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2006 Data

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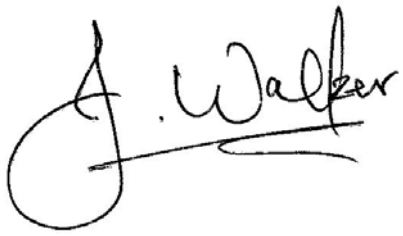

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Organic Contaminants in Sentinel Shellfish: 2006 Data

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Contents

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1 Executive Summary

Samples of oysters from the Manukau Harbour and transplanted mussels from seven Auckland estuary and harbour sites were received in the NIWA laboratory on 21st December 2006. Five replicate samples of oysters from each of four sites were received, giving 20 oyster samples for analysis. Five replicate samples of mussels from each of seven sites and one sample labelled "predeployment" were received, giving 36 mussel samples for analysis. All samples were analysed for organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). Analytical data for oysters are listed in Tables 3–6 and analytical data for mussels are listed in Tables 7–14. Analytical procedures and a quality assurance summary are appended. Data for composite samples and archived samples are reproduced in Tables 15 and 16.

Lipid-normalised concentrations of a sub-set of major compounds for oysters (used in trend assessment) are presented in Table 1 to facilitate comparisons of contaminant concentrations between 2003 and 2006. Summary Tables of mean total contaminant levels and lipid-normalised concentrations for mussels have been compiled and presented in Tables 2a and 2b.

Total contaminant levels highlighted in red in Tables 3-14 were considered to be distinctly different from other values generated for remaining replicates from the same site. This data was omitted in calculating means and standard errors in Summary Tables 1, 2a and 2b.

Major features of the 2006 oyster data (lipid-normalised) were:

- The PAH levels in 2006 at most sites appeared to be slightly higher than those recorded previously.
- In general, DDT, chlordane and PCB levels were similar to those recorded in 2003.
- Dieldrin levels were observed at levels similar to those recorded in 2003 with higher levels observed at Pahurehure.
- Levels of contaminants at Granny's Bay were higher than previously recorded.

Major features of the 2006 mussel data (lipid-normalised) were:

- Due to unknown contamination, dieldrin could not be quantified in the mussel samples. An attempt will be made to analyse these samples and present these data in a subsequent data report.
- PAH levels in 2006 were higher for all sites.
- In general, DDT, PCB and chlordane levels were similar or lower at all sites except Iliomana.
- Levels of all contaminants were elevated for Iliomana when compared with 2005 data.

2 Results

Table 1:

Comparison of mean concentrations of organic contaminants in oysters from 2003 to 2006. Concentrations (ng/g lipid) are lipid-normalised totals of a sub-set of major components used for temporal trend assessment[1]

	Cornwallis Beach			Pahurehure Creek			Hingaia Bridge			Granny's Bay		
Analyte	2006	2005	2003	2006	2005	2003	2006	2005	2003	2006	2005	2003
Total PAH	141 (4)	119 (6)	128 (7)	552 (23)	520 (7)	463 (25)	370 (4)	326 (12)	342 (7)	757 (15)	594 (60)	577 (25)
Total DDT	90 (5)	89 (3)	158 (4)	130 (3)	91 (3)	156 (9)	126 (4)	114 (7)	209 (7)	871 (39)	365 (16)	789 (32)
Dieldrin	11 (1)	16 (4)	12 (2)	14 (1)	28 (4)	16 (1)	38 (2)	17 (2)	19 (1)	42 (2)	16 (1)	39 (2)
Total PCB	49 (3)	54 (3)	74 (2)	81 (1)	59 (2)	76 (5)	63 (1)	54 (4)	69 (2)	347 (14)	158 (7)	302 (14)
Total Chlordane	3.8 (0.3)	3.3 (0.4)	6.9 (0.2)	5.5 (0.3)	2.3 (0.3)	4.6 (0.4)	4.5 (0.2)	2.6 (0.4)	5.3 (0.2)	30 (0.3)	14 (0.8)	34 (0.8)

1. Total PAH = sum of fluoranthene, pyrene, benz[a]anthracene, chrysene, benzo[b]-fluoranthene, benzo[k]fluoranthene, and benzo[a]pyrene. Total DDT = sum of p,p'-DDE, p,p'-DDD, and p,p'-DDT. Total PCB = sum of congeners 118, 153, 138, and 180. Total chlordane = sum of cis-chlordane and trans-chlordane.

2. Numbers in parenthesis represent standard error in site replicates.

3. Numbers in red show mean concentrations generated from selected replicates at a given site.

Table 2a:

Mean concentrations of lipid (%) and organic contaminants (ng/g dry tissue) in mussels from each of the seven sample sites.

Site	Iliomana	Chelsea	Upper Tamaki	Mangere Inlet	Papakura Channel	Upper Waitemata	Weymouth
Lipid (%)	7.3	5.9	5.0	5.6	6.0	6.4	6.6
Total PAH	50	111	107	49	18	78	21
Total DDT	7.1	8.3	4.8	12	3.8	10	2.4
Total Chlordane	0.6	0.7	1.0	1.8	0.3	1.0	0.1
Total PCB	11	16	22	24	4.7	18.9	4.3

Table 2b:

Mean lipid-normalised organic contaminant concentrations (ng/g lipid) in mussels from each of the seven sample sites.

Site	Iliomana	Chelsea	Upper Tamaki	Mangere Inlet	Papakura Channel	Upper Waitemata	Weymouth
Lipid (%)	7.3 (0.1)	5.9 (0.4)	5.0 (0.1)	5.6 (0.1)	6.0 (0.1)	6.4 (0.3)	6.6 (0.1)
Total PAH	677 (23)	1900 (94)	2130 (66)	887 (26)	301 (13)	1218 (39)	312 (1)
Total DDT	98 (5)	140 (6)	95 (2)	216 (4)	64 (3)	158 (7)	36 (1)
Total Chlordane	9.0 (0.5)	13 (0.8)	20 (0.5)	32 (0.8)	6.0 (0.5)	15 (0.2)	2.0 (0.1)
Total PCB	155 (5)	275 (8)	439 (10)	424 (11)	79 (3)	295 (11)	64 (1)

1. Numbers in parenthesis represent standard error in site replicates.

Table 3:

Organic contaminants in oysters at Cornwallis Beach (ng/g dry weight).

NIWA Lab Code	OA121/6	OA121/7	OA121/8	OA121/9	OA121/10
ARC Sample Code	COR 1	COR 2	COR 3	COR 4	COR 5
Lipid Content (% DW)	15.0	14.4	11.4	11.6	13.2
PAHs					
phenanthrene	3.0	2.8	2.8	2.3	2.8
anthracene	0.2	0.2	0.2	0.2	0.2
1-methylphenanthrene	1.6	1.5	1.6	1.1	1.5
fluoranthene	6.4	6.3	5.4	4.9	6.2
pyrene	4.8	4.6	4.2	3.6	4.7
benz[a]anthracene	1.4	1.3	1.1	1.0	1.3
chrysene	4.3	4.1	3.7	3.2	4.0
benzo[b]fluoranthene	2.5	2.3	2.3	1.8	2.3
benzo[k]fluoranthene	0.7	0.7	0.6	0.5	0.6
benzo[e]pyrene	1.6	1.6	1.6	1.3	1.5
benzo[a]pyrene	0.4	0.4	0.3	0.3	0.3
perylene	5.6	2.6	2.4	1.9	2.5
indeno[123-cd]pyrene	0.3	0.3	0.3	0.3	0.4
dibenz[ah]anthracene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
benzo[ghi]perylene	0.6	0.6	0.6	0.6	0.6
Total PAH	33.2	29.1	27.1	23.0	29.0
DDTs					
o,p'-DDE	1.3	1.2	1.1	1.0	1.2
p,p'-DDE	9.8	9.8	9.8	8.8	9.8
o,p'-DDD	0.3	0.3	0.2	0.2	0.3
p,p'-DDD	1.5	1.4	1.5	1.3	1.6
o,p'-DDT	0.2	0.2	0.1	0.2	0.2
p,p'-DDT	0.6	0.6	0.7	0.6	0.7
Total DDT	13.7	13.5	13.4	12.1	13.8
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.3	0.3	0.3	0.3	0.4
c-chlordane	0.2	0.1	0.2	0.2	0.2
t-nonachlor	0.3	0.3	0.3	0.3	0.3

