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Monitoring of the marine biosphere around Iceland in 2005 - 2006

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Ágrip á íslensku:	<p>Í þessari skýrslu eru birtar niðurstöður árlegs vöktunarverkefnis á vegum Umhverfísráðuneytisins fyrir árin 2005 og 2006. Markmiðið með þessari vöktun er að uppfylla skuldbindingar Íslands varðandi Oslóar- og Parísarsamninginn (OSPAR), auk AMAP (Arctic Monitoring Assessment Program).</p> <p>Gögnin hafa verið send í gagnabanka Alþjóðahafrannsóknarráðsins (ICES). Hafrannsóknastofnun sér um að afla sýna og Rannsóknastofnun fiskiðnaðarins hafði umsjón með undirbúningi sýna og mælingum á snefilefnum í lífríki hafsins. Sýnin voru mæld á Rf og á Rannsóknastofnu í lyfja- og eiturefnafræði.</p> <p>Mæld voru ýmis ólífræn snefilefni og klórlífræn efni í þorski veiddum í árlegu vorralli Hafrannsóknastofnunarinnar í mars 2006 og í kræklingi sem safnað var á 11 stöðum í kringum landið í ágúst/sept 2005.</p> <p>Vöktun í lífríki sjávar við Ísland hófst 1989.</p>		
Lykilorð á íslensku:	<i>OSPAR, AMAP, vöktun á lífríki sjávar, ólífræn snefilefni, klórlífræn efni, þorskur, kræklingur.</i>		
Summary in English:	<p>This report contains results of the annual monitoring of the biosphere around Iceland in 2005 and 2006. The project, overseen by the Environmental and Food Agency of Iceland, is to fulfil the OSPAR (Oslo and Paris agreement) and AMAP (Arctic Monitoring Assessment Program) agreements.</p> <p>The data has been submitted to the ICES databank (ices.dk), collection of data began 1989. The Icelandic Fisheries Laboratories (IFL) (now Matis) is the coordinator for marine biota monitoring and is responsible for methods relating to sampling, preparation and analysis of samples. The samples were analyzed at IFL/Matis and at the Department of Pharmacology and Toxicology at the University of Iceland.</p> <p>Trace metals and organochlorines were analysed in cod (<i>Gadus morhua</i>) caught in March 2006 and in blue mussel (<i>Mytilus edulis</i>) collected in August/Sept 2005.</p> <p>Marine monitoring began in Iceland 1989.</p>		
English keywords:	<i>OSPAR, AMAP, monitoring, trace metals, organochlorine compounds, cod (Gadus Morhua), blue mussel (Mytilus edulis).</i>		

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- III. Quality assurance in metal analysis and in persistent organochlorines analysis.
- IV. Results of trace metal analysis for Blue mussel (*Mytilus edulis*) 2005 and Cod (*Gadus Morhua*) 2006.
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- VII. Graphs of metals and organic compounds in Blue mussel (*Mytilus edulis*) 1990-2005.
- VIII. Graphs of metals and organic compounds in Cod (*Gadus morhua*) 1990-2006.

I. Introduction

This report contains the results of the annual monitoring of heavy metals and organochlorine analyses for blue mussel (*Mytilus edulis*), collected in the waters around Iceland in 2005, as well as for cod (*Gadus morhua*), which collected in Icelandic territorial waters in 2006. Annual monitoring of trace metals in the marine biota around Iceland began in 1989 and the monitoring of organochlorine compounds a few years later, in 1991. Several reports have already been published on this matter (1-11). To meet the requirements of the OSPAR (Oslo and Paris agreement) and the AMAP (Arctic Monitoring Assessment Program), data has been submitted to the ICES databank (ices.dk), the first data from 1989. The project is supervised by the Environment and Food Agency in Iceland and financed by The Ministry for the Environment. The IFL/Matvælarannsóknir Íslands (Matís) is the coordinator for the marine biota monitoring and responsible for methods relating to sampling, preparation and analysis of samples. The samples were analyzed at the IFL/Matís and at the Department of Pharmacology and Toxicology at the University of Iceland.

