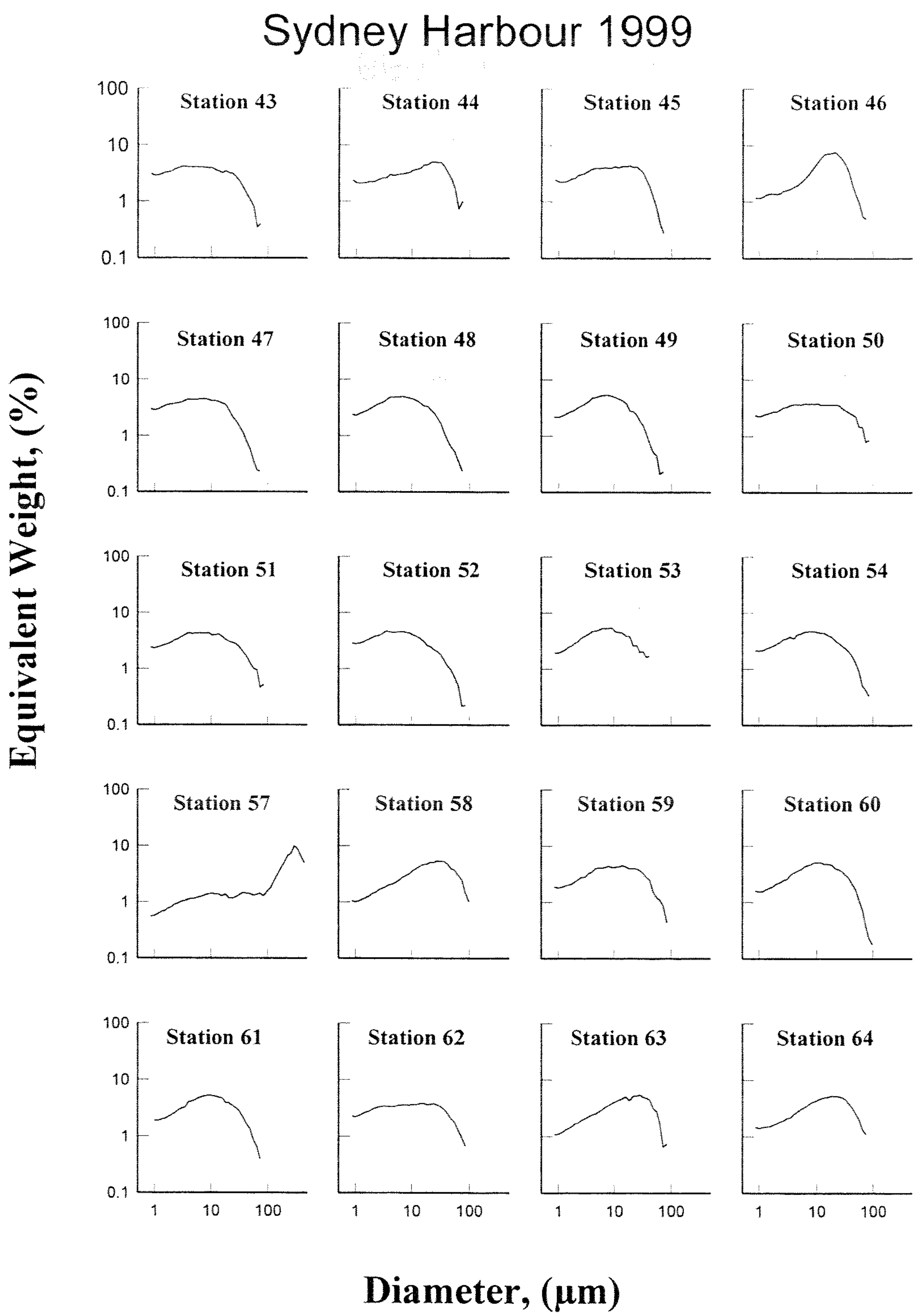
Appendix II. Disaggregated inorganic grain size spectra of bottom sediments from Sydney Harbour, sampled in October, 1999.