NIWA Lab Code ARC Sample Code	OA121/6 COR 1	OA121/7 COR 2	OA121/8 COR 3	OA121/9 COR 4	OA121/10 COR 5
c-nonachlor	0.3	0.3	0.3	0.3	0.4
Total Chlordane	1.1	1.0	1.1	1.1	1.3
Other OCPs					
Hexachlorobenzene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin	1.4	1.3	1.6	1.2	1.4
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	0.2	0.2	0.2	0.1	0.1
44	< 0.1	0.1	0.1	< 0.1	< 0.1
49	0.2	0.2	0.1	0.1	0.1
52	0.3	0.3	0.3	0.2	0.3
66	0.2	0.2	0.2	0.2	0.2
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	1.0	1.0	1.0	0.9	1.0
105	0.3	0.2	0.2	0.2	0.3
110	0.8	0.8	0.7	0.6	0.7
118	1.0	1.0	1.0	0.9	1.0
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.2	0.2	0.2	0.2	0.2
138	1.8	1.8	1.8	1.8	1.8
141	0.1	0.1	0.1	0.1	0.1
151	0.4	0.4	0.4	0.3	0.4
153	3.2	3.3	3.4	3.1	3.2
156	0.1	< 0.1	< 0.1	< 0.1	< 0.1
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
180	0.3	0.3	0.2	0.2	0.3
187	0.9	0.9	0.9	0.8	0.9
194	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	10.8	11.0	10.8	10.0	10.6

Table 4:

Organic contaminants in oysters at Pahurehure Inlet (ng/g dry weight),

NIWA Lab Code	OA121/1	OA121/2	OA121/3	OA121/4	OA121/5
ARC Sample Code	PAH 1	PAH 2	PAH 3	PAH 4	PAH 5
Lipid Content (% DW)	3.3	7.1	6.7	6.8	5.9
PAHs					
phenanthrene	1.8	3.0	3.1	3.3	3.0
anthracene	< 0.2	< 0.2	0.2	0.2	< 0.2
1-methylphenanthrene	1.0	2.2	2.2	2.2	2.1
fluoranthene	4.2	8.9	8.7	9.9	8.2
pyrene	4.9	10.4	10.3	11.9	10.0
benz[a]anthracene	0.8	2.2	2.2	2.8	2.1
chrysene	3.0	6.5	6.4	7.8	6.6
benzo[b]fluoranthene	2.8	5.5	5.8	7.0	5.9
benzo[k]fluoranthene	0.7	1.5	1.6	2.0	1.6
benzo[e]pyrene	1.8	4.0	4.2	4.8	4.2
benzo[a]pyrene	0.5	0.6	0.7	0.8	0.6
perylene	3.8	10.1	9.2	11.6	9.4
indeno[123-cd]pyrene	1.0	2.1	2.1	2.8	2.5
dibenz[ah]anthracene	0.2	0.5	0.5	0.7	0.6
benzo[ghi]perylene	1.3	2.9	3.0	3.8	3.4
Total PAH	27.8	60.4	60.2	71.7	60.2
DDTs					
o,p'-DDE	< 0.1	0.2	0.2	0.2	0.2
p,p'-DDE	3.7	6.8	7.0	7.2	6.1
o,p'-DDD	< 0.1	0.2	0.2	0.2	0.2
p,p'-DDD	0.4	1.0	1.1	1.1	0.9
o,p'-DDT	0.1	0.3	0.3	0.4	0.3
p,p'-DDT	0.3	0.7	0.7	0.8	0.6
Total DDT	4.6	9.1	9.5	9.8	8.3
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.1	0.2	0.2	0.2	0.2
c-chlordane	0.1	0.1	0.1	0.1	0.1
t-nonachlor	0.1	0.3	0.2	0.2	0.2

NIWA Lab Code ARC Sample Code	OA121/1 PAH 1	OA121/2 PAH 2	OA121/3 PAH 3	OA121/4 PAH 4	OA121/5 PAH 5
c-nonachlor	0.1	0.1	0.1	0.1	0.1
Total Chlordane	0.4	0.7	0.6	0.6	0.6
Other OCPs					
Hexachlorobenzene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin	0.4	1.0	0.9	1.0	1.0
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	0.1	0.1	0.1	0.1	0.1
52	0.1	0.2	0.2	0.2	0.2
66	< 0.1	0.1	0.1	0.1	0.1
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.4	0.8	0.8	0.8	0.7
105	0.1	0.2	0.2	0.2	0.2
110	0.3	0.6	0.6	0.6	0.5
118	0.4	0.7	0.7	0.7	0.6
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.1	0.2	0.2	0.2	0.2
138	0.8	1.7	1.8	1.7	1.5
141	< 0.1	0.1	< 0.1	0.1	< 0.1
151	0.2	0.3	0.3	0.3	0.3
153	1.5	2.8	3.0	2.8	2.4
156	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
180	0.1	0.2	0.2	0.3	0.2
187	0.4	0.8	0.9	0.8	0.7
194	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	4.3	8.9	9.1	9.0	7.7

Table 5:

Organic contaminants in oysters at Hingaia Bridge (ng/g dry weight).

NIWA Lab Code ARC Sample Code	OA121/16 HIN 1	OA121/17 HIN 2	OA121/18 HIN 3	OA121/19 HIN 4	OA121/20 HIN 5
Lipid Content (% DW)	5.0	7.6	6.3	6.2	8.9
PAHs					
phenanthrene	1.6	2.9	2.1	2.1	3.2
anthracene	< 0.2	0.3	< 0.2	0.2	0.2
1-methylphenanthrene	1.1	2.1	1.4	1.5	2.3
fluoranthene	4.3	7.6	6.0	6.1	8.7
pyrene	4.7	8.3	6.7	6.5	9.5
benz[a]anthracene	1.1	1.7	1.4	1.4	2.0
chrysene	3.4	5.2	4.3	4.4	6.0
benzo[b]fluoranthene	3.1	4.1	3.7	3.6	4.8
benzo[k]fluoranthene	0.9	1.1	1.0	1.0	1.3
benzo[e]pyrene	2.1	3.1	2.7	2.5	3.4
benzo[a]pyrene	0.4	0.5	0.5	0.5	0.6
perylene	3.5	4.8	4.5	3.7	6.0
indeno[123-cd]pyrene	0.9	1.0	1.3	1.2	1.3
dibenz[ah]anthracene	0.2	0.3	0.3	0.3	0.4
benzo[ghi]perylene	1.6	1.7	2.0	1.8	2.1
Total PAH	28.8	44.4	37.9	36.8	51.7
DDTs					
o,p'-DDE	< 0.1	0.2	0.1	0.1	0.2
p,p'-DDE	5.2	8.2	5.9	6.4	9.8
o,p'-DDD	0.1	0.2	0.2	0.2	0.2
p,p'-DDD	0.6	1.1	0.8	0.8	1.4
o,p'-DDT	0.1	0.3	0.1	0.2	0.3
p,p'-DDT	0.3	0.8	0.5	0.5	1.1
Total DDT	6.4	10.7	7.6	8.2	13.1
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.2	0.2	0.2	0.1	0.3
c-chlordane	0.1	0.2	0.1	0.1	0.1
t-nonachlor	0.1	0.2	0.2	0.2	0.3