II. Sampling and preparation of samples

The Marine Research Institute handles all sampling, whereas the IFL/Matís is responsible for the storage of samples, preparation and chemical analysis.

2.1 Sampling

Using standard sampling guidelines (JMP, ICES and OSPAR), the sampling of cod (30-45 cm length, 3 samples (N-NW(1), N-NW(2) and NE) was carried out in the annual bottom trawl survey in March 2006. Blue mussel, 4-6 cm length, was collected from 11 sites around the country in August/September 2005. Sampling sites for cod and blue mussel are shown in Figure 1 and coordinates are given in appendix I and II. Icelandic waters have been divided into five main locations (N-NW, NE, SE-E, S, and SW) (6).

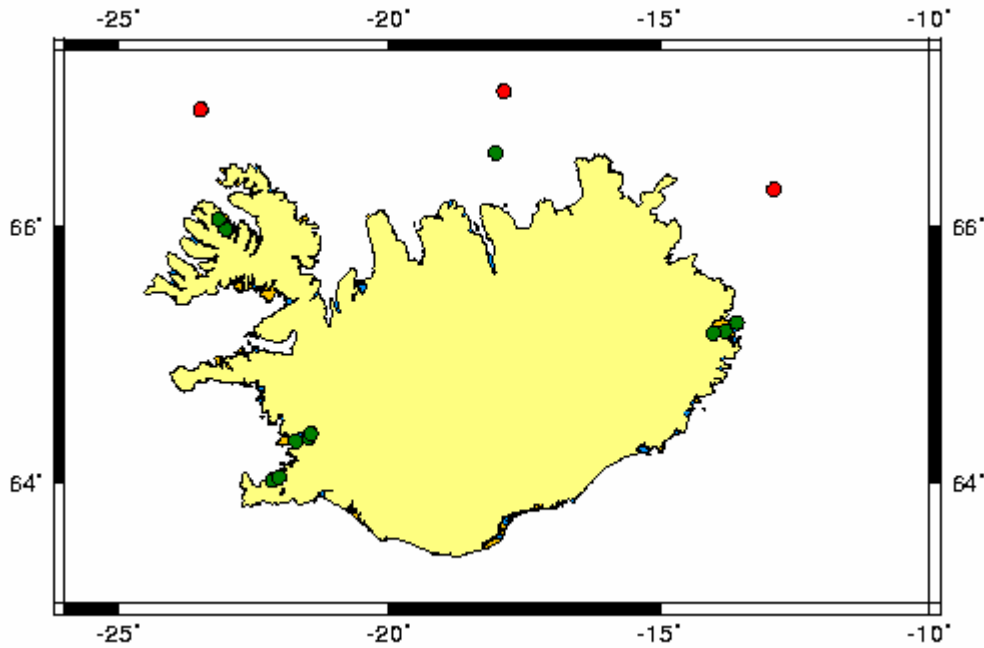


Figure 1. Locations for sampling of cod (*Gadus morhua*) (red dots) 2006 and blue mussel (*Mytilus edulis*) (green dots) 2005.

2.2 Preparation of samples prior to analysing

Each sample of mussel contained 50 ± 5 individuals. Each mussel was weighed and its length (4-6 cm), height and width measured. The flesh and the shell were then weighed separately (Appendix I). After each sample (50 individuals) had been homogenized it was kept frozen until the analysis took place.

30-45 cm long cod was selected, each sample containing 25 ± 5 individuals. At the time of the sampling, the total weight as well as the gender of each fish was determined, livers were put in pre-weighed and pre-cleaned glass jars and, finally, the fish was gutted. All samples were kept frozen until further preparation for analysis took place. Later, the otoliths were removed for age determination, the fish was filleted, skinned, and the flesh weighed (Appendix II). Finally, each sample of flesh (25 ± 5 individuals) was homogenized. The livers of each cod sample were divided into sub samples, according to the weight of the livers. All liver samples were homogenized and kept frozen until analysis took place.