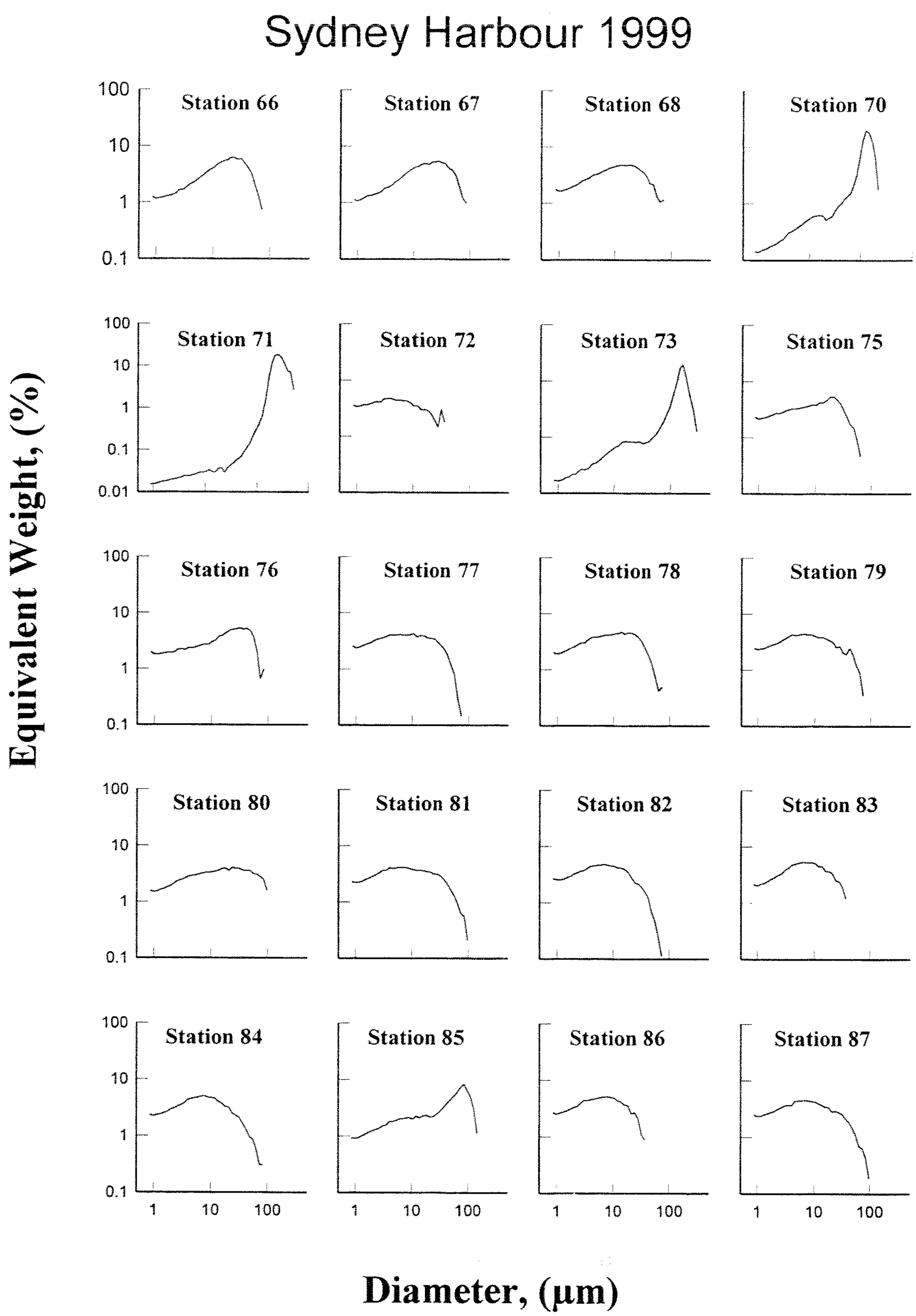
APPENDIX II (cont). Disaggregated inorganic grain size spectra of bottom sediments from Sydney Harbour, sampled in October, 1999.



APPENDIX II (cont). Disaggregated inorganic grain size spectra of bottom sediments from Sydney Harbour, sampled in October, 1999.



APPENDIX II (cont). Disaggregated inorganic grain size spectra of bottom sediments from Sydney Harbour, sampled in October, 1999.



APPENDIX II (cont). Disaggregated inorganic grain size spectra of bottom sediments from Sydney Harbour, sampled in October, 1999.