NIWA Lab Code	OA121/16	OA121/17	OA121/18	OA121/19	OA121/20
ARC Sample Code	HIN 1	HIN 2	HIN 3	HIN 4	HIN 5
c-nonachlor	0.1	0.1	0.1	0.1	0.2
Total Chlordane	0.5	0.7	0.6	0.5	0.8
Other OCPs					
Hexachlorobenzene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin	2.1	2.6	2.4	2.4	1.3
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	< 0.1	0.1	0.1	0.1	0.1
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	< 0.1	0.1	< 0.1	< 0.1	0.1
52	0.1	0.2	0.1	0.1	0.2
66	< 0.1	0.1	< 0.1	0.1	0.1
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.4	0.6	0.4	0.5	0.7
105	0.1	0.2	0.1	0.1	0.2
110	0.3	0.5	0.3	0.3	0.5
118	0.4	0.6	0.5	0.5	0.7
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.1	0.2	0.1	0.1	0.2
138	1.1	1.5	1.3	1.3	1.8
141	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
151	0.2	0.2	0.2	0.2	0.3
153	1.8	2.4	1.9	2.0	2.8
156	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
180	0.2	0.2	0.2	0.2	0.2
187	0.6	0.9	0.6	0.7	1.1
194	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	5.1	7.8	5.8	6.2	9.1

Table 6:

Organic contaminants in oysters at Granny's Bay (ng/g dry weight).

NIWA Lab Code ARC Sample Code	OA121/11 GRA 1	OA121/12 GRA 2	OA121/13 GRA 3	OA121/14 GRA 4	OA121/15 GRA 5
Lipid Content (% DW)	5.3	5.5	4.4	5.5	5.5
PAHs					
phenanthrene	2.7	2.9	2.3	2.7	2.9
anthracene	0.2	0.3	0.2	0.3	0.3
1-methylphenanthrene	1.8	1.8	1.5	2.0	2.0
fluoranthene	8.4	8.5	6.9	8.6	9.8
pyrene	11.3	11.5	9.5	12.3	13.3
benz[a]anthracene	2.4	2.5	2.1	2.7	3.2
chrysene	8.1	8.3	6.6	8.0	8.9
benzo[b]fluoranthene	6.8	6.6	5.6	6.3	6.8
benzo[k]fluoranthene	2.0	1.9	1.7	1.9	2.0
benzo[e]pyrene	5.1	5.0	4.2	5.1	5.6
benzo[a]pyrene	0.7	0.7	0.7	0.8	0.9
perylene	2.7	3.2	6.3	3.5	4.0
indeno[123-cd]pyrene	3.0	2.6	2.6	2.2	2.3
dibenz[ah]anthracene	0.9	0.8	0.8	0.6	0.7
benzo[ghi]perylene	4.2	3.8	3.4	3.5	3.6
Total PAH	60.3	60.5	54.5	60.4	66.2
DDTs					
o,p'-DDE	1.1	1.0	0.8	1.1	1.1
p,p'-DDE	47.6	42.0	31.3	47.1	39.7
o,p'-DDD	0.8	0.8	0.6	0.8	0.7
p,p'-DDD	3.5	3.4	2.5	3.7	3.8
o,p'-DDT	0.5	0.5	0.4	0.5	0.6
p,p'-DDT	1.1	0.8	0.7	0.9	0.7
Total DDT	54.6	48.5	36.2	54.1	46.6
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	1.1	1.1	0.8	1.1	1.1
c-chlordane	0.5	0.6	0.5	0.5	0.5
t-nonachlor	0.8	0.8	0.6	0.7	0.6
c-nonachlor	0.9	0.9	0.7	0.9	0.9

NIWA Lab Code ARC Sample Code	OA121/11 GRA 1	OA121/12 GRA 2	OA121/13 GRA 3	OA121/14 GRA 4	OA121/15 GRA 5
Total Chlordane	3.3	3.4	2.6	3.2	3.1
Other OCPs					
Hexachlorobenzene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin	2.4	2.1	1.8	2.4	2.5
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	0.6	0.5	0.4	0.6	0.7
44	0.3	0.3	0.2	0.3	0.4
49	0.6	0.5	0.4	0.6	0.6
52	1.0	1.0	0.7	1.0	1.0
66	0.8	0.7	0.6	0.9	0.8
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	3.7	3.5	2.5	3.6	3.4
105	0.9	0.9	0.6	0.8	0.8
110	2.7	2.6	1.8	2.7	2.7
118	3.5	3.4	2.3	3.4	3.2
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.5	0.5	0.4	0.4	0.5
138	6.2	5.7	3.8	5.2	5.2
141	0.2	0.2	0.2	0.2	0.2
151	1.2	1.1	0.8	1.1	1.0
153	10.7	9.7	7.2	10.1	9.0
156	0.2	0.2	0.1	0.2	0.2
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	0.1	0.1	< 0.1	< 0.1	0.1
180	0.6	0.5	0.4	0.5	0.5
187	2.4	2.4	1.7	2.4	2.4
194	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	36.2	33.8	24.1	34.1	32.6

Table 7:

Organic contaminants in mussels from Iliomana (ng/g dry weight).

Niwa Lab Code	OA122/1	OA122/2	OA122/3	OA122/4	OA122/5
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
Lipid Content (% DW)	7.0	7.1	7.4	7.6	7.6
PAHs					
phenanthrene	3.4	3.4	2.9	2.6	3.2
anthracene	0.6	0.6	0.7	0.5	0.6
1-methylphenanthrene	0.9	0.9	0.8	0.8	1.0
fluoranthene	5.7	6.2	6.5	5.2	6.1
pyrene	5.8	6.4	6.7	5.5	6.5
benz[a]anthracene	2.6	2.9	3.0	2.6	2.9
chrysene	4.3	4.8	4.3	4.2	4.9
benzo[b]fluoranthene	5.4	6.1	5.6	5.5	6.1
benzo[k]fluoranthene	2.0	2.3	2.1	2.0	2.3
benzo[e]pyrene	2.5	2.9	2.8	2.5	3.1
benzo[a]pyrene	3.0	3.6	4.0	3.1	3.6
perylene	2.0	2.3	2.3	2.0	2.4
indeno[123-cd]pyrene	3.8	4.4	4.5	3.8	4.4
dibenz[ah]anthracene	0.8	1.0	1.0	0.8	1.0
benzo[ghi]perylene	3.9	4.6	4.4	3.9	4.6
Total PAH	46.9	52.2	51.5	45.1	52.5
DDTs					
o,p-DDE	0.3	0.3	0.2	0.2	0.3
p,p'-DDE	1.6	1.7	1.4	1.6	1.9
o,p-DDD	0.7	0.7	0.6	0.7	0.7
p,p-DDD	2.1	2.0	1.7	2.0	2.1
o,p-DDT	0.5	0.6	0.4	0.5	0.5
p,p'-DDT	2.2	2.2	1.6	2.1	2.1
Total DDT	7.4	7.4	6.0	7.2	7.7
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epox	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
trans-chlordane	0.2	0.2	0.2	0.2	0.2
cis-chlordane	0.1	0.1	0.1	0.1	0.1
trans-nonachlor	0.2	0.2	0.2	0.2	0.2