III. Analysis

3.1 Metals and organic contaminants in biota

The trace metal analysis of lead, cadmium, copper, zinc, mercury, arsenic and selenium was carried out at the IFL/Matís, as well as analysis of the supporting parameters, dry matter and fat. The following organic compounds were analysed at the Department of Pharmacology and Toxicology at the University of Iceland: 11 PCBs, HCB, a-HCH, b-HCH and g-HCH, p,p'-DDT, o,p'-DDT, p,p'-DDE and p,p'-DDD, transnonachlor, a-chlordan, g-chlordan, oxychlordan, TOX-26, Tox-50 and Tox-62. Table 1 presents the samples and all the parameters measured in each sample.

Table 1. Parameters measured in different samples.

Species	Number of samples	Number of individuals	Type of sample	Number of groups	Inorganic contaminants	Organic contaminants	Other
Mussel, 2005 (<i>Mytilus edulis</i>)	11	50	Whole soft body		Cd, Cu, Zn, Pb,As, Se, Hg	X*	dry matter and fat
Cod, 2006 (<i>Gadus morhua</i>)	3	25	Flesh	3	Hg		dry matter and fat
			Liver	16	Cd, Cu, Zn, Pb, As, Se, Hg	X*	dry matter and fat
Labels: Cod-N-NW (1) 06 Cod-N-NW (2) 06 Cod-NE 06							

X*: PCB28, PCB31, PCB52, PCB101, PCB105, PCB118, PCB138, PCB153, PCB156, PCB170, PCB180, a, b, g-HCH, HCB, p,p'-DDT, o,p'-DDT, p,p'-DDE, p,p'-DDD, transnonachlor, a-chlordan, g-chlordan, oxychlordan, TOX-26, Tox-50, Tox-62.

3.2 Methods

Inorganic contaminants (Cd, Cu, Zn, As, Se, Hg, Pb) in the samples were determined by ICP-MS after mineralization of the samples with closed vessel acid digestion. Portions (up to 200 mg weighed to 0.1 mg) of freeze dried samples (cod liver was used wet) together with 3 ml HNO₃ were transferred to 50 ml Parr digestion bombs. Samples were digested for 6 hours at 180 °C (cod liver 18 hours at 180 °C). The digested sample solutions were quantitatively transferred to 50 ml polypropylene

tubes and diluted to 30 ml with Milli-Q water. The concentration of the different elements (Cd, Cu, Zn, As, Se, Hg, Pb) in these digests was determined by ICP-MS (Agilent 7500ce, Waldbronn, Germany). ^{45}Sc , ^{72}Ge , ^{115}In and ^{205}Tl were used as internal standards. The organochlorine compounds were analysed by GC-ECD using HP5890 Series II with an automatic injector (HP7673). A detailed description of the analyses of organic compounds and supporting parameters (dry matter and fat) is given in previous report (7).

3.3 Quality assurance

The quality of the metal analysis was checked in several ways. Certified reference materials are routinely treated and analysed in the same manner as the samples. For all the elements measured, standard additions to tissue homogenates prior to decomposition were implemented. The additions corresponded to 50, 100 and 150% increase of the expected concentrations. Results for analysis of reference materials, recovery of standard additions and limits of detection are shown in Table 2 and 3 in appendix III. Also shown are Z scores for the reference materials. The trace analytical lab at the IFL/Matís has participated in Quasimeme annually with satisfactory results. Also, IFL/Matís participated in Quash with satisfactory results. The average field blank (C_B), derived from the sample field blanks, and three times its standard deviation ($3xS_B$), and were used to evaluate the limit of detection (LOD).

For **organic contaminants**, a solvent blank and sample of certified reference material was extracted with each batch of samples. A certified standard solution was also run with the samples to check own standards. The limit of detection was estimated to be 3 x STDEV of the blanks. The Department of Pharmacology and Toxicology at the University of Iceland has participated in Quasimeme annually with satisfactory results. Results for analysis in certificate mussel and cod liver samples are presented in appendix III, Tables 4 and 5 along with relevant detection limits in Table 6.