Niwa Lab Code	OA122/1	OA122/2	OA122/3	OA122/4	OA122/5
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
cis-nonachlor	0.1	0.1	0.1	0.1	0.1
Total Chlordane	0.7	0.7	0.5	0.6	0.7
Other OCPs					
Hexachlorobenzene	0.4	0.4	0.3	0.3	0.4
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin					
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
52	0.2	0.2	0.2	0.2	0.2
66	0.1	0.1	0.1	0.1	0.1
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.3	0.3	0.3	0.3	0.3
105	0.3	0.2	0.2	0.3	0.3
110	0.1	0.1	0.1	0.1	0.1
118	0.9	0.8	0.7	0.9	0.9
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.4	0.4	0.3	0.4	0.4
138	3.1	2.8	2.6	3.0	3.3
141	< 0.1	< 0.1	< 0.1	< 0.1	0.1
151	0.3	0.3	0.3	0.3	0.4
153	3.5	3.3	3.0	3.4	3.8
156	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	0.4	0.4	0.4	0.4	0.5
180	0.9	0.9	0.8	0.9	1.0
187	1.0	0.9	0.9	1.0	1.1
194	0.1	0.1	0.1	0.1	0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	11.6	11.0	10.2	11.4	12.7

Table 8:

Organic contaminants in mussels from Chelsea (ng/g dry weight).

NIWA Lab Code	OA122/6	OA122/7	OA122/8	OA122/9	OA122/10
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
Lipid Content (% DW)	5.5	7.1	4.9	5.9	5.9
PAHs					
phenanthrene	6.3	7.6	5.8	5.0	6.1
anthracene	1.2	1.3	1.0	0.9	1.2
1-methylphenanthrene	2.1	2.5	2.0	1.7	1.9
fluoranthene	14.5	14.6	10.3	10.8	14.0
pyrene	14.9	15.1	11.0	11.0	14.9
benz[a]anthracene	6.7	7.1	5.2	5.3	7.1
chrysene	10.3	11.6	8.6	8.3	10.4
benzo[b]fluoranthene	12.9	14.2	10.7	10.8	13.7
benzo[k]fluoranthene	4.8	5.3	4.0	4.1	5.2
benzo[e]pyrene	7.1	7.4	5.6	5.5	7.2
benzo[a]pyrene	8.0	8.8	6.6	6.6	8.8
perylene	6.9	7.5	6.0	7.2	7.7
indeno[123-cd]pyrene	9.4	9.9	7.6	7.6	9.8
dibenz[ah]anthracene	2.1	2.3	1.8	1.9	2.3
benzo[ghi]perylene	10.2	10.8	8.3	8.3	10.7
Total PAH	117.4	126.2	94.5	95.0	120.8
DDTs					
o,p'-DDE	0.2	0.3	0.2	0.3	0.3
p,p'-DDE	2.7	4.0	2.0	3.5	3.3
o,p'-DDD	0.8	0.9	0.5	0.8	0.8
p,p'-DDD	2.0	2.6	1.5	2.3	2.3
o,p'-DDT	0.6	0.6	0.4	0.5	0.5
p,p'-DDT	1.4	1.8	1.0	1.6	1.6
Total DDT	7.7	10.1	5.7	9.0	8.8
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.3	0.3	0.2	0.2	0.2
c-chlordane	0.2	0.2	0.1	0.2	0.2
t-nonachlor	0.2	0.2	0.1	0.2	0.2

NIWA Lab Code	OA122/6	OA122/7	OA122/8	OA122/9	OA122/10
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
c-nonachlor	0.1	0.2	0.1	0.2	0.2
Total Chlordane	0.8	0.8	0.5	0.8	0.8
Other OCPs					
Hexachlorobenzene	0.6	0.8	0.5	0.5	0.5
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin					
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	0.2	< 0.1	< 0.1	< 0.1	< 0.1
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
52	0.3	0.3	0.2	0.3	0.3
66	0.2	0.2	0.1	0.2	0.2
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.5	0.5	0.3	0.4	0.4
105	0.4	0.4	0.3	0.4	0.4
110	0.2	0.2	0.1	0.2	0.2
118	1.1	1.4	0.9	1.3	1.3
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.6	0.7	0.5	0.7	0.6
138	4.1	5.0	3.3	4.6	4.5
141	0.2	0.2	0.1	0.1	0.1
151	0.4	0.5	0.3	0.5	0.4
153	4.1	5.1	3.4	4.8	4.6
156	0.1	0.2	0.2	0.2	0.2
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	0.6	0.7	0.5	0.7	0.7
180	1.1	1.3	1.0	1.2	1.2
187	1.4	1.7	1.1	1.6	1.6
194	0.1	0.1	< 0.1	0.1	0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	15.6	18.6	12.3	17.3	16.8

Table 9:

Organic contaminants in mussels from Upper Tamaki Estuary (ng/g dry weight).

NIWA Lab Code	OA122/11	OA122/12	OA122/13	OA122/14	OA122/15
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
Lipid Content (% DW)	5.1	4.7	5.1	5.4	4.8
PAHs					
phenanthrene	5.1	4.1	3.7	4.2	4.3
anthracene	1.0	0.8	0.7	0.8	0.9
1-methylphenanthrene	1.9	1.7	1.6	1.8	1.6
fluoranthene	12.3	10.4	9.9	10.5	10.7
pyrene	15.1	13.6	13.4	14.2	13.7
benz[a]anthracene	5.8	4.8	4.5	5.0	5.2
chrysene	9.4	7.4	8.0	8.5	8.7
benzo[b]fluoranthene	12.3	10.1	10.6	11.3	11.4
benzo[k]fluoranthene	4.5	3.8	3.8	4.2	4.2
benzo[e]pyrene	6.7	5.8	5.8	6.3	6.3
benzo[a]pyrene	6.9	6.1	5.5	6.1	6.6
perylene	16.1	13.9	14.9	15.9	15.6
indeno[123-cd]pyrene	8.5	7.2	7.4	7.8	7.8
dibenz[ah]anthracene	2.0	1.6	1.7	1.8	1.9
benzo[ghi]perylene	10.0	8.5	9.0	9.3	9.3
Total PAH	117.6	99.7	100.7	107.8	108.1
DDTs					
o,p'-DDE	0.1	< 0.1	0.1	0.1	< 0.1
p,p'-DDE	2.1	1.5	1.8	2.0	2.0
o,p'-DDD	0.5	0.4	0.5	0.5	0.4
p,p'-DDD	1.6	1.3	1.5	1.6	1.4
o,p'-DDT	0.2	0.2	0.3	0.2	0.2
p,p'-DDT	0.7	0.7	0.8	0.7	0.6
Total DDT	5.2	4.1	5.0	5.0	4.6
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.4	0.3	0.4	0.4	0.4
c-chlordane	0.2	0.2	0.2	0.2	0.2
t-nonachlor	0.3	0.2	0.2	0.3	0.2
c-nonachlor	0.2	0.2	0.2	0.2	0.2

NIWA Lab Code	OA122/11	OA122/12	OA122/13	OA122/14	OA122/15
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
Total Chlordane	1.1	0.9	1.0	1.1	1.0
Other OCPs					
Hexachlorobenzene	0.7	0.4	0.6	0.5	0.6
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin					
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	0.3	0.2	0.3	0.3	0.3
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	0.1	< 0.1	0.1	0.1	< 0.1
52	0.5	0.5	0.5	0.6	0.5
66	0.4	0.4	0.4	0.4	0.4
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.9	0.9	0.8	0.8	0.8
105	0.5	0.4	0.5	0.6	0.5
110	0.3	0.3	0.3	0.3	0.3
118	1.7	1.4	1.6	1.8	1.6
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.7	0.7	0.7	0.8	0.8
138	5.9	5.0	5.3	6.4	5.7
141	0.3	0.3	0.3	0.3	0.3
151	0.7	0.6	0.7	0.8	0.6
153	5.7	5.0	5.1	6.1	5.4
156	0.3	0.2	0.2	0.2	0.2
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	0.9	0.9	0.8	1.0	0.9
180	1.7	1.6	1.5	1.8	1.7
187	1.9	1.6	1.7	2.0	1.8
194	0.1	0.1	0.1	0.1	0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	23.0	20.0	20.8	24.5	22.0

Table 10:

Organic contaminants in mussels from Mangere Inlet (ng/g dry weight).