IV. Results

This report contains data from the years 2005 and 2006 which has not been statistically evaluated in connection with previous results in order to evaluate time trend or spatial difference. However, there are apparently no obvious changes in contaminant concentrations pattern seen in previous years (see graphical representation in appendices VII and VIII). To be able to monitor long term trends and to indicate large scale spatial difference in the marine biota around Iceland, data from many years needs to be assessed with statistical models.

4.1 Biological variations

Figures 2a-d in appendix VI shows the biological variation in cod (*Gadus morhua*) 1990-2006, (average age, average weight of ungutted fish, average weight of liver, and average fat content in liver).

4.2 Heavy metals

Results for metals in blue mussel (2005) and cod (2006) are presented in Tables 7 and 8 in appendix IV. New data is presented along with data from previous years (1, 4-11) in figures 3a-c and 4a-c (Appendix VII) for blue mussel and in figures 6a, b and 7a-f (Appendix VIII) for cod, giving an overview of a period of 14-15 years. It should be noted that results for cod are on a wet weight basis but for mussel on a dry weight basis.

4.2.1 Blue mussel

Figures 3a-c in appendix VII show the average concentration of heavy metals in blue mussel 1991-2005, on a dry weight basis. The horizontal red line shows the ICES90 75% baseline (11). Figures 4a-c in appendix VII show average concentrations (dw), of heavy metals in blue mussel from different sampling sites, 1990-2005. Metal concentrations vary considerably between years and different locations. Concentration of arsenic is noticeably higher at Úlfsá, Skutulsfjordur than any other sample place for blue mussel. The results show low values for Hg in blue mussel when compared with ICES90 75% baseline values. Cu and Zn are close to these values but Cd is high in

blue mussel from Icelandic coasts, compared to other areas. This cadmium is considered to be of natural origin since no anthropogenic source is known.

4.2.2 Cod

Figures 6a-b in appendix VIII show the average heavy metal concentration in livers of 30-45 cm cod (wet weight), caught in Icelandic waters in March every year between 1990-2006. Figures 7a-f in appendix VIII show average concentrations (ww), of heavy metals in cod from different sampling sites, 1990-2006. Mercury is measured in the flesh and liver as well. Lead concentration was below the limits of detection in all samples. Variations in concentration between years and locations over the time interval can be seen. The concentration of heavy metals in cod from Icelandic waters is low compared to cod from other northern locations (6). As for the blue mussel the only exception is cadmium which is probably of natural origin reflecting the natural background values. However, the amount of cadmium in cod and other species in Icelandic coastal waters is far below the TWI (Tolerable Weekly Intake) standard of WHO, even with heavy consumption (6).

4.3 Organic compounds

Results for organic compounds in blue mussel (2005) and cod (2006) are presented in appendix V, Tables 9 and 10. The results for cod are presented on a wet-weight basis but results for blue mussel are on a dry-weight basis. New data is shown along with data from previous years (1, 4-10) in figures 5a-b (Appendix VII) for blue mussel and in figures 8 and 9a-e (Appendix VIII) for cod, giving an overview of a 14-15 year period.

4.3.1 Blue mussel

Figures 5a-b in appendix VII show the concentration on a dry-weight basis of organic compounds in blue mussel from different locations in Iceland 1991-2005. The most common organochlorines found in blue mussel are PCBs. The concentration of PCBs in blue mussel found in Iceland are comparable with values found in mussels from remote areas of the west coast of United States and also similar to the lowest values found in mussels on the coast of the United Kingdom and Ireland (6). In general, concentration of HCH, HCB and DDE is low, close to the limit of detection.

4.3.2 Cod

Figure 8 in appendix VIII shows the average concentration on a wet-weight basis of organic compounds in livers of 30-45 cm cod, caught in Icelandic waters in March every year between 1991-2006. Figures 9a-e in appendix VIII show average concentrations (ww), of some organic compounds in cod from different sampling sites, 1991-2006. The sum of seven PCBs (PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180) is about 90% of the 11 PCBs measured. The concentrations of the organic substances that are measured in cod from Icelandic waters correspond to the lowest values observed elsewhere (6).