NIWA Lab Code	OA122/26	OA122/27	OA122/28	OA122/29	OA122/30
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
Lipid Content (% DW)	5.4	5.6	6.0	5.4	5.5
PAHs					
phenanthrene	3.0	2.9	2.9	2.7	3.0
anthracene	0.6	0.4	0.5	0.4	0.5
1-methylphenanthrene	1.1	1.1	1.1	1.1	1.2
fluoranthene	5.0	5.0	4.7	4.5	5.0
pyrene	7.9	7.8	7.7	7.6	8.1
benz[a]anthracene	2.6	2.4	2.3	2.1	2.3
chrysene	4.9	4.7	4.5	4.3	4.5
benzo[b]fluoranthene	5.3	5.3	4.9	4.7	4.9
benzo[k]fluoranthene	1.8	1.8	1.8	1.7	1.8
benzo[e]pyrene	3.0	3.1	2.9	2.8	2.8
benzo[a]pyrene	2.7	2.6	2.5	2.4	2.5
perylene	5.4	6.1	5.0	4.7	4.9
indeno[123-cd]pyrene	3.3	3.1	2.9	2.7	2.9
dibenz[ah]anthracene	0.7	0.6	0.6	0.6	0.6
benzo[ghi]perylene	4.6	4.5	4.2	3.9	4.0
Total PAH	51.8	51.4	48.5	46.4	49.0
DDTs					
o,p'-DDE	0.7	0.6	0.7	0.6	0.6
p,p'-DDE	8.8	8.6	9.6	8.2	9.3
o,p'-DDD	0.3	0.3	0.3	0.2	0.3
p,p'-DDD	1.7	1.7	1.7	1.6	1.8
o,p'-DDT	0.1	0.1	0.2	0.2	0.2
p,p'-DDT	0.4	0.3	0.4	0.4	0.4
Total DDT	12.0	11.6	13.0	11.1	12.6
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.7	0.7	0.7	0.6	0.7
c-chlordane	0.3	0.3	0.3	0.3	0.3
t-nonachlor	0.4	0.4	0.3	0.3	0.3

NIWA Lab Code	OA122/26	OA122/27	OA122/28	OA122/29	OA122/30
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
c-nonachlor	0.5	0.4	0.4	0.4	0.4
Total Chlordane	1.9	1.8	1.8	1.7	1.8
Other OCPs					
Hexachlorobenzene	0.3	0.4	0.4	0.3	0.3
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin					
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	0.4	0.4	0.4	0.4	0.4
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	0.1	0.2	0.2	0.1	0.2
52	0.6	0.6	0.7	0.6	0.8
66	0.6	0.6	0.7	0.6	0.7
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.9	1.0	1.2	0.9	1.1
105	0.7	0.6	0.6	0.6	0.7
110	0.4	0.4	0.5	0.4	0.5
118	2.1	2.0	2.1	1.9	2.2
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.8	0.8	0.8	0.7	0.8
138	5.7	5.3	5.6	5.1	5.7
141	0.3	0.3	0.3	0.3	0.3
151	0.7	0.7	0.7	0.6	0.8
153	5.1	4.6	5.0	4.5	5.1
156	0.3	0.3	0.3	0.2	0.3
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	1.1	1.0	1.0	0.9	1.1
180	1.9	1.7	1.8	1.6	1.8
187	2.2	2.1	2.2	2.0	2.3
194	0.2	0.2	0.2	0.2	0.2
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	24.3	22.9	24.4	21.9	24.7

Table 11:

Organic contaminants in mussels from Papakura Channel (ng/g dry weight).

NIWA Lab Code	OA122/16	OA122/17	OA122/18	OA122/19	OA122/20
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
Lipid Content (% DW)	5.8	6.0	5.9	6.2	5.9
PAHs					
phenanthrene	1.3	2.0	1.6	1.8	1.7
anthracene	0.3	0.3	0.2	< 0.2	0.2
1-methylphenanthrene	0.5	0.5	0.5	0.5	0.5
fluoranthene	1.7	2.4	1.7	1.9	1.8
pyrene	1.8	2.5	1.9	2.1	2.1
benz[a]anthracene	0.8	1.1	0.8	0.7	0.7
chrysene	1.6	1.8	1.4	1.4	1.4
benzo[b]fluoranthene	1.6	1.9	1.6	1.6	1.5
benzo[k]fluoranthene	0.5	0.7	0.5	0.6	0.5
benzo[e]pyrene	0.9	1.1	0.9	0.9	0.9
benzo[a]pyrene	1.0	1.3	1.1	1.0	0.9
perylene	2.6	2.6	2.4	2.6	2.6
indeno[123-cd]pyrene	0.9	1.3	1.2	1.0	1.0
dibenz[ah]anthracene	< 0.2	0.2	0.2	< 0.2	< 0.2
benzo[ghi]perylene	1.3	1.5	1.5	1.3	1.2
Total PAH	16.7	21.2	17.4	17.3	17.0
DDTs					
o,p'-DDE	0.4	0.4	0.4	0.4	0.4
p,p'-DDE	3.2	2.6	2.4	3.0	2.5
o,p'-DDD	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p,p'-DDD	0.5	0.4	0.5	0.4	0.4
o,p'-DDT	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p,p'-DDT	0.2	0.2	0.2	0.2	0.2
Total DDT	4.4	3.6	3.5	4.1	3.5
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.2	0.2	0.2	0.2	0.2
c-chlordane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-nonachlor	0.1	< 0.1	< 0.1	< 0.1	< 0.1

NIWA Lab Code	OA122/16	OA122/17	OA122/18	OA122/19	OA122/20
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
c-nonachlor	0.1	0.1	0.1	0.1	0.1
Total Chlordane	0.4	0.3	0.3	0.3	0.3
Other OCPs					
Hexachlorobenzene	0.3	0.2	0.3	0.2	0.2
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin					
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	< 0.1	< 0.1	< 0.1	0.1	< 0.1
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
52	0.1	0.1	0.1	0.1	0.1
66	0.1	< 0.1	< 0.1	0.2	< 0.1
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.1	0.1	0.1	0.2	0.1
105	0.2	0.1	0.1	0.2	0.1
110	< 0.1	< 0.1	< 0.1	0.1	< 0.1
118	0.4	0.4	0.4	0.5	0.4
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.2	0.1	0.2	0.3	0.1
138	1.4	1.2	1.2	1.5	1.1
141	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
151	0.2	0.1	0.1	0.2	0.1
153	1.4	1.2	1.2	0.8	1.1
156	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	0.2	0.3	0.2	0.3	0.2
180	0.4	0.4	0.4	0.2	0.4
187	0.5	0.4	0.4	0.5	0.4
194	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	5.2	4.7	4.4	5.2	4.1

Table 12:

Organic contaminants in mussels from Upper Waitemata Harbour (ng/g dry weight).

NIWA Lab Code	OA122/21	OA122/22	OA122/23	OA122/24	OA122/25
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
Lipid Content (% DW)	6.3	6.6	5.4	6.6	7.0
PAHs					
phenanthrene	21.4	3.4	2.9	3.5	4.1
anthracene	3.4	0.6	0.5	0.5	0.8
1-methylphenanthrene	8.3	1.2	1.0	1.3	1.6
fluoranthene	13.1	7.6	6.2	8.2	9.5
pyrene	12.0	8.5	7.1	9.3	10.4
benz[a]anthracene	4.8	4.1	3.0	4.0	4.7
chrysene	10.5	6.6	5.2	6.8	7.8
benzo[b]fluoranthene	10.1	9.2	7.7	9.7	11.0
benzo[k]fluoranthene	3.6	3.2	2.8	3.6	4.0
benzo[e]pyrene	5.8	4.8	3.9	5.0	5.6
benzo[a]pyrene	5.6	5.2	4.2	5.2	6.3
perylene	7.8	7.0	6.1	7.5	9.0
indeno[123-cd]pyrene	6.8	6.5	5.4	7.1	7.7
dibenz[ah]anthracene	1.7	1.4	1.1	1.5	1.7
benzo[ghi]perylene	7.5	7.0	5.8	7.8	8.4
Total PAH	122.4	76.4	62.7	81.0	92.8
DDTs					
o,p'-DDE	0.3	0.3	0.2	0.3	0.3
p,p'-DDE	5.6	5.2	3.3	5.4	6.0
o,p'-DDD	0.8	0.8	0.6	0.9	1.0
p,p'-DDD	2.7	2.7	2.0	2.8	3.1
o,p'-DDT	0.2	0.2	0.2	0.3	0.3
p,p'-DDT	1.2	1.1	0.8	1.3	1.2
Total DDT	10.7	10.3	7.1	10.8	11.9
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.3	0.3	0.3	0.3	0.4
c-chlordane	0.2	0.2	0.2	0.2	0.2
t-nonachlor	0.3	0.3	0.2	0.2	0.3

NIWA Lab Code	OA122/21	OA122/22	OA122/23	OA122/24	OA122/25
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
c-nonachlor	0.2	0.2	0.2	0.2	0.2
Total Chlordane	1.0	1.0	0.8	1.0	1.1
Other OCPs					
Hexachlorobenzene	0.4	0.3	0.4	0.3	0.5
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin					
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	0.1	< 0.1	0.1	< 0.1	0.1
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
52	0.5	0.3	0.2	0.3	0.4
66	0.2	0.2	0.2	0.2	0.3
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.5	0.4	0.3	0.4	0.5
105	0.5	0.5	0.4	0.4	0.6
110	0.2	0.2	0.1	0.2	0.2
118	1.6	1.7	1.2	1.5	1.9
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.8	0.9	0.6	0.7	0.9
138	5.3	5.8	4.0	4.8	6.0
141	0.2	0.1	< 0.1	0.1	0.2
151	0.5	0.5	0.4	0.5	0.6
153	5.0	5.3	3.9	4.8	5.9
156	0.2	0.2	0.2	0.2	0.2
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	0.8	0.9	0.6	0.7	0.8
180	1.3	1.5	1.0	1.2	1.5
187	1.7	1.8	1.3	1.5	2.0
194	0.1	0.1	0.1	0.1	0.2
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	19.5	20.5	14.6	17.6	22.1

Table 13:

Organic contaminants in mussels from Weymouth (ng/g dry weight).

NIWA Lab Code	OA122/31	OA122/32	OA122/33	OA122/34	OA122/35
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
Lipid Content (% DW)	6.7	6.8	6.2	7.0	6.5
PAHs					
phenanthrene	2.0	2.9	8.6	11.9	4.9
anthracene	0.2	0.4	1.2	1.8	0.7
1-methylphenanthrene	0.7	0.9	2.8	3.9	1.5
fluoranthene	2.1	2.3	4.4	5.5	3.0
pyrene	2.9	2.8	4.0	4.9	3.4
benz[a]anthracene	0.9	0.8	1.0	1.2	0.9
chrysene	1.9	1.9	2.9	3.6	2.4
benzo[b]fluoranthene	1.9	1.7	1.9	1.9	2.0
benzo[k]fluoranthene	0.6	0.5	0.6	0.6	0.7
benzo[e]pyrene	1.2	1.1	1.3	1.4	1.3
benzo[a]pyrene	1.1	0.8	0.9	1.0	1.0
perylene	2.6	2.4	2.6	2.5	2.7
indeno[123-cd]pyrene	1.0	1.0	1.0	1.0	1.3
dibenz[ah]anthracene	0.2	0.2	0.2	0.3	0.3
benzo[ghi]perylene	1.4	1.4	1.4	1.4	1.7
Total PAH	20.9	21.2	34.9	42.9	27.6
DDTs					
o,p'-DDE	0.2	0.2	0.1	0.2	0.1
p,p'-DDE	1.7	1.7	1.6	1.8	1.5
o,p'-DDD	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p,p'-DDD	0.3	0.3	0.3	0.4	0.3
o,p'-DDT	< 0.1	< 0.1	< 0.1	< 0.1	0.1
p,p'-DDT	0.2	0.2	0.2	0.2	0.2
Total DDT	2.5	2.4	2.3	2.6	2.2
Chlordanes					
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-chlordane	0.1	0.1	0.1	0.1	0.1
c-chlordane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
t-nonachlor	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

NIWA Lab Code	OA122/31	OA122/32	OA122/33	OA122/34	OA122/35
ARC Sample Code	# 1	# 2	# 3	# 4	# 5
c-nonachlor	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Chlordane	0.1	0.1	0.1	0.1	0.1
Other OCPs					
Hexachlorobenzene	0.4	0.4	0.4	0.4	0.3
lindane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin					
PCBs					
8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
44	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
49	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
52	0.1	0.1	0.2	0.2	0.1
66	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
101	0.1	0.1	0.1	0.1	< 0.1
105	0.1	< 0.1	0.1	0.1	< 0.1
110	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
118	0.3	0.3	0.3	0.4	0.3
121	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
128	0.1	0.2	0.2	0.2	0.2
138	1.1	1.2	1.1	1.3	1.2
141	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
151	0.1	0.1	0.1	0.1	0.1
153	1.2	1.2	1.2	1.3	1.2
156	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
169	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
170	0.2	0.2	0.2	0.2	0.2
180	0.4	0.4	0.4	0.4	0.4
187	0.4	0.4	0.4	0.4	0.4
194	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
195	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB	4.1	4.2	4.2	4.7	4.1

Table 14:

Organic contaminants in mussels predeployment (ng/g dry weight).

NIWA Lab Code	OA122/36
ARC Sample Code	Predeployment
Lipid Content (% DW)	5.7
PAHs	
phenanthrene	5.4
anthracene	0.5
1-methylphenanthrene	1.8
fluoranthene	2.4
pyrene	2.2
benz[a]anthracene	0.5
chrysene	1.8
benzo[b]fluoranthene	0.7
benzo[k]fluoranthene	< 0.2
benzo[e]pyrene	0.5
benzo[a]pyrene	0.4
perylene	< 0.2
indeno[123-cd]pyrene	0.3
dibenz[ah]anthracene	< 0.2
benzo[ghi]perylene	0.4
Total PAH	16.9
DDTs	
o,p'-DDE	< 0.1
p,p'-DDE	< 0.1
o,p'-DDD	< 0.1
p,p'-DDD	0.1
o,p'-DDT	< 0.1
p,p'-DDT	< 0.1
Total DDT	<0.3
Chlordanes	
heptachlor	< 0.2
heptachlor epoxide	< 0.1
t-chlordane	< 0.1
c-chlordane	< 0.1
t-nonachlor	< 0.1

NIWA Lab Code	OA122/36
ARC Sample Code	Predeployment
c-nonachlor	< 0.1
Total Chlordane	<0.3
Other OCPs	
Hexachlorobenzene	0.2
lindane	< 0.1
dieldrin	
PCBs	
8	< 0.1
18	< 0.1
28	< 0.1
44	< 0.1
49	< 0.1
52	< 0.1
66	< 0.1
77	< 0.1
86	< 0.1
101	< 0.1
105	< 0.1
110	< 0.1
118	< 0.1
121	< 0.1
126	< 0.1
128	< 0.1
138	0.2
141	< 0.1
151	< 0.1
153	0.2
156	< 0.1
169	< 0.1
170	< 0.1
180	< 0.1
187	< 0.1
194	< 0.1
195	< 0.1
206	< 0.1
209	< 0.1
Total PCB	<2.0

Table 15:

Organic contaminants in mussel composites (ng/g dry weight).

NIWA Lab Code ARC Sample Code	OA122/Comp 1	OA122/Comp 2	OA122/Comp 3
Lipid Content (% DW)	6.9	7.5	7.3
PAHs			
phenanthrene	3.9	4.0	3.7
anthracene	0.7	0.7	0.7
1-methylphenanthrene	1.2	1.2	1.1
fluoranthene	5.5	5.9	5.7
pyrene	5.4	6.0	5.7
benz[a]anthracene	2.5	2.8	2.7
chrysene	4.3	4.6	4.4
benzo[b]fluoranthene	5.4	5.9	5.5
benzo[k]fluoranthene	2.0	2.2	2.0
benzo[e]pyrene	2.7	2.9	2.7
benzo[a]pyrene	3.1	3.5	3.4
perylene	2.0	2.2	2.2
indeno[123-cd]pyrene	3.8	4.2	4.0
dibenz[ah]anthracene	0.8	0.9	0.9
benzo[ghi]perylene	3.9	4.2	4.1
Total PAH	47.3	51.3	48.9
DDTs			
o,p'-DDE	0.3	0.3	0.2
p,p'-DDE	1.6	1.6	1.4
o,p'-DDD	0.8	0.7	0.7
p,p'-DDD	1.9	1.9	1.8
o,p'-DDT	0.4	0.4	0.4
p,p'-DDT	1.7	1.7	1.6
Total DDT	6.7	6.7	6.1
Chlordanes			
heptachlor	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.1	< 0.1	< 0.1
t-chlordane	0.2	0.2	0.2
c-chlordane	0.1	0.1	0.1
t-nonachlor	0.2	0.2	0.2
c-nonachlor	0.1	0.1	0.1

NIWA Lab Code ARC Sample Code	OA122/Comp 1	OA122/Comp 2	OA122/Comp 3
Total Chlordane	0.6	0.6	0.6
Other OCPs			
Hexachlorobenzene	0.3	0.3	0.3
lindane	< 0.1	< 0.1	< 0.1
dieldrin			
PCBs			
8	< 0.1	< 0.1	< 0.1
18	< 0.1	< 0.1	< 0.1
28	< 0.1	< 0.1	< 0.1
44	< 0.1	< 0.1	< 0.1
49	< 0.1	< 0.1	< 0.1
52	0.2	0.2	0.2
66	0.1	0.1	0.2
77	< 0.1	< 0.1	< 0.1
86	< 0.1	< 0.1	< 0.1
101	0.3	0.3	0.3
105	0.2	0.2	0.2
110	0.1	0.1	0.1
118	0.8	0.8	0.7
121	< 0.1	< 0.1	< 0.1
126	< 0.1	< 0.1	< 0.1
128	0.4	0.4	0.3
138	3.0	2.9	2.7
141	< 0.1	< 0.1	< 0.1
151	0.3	0.3	0.3
153	3.4	3.3	3.0
156	< 0.1	< 0.1	< 0.1
169	< 0.1	< 0.1	< 0.1
170	0.4	0.5	0.4
180	0.9	0.9	0.8
187	0.8	0.8	0.7
194	0.1	0.1	< 0.1
195	< 0.1	< 0.1	< 0.1
206	< 0.1	< 0.1	< 0.1
209	< 0.1	< 0.1	< 0.1
Total PCB	11.0	10.9	10.0

Table 16:

Organic contaminants in archived mussel and oyster samples from 2003 (ng/g dry weight).

NIWA Lab Code	OA92/15	OA92/15	OA93/13	OA93/13
Year analysed	2003	2006	2003	2006
Lipid Content (% DW)	10.1	9.2	6.4	6.4
PAHs				
phenanthrene	2.5	2.8	2.6	3.6
anthracene	1.0	0.3	1.3	0.7
1-methylphenanthrene	2.3	2.7	1.1	1.4
fluoranthene	13.3	11.9	7.8	8.0
pyrene	20.2	16.8	12.5	11.3
benz[a]anthracene	4.2	1.8	3.9	3.6
chrysene	10.0	10.7	7.1	7.4
benzo[b]fluoranthene	5.0	6.0	6.5	10.2
benzo[k]fluoranthene	2.6	1.8	5.1	3.7
benzo[e]pyrene	4.8	5.1	4.7	5.6
benzo[a]pyrene	1.4	0.5	4.5	3.6
perylene	4.4	2.0	11.3	10.1
indeno[123-cd]pyrene	1.2	1.6	4.2	6.2
dibenz[ah]anthracene	0.4	0.6	1.0	1.3
benzo[ghi]perylene	2.0	2.6	5.9	7.8
Total PAH	75.3	67.2	79.6	84.7
DDTs				
o,p'-DDE	2.0	2.2	0.2	0.2
p,p'-DDE	59.8	68.1	3.0	3.1
o,p'-DDD	0.8	1.0	0.7	0.8
p,p'-DDD	5.0	4.6	2.7	2.3
o,p'-DDT	< 0.1	< 0.1	0.2	0.2
p,p'-DDT	0.7	0.7	0.7	0.7
Total DDT	68.3	76.5	7.5	7.2
Chlordanes				
heptachlor	< 0.2	< 0.2	< 0.1	< 0.2
heptachlor epoxide	0.2	< 0.1	0.2	< 0.1
t-chlordane	1.4	1.5	0.2	0.3
c-chlordane	1.3	1.3	0.3	0.3
t-nonachlor	1.4	1.5	0.4	0.4

NIWA Lab Code	OA92/15	OA92/15	OA93/13	OA93/13
Year analysed	2003	2006	2003	2006
c-nonachlor	1.7	2.0	0.3	0.3
Total Chlordane	6.0	6.3	1.4	1.4
Other OCPs				
Hexachlorobenzene	< 0.1	< 0.1		0.2
lindane	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin				
PCBs				
8	<0.1	< 0.1	< 0.1	< 0.1
18	<0.1	< 0.1	< 0.1	< 0.1
28	0.7	0.4	0.3	0.2
44	0.8	0.8	< 0.1	< 0.1
49	0.9	1.0	0.1	0.1
52	2.0	2.0	0.7	0.5
66	1.3	1.4	0.5	0.4
77	0.2	0.2	< 0.1	< 0.1
86	<0.1	< 0.1	< 0.1	< 0.1
101	6.1	6.0	1.4	1.3
105	1.2	1.3	0.6	0.7
110	4.2	4.7	0.4	0.4
118	5.1	5.1	2.4	2.4
121	<0.1	< 0.1	< 0.1	< 0.1
126	0.2	< 0.1	< 0.1	< 0.1
128	0.8	0.9	1.1	1.0
138	9.3	9.3	7.6	8.0
141	0.5	0.5	0.4	0.4
151	1.9	1.8	1.1	1.0
153	12.0	13.0	7.9	7.7
156	0.3	0.3	0.2	0.3
169	<0.1	< 0.1	< 0.1	< 0.1
170	0.2	0.2	1.3	1.2
180	0.9	1.0	2.1	2.3
187	3.1	2.8	2.2	2.4
194	0.2	< 0.1	0.2	0.2
195	<0.1	< 0.1	< 0.1	< 0.1
206	<0.1	< 0.1	< 0.1	< 0.1
209	<0.1	< 0.1	< 0.1	< 0.1
Total PCB	51.9	52.6	30.5	30.7

Table 17:

Organic contaminants in archived mussel and oyster samples from 2005 (ng/g dry weight).

NIWA Lab Code Year analysed	OA115/8 2005	OA115/10 2006	OA114/18 2005	OA114/19 2006
Lipid Content (% DW)	10.5	9.6	7.0	6.6
PAHs				
phenanthrene	1.7	2.1	1.1	1.9
anthracene	<0.2	< 0.2	<0.2	< 0.2
1-methylphenanthrene	1.0	1.2	0.3	0.4
fluoranthene	3.1	3.0	1.0	1.2
pyrene	2.6	2.6	1.1	1.3
benz[a]anthracene	0.7	0.6	0.3	0.4
chrysene	2.2	2.6	0.9	0.9
benzo[b]fluoranthene	1.5	1.9	0.6	0.9
benzo[k]fluoranthene	0.7	0.5	0.5	0.3
benzo[e]pyrene	1.2	1.3	0.5	0.5
benzo[a]pyrene	0.3	0.3	0.4	0.5
perylene	1.7	1.1	1.6	1.7
indeno[123-cd]pyrene	0.4	0.4	0.6	0.6
dibenz[ah]anthracene	<0.2	< 0.2	<0.2	< 0.2
benzo[ghi]perylene	0.6	0.7	0.7	0.7
Total PAH	17.7	18.2	9.6	11.4
DDTs				
o,p'-DDE	0.2	0.5	0.2	0.3
p,p'-DDE	7.5	6.6	3.1	2.8
o,p'-DDD	0.2	0.1	< 0.1	< 0.1
p,p'-DDD	1.0	1.0	0.5	0.5
o,p'-DDT	<0.1	< 0.1	< 0.1	< 0.1
p,p'-DDT	0.2	0.2	0.3	0.2
Total DDT	9.1	8.5	4.1	3.8
Chlordanes				
heptachlor	< 0.2	< 0.2	< 0.2	< 0.2
heptachlor epoxide	< 0.2	< 0.1	< 0.1	< 0.1
t-chlordane	0.5	0.3	0.1	0.1
c-chlordane	0.5	0.2	0.1	< 0.1
t-nonachlor	0.6	0.2	0.1	0.1

NIWA Lab Code	OA115/8	OA115/10	OA114/18	OA114/19
Year analysed	2005	2006	2005	2006
c-nonachlor	0.7	0.3	0.2	0.2
Total Chlordane	2.3	0.9	0.5	0.4
Other OCPs				
Hexachlorobenzene		< 0.1		0.3
lindane	< 0.1	< 0.1	< 0.1	< 0.1
dieldrin				
PCBs				
8	<0.1	< 0.1	< 0.1	< 0.1
18	<0.1	< 0.1	< 0.1	< 0.1
28	< 0.1	0.1	< 0.1	< 0.1
44	<0.1	< 0.1	< 0.1	< 0.1
49	0.1	< 0.1	< 0.1	< 0.1
52	0.2	0.2	0.2	0.1
66	0.2	0.2	0.2	< 0.1
77	<0.1	< 0.1	< 0.1	< 0.1
86	<0.1	< 0.1	< 0.1	< 0.1
101	0.9	0.7	0.2	0.2
105	0.2	0.2	0.2	0.2
110	0.5	0.5	< 0.1	< 0.1
118	0.8	0.7	0.5	0.5
121	<0.1	< 0.1	< 0.1	< 0.1
126	<0.1	< 0.1	< 0.1	< 0.1
128	0.2	0.2	0.3	0.2
138	1.9	1.5	1.7	1.6
141	<0.1	< 0.1	< 0.1	< 0.1
151	0.3	0.2	0.2	0.2
153	2.5	2.2	1.7	1.6
156	<0.1	< 0.1	< 0.1	< 0.1
169	<0.1	< 0.1	< 0.1	< 0.1
170	<0.1	< 0.1	0.3	0.3
180	0.2	0.2	0.4	0.5
187	0.7	0.6	0.6	0.5
194	<0.1	< 0.1	0.1	< 0.1
195	<0.1	< 0.1	< 0.1	< 0.1
206	<0.1	< 0.1	< 0.1	< 0.1
209	<0.1	< 0.1	< 0.1	< 0.1
Total PCB	8.7	7.7	6.6	5.7

3 Analytical Procedures

The shellfish were thawed, shucked, homogenised, then freeze-dried. Sub-samples were spiked with analytical surrogates representative of each class of compounds and extracted with dichloromethane (DCM) using Accelerated Solvent Extraction (ASE). A combination of silica/alumina, gel permeation, and silica gel chromatography was used to clean up and fractionate the extracts. Internal standards were added to all extracts before GC analysis.

The lipid content of each sample was determined gravimetrically from a measured aliquot of the original ASE extract.

Quantitative analysis of PAHs and PCBs was carried out by capillary gas chromatography using mass selective detection in selected ion mode (GC–MS–SIM).

Concentrations have been corrected for surrogate recovery. Detection limits were approximately 0.1–0.5 ng/g dry weight. In this report, the data "less than detection limit" (given as "< " values in tables) have been assigned values of 0 ng/g for calculation of compound class totals and means. The totals listed are therefore slightly lower than "true" values, but this has no practical effect on the meaning or interpretation of the data.

4 Quality Assurance

QA assessment was carried out by:

- Triplicate analysis of a composite mussel sample. Results are presented in Table 15 and summarised in Table A1.
- Monitoring of surrogate recoveries for both oysters and mussels. These are summarised in Tables A2 and A3.
- Collecting data for blanks and two archived samples from both 2003 or 2005. Data for archived samples are presented in Tables 16 and 17.

Table A1:

Triplicate analysis of composite mussel tissue (ng/g, except lipid in %).

Analyte	Mean	cv (%)
Lipid (%)	7.2	4.2
Total PAHs	49	4.1
Total DDTs	6.5	5.2
Total Chlordanes	0.6	4.8
Total PCBs	10.6	5.3

Table A2:

Summary of surrogate percentage recoveries for oysters.

Surrogate	Mean (%)	cv (%)
phenanthrene-d10	89.9	8.5
Fluoranthene-d10	97.6	7.8
pyrene-d10	96.4	8.0
benz[a]anthracene-d12	90.9	8.0
perylene-d12	68.8	14
PCB103	96.1	8.2
PCB207	95.2	12

Table A3:

Summary of surrogate percentage recoveries for mussels.

Surrogate	Mean (%)	cv (%)
phenanthrene-d10	88.2	8.5
Fluoranthene-d10	94.7	6.3
pyrene-d10	94.9	6.9
benz[a]anthracene-d12	91.3	6.4
perylene-d12	80.9	6.3
PCB103	92.8	4.7
PCB207	92.7	8.7