V. Conclusion

This report contains the results of an evaluation of trace elements in Icelandic marine biota for the years 2005 and 2006. It adds to the information gathered every year to determine: if the concentration of trace elements is increasing, decreasing or not changing; if current situation is a cause for health concerns; and if the marine environment is being threatened by pollution.

This data has not been statistically evaluated in connection with previous results in order to evaluate time trend or spatial difference. However, there are apparently no obvious changes in contaminant concentrations pattern seen in previous years. **A full statistical analysis of all data is needed to confirm changes if any.** This was done in 1998 (6) but new data calls for a new evaluation. In addition, when comparing data of livers it is necessary to keep in mind the factors (i.e. fat, age, dw) that may affect the quantity and concentration of trace elements.

Iceland is unique in terms of geology, oceanography and meteorology. High levels of heavy metals, particularly cadmium, occur naturally in the environment in Iceland. Therefore, natural background values need to be kept in mind when comparing contamination levels with other countries.

VI. Acknowledgement

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Appendix I.

Biological measurements of Blue mussel (*Mytilus edulis*)

2005

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	22.8.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Úlfsá/Sigurðarbrú, Skutulsfjörður		Date of preparation:	May 2006		
Coordinates:	660355-230996		IFL#:	SN-2006-38		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	12,6	23,1	16,2	7,74	4,42	3,21
2	48,5	22,8	19,5	11,80	6,35	5,41
3	53,4	25,0	24,4	18,32	9,77	8,48
4	50,2	26,3	21,9	14,06	8,17	5,77
5	53,5	24,4	23,4	16,65	9,34	7,29
6	54,9	24,2	22,2	17,55	9,01	8,45
7	53,9	24,4	24,2	19,15	10,27	8,87
8	53,8	25,0	23,9	19,65	9,77	9,79
9	46,9	22,6	18,5	10,68	6,16	4,48
10	50,1	25,6	21,3	14,40	7,69	6,46
11	56,6	25,7	22,7	18,56	10,70	8,10
12	47,5	24,1	20,9	12,40	7,87	4,49
13	52,6	26,7	22,4	17,86	9,09	8,70
14	50,7	23,4	21,3	14,23	7,79	6,36
15	46,2	21,1	19,3	10,34	5,65	4,60
16	47,1	21,3	22,1	13,44	6,75	6,67
17	46,1	21,8	19,0	11,26	5,67	5,58
18	47,5	22,3	20,2	11,19	6,15	4,91
19	42,6	21,1	19,1	9,52	5,56	3,94
20	43,8	21,7	20,0	10,27	5,76	4,47
21	53,7	27,0	26,4	22,36	12,26	9,89
22	48,2	22,4	22,6	14,98	7,54	7,44
23	40,3	21,1	17,3	8,90	4,82	4,05
24	54,6	23,3	24,2	18,64	9,53	9,00
25	51,9	25,3	23,4	16,21	9,87	6,29
26	49,9	22,6	20,5	14,10	7,87	6,13
27	52,0	26,2	19,5	12,92	8,00	4,85
28	45,4	22,2	18,2	9,28	5,67	3,59
29	43,5	22,4	18,9	11,11	5,37	5,76
30	52,9	27,4	23,8	22,63	11,79	10,72
31	49,6	23,9	20,3	15,31	7,16	7,95
32	49,8	23,3	21,4	13,45	7,31	6,05
33	46,8	23,2	21,7	11,99	6,86	5,15
34	44,1	22,2	18,6	9,81	5,21	4,55
35	41,8	20,4	18,0	8,40	4,41	4,01
36	53,1	24,4	23,0	18,07	9,29	8,62
37	53,3	24,5	24,5	20,63	10,21	10,33
38	44,0	22,3	17,6	9,09	5,44	3,64
39	40,8	18,4	16,6	6,43	3,63	2,68
40	44,5	20,3	19,3	9,50	5,15	4,23
41	60,0	27,0	28,1	27,80	14,29	13,43
42	52,9	22,9	24,3	15,91	7,97	7,91
43	51,9	24,9	23,4	17,19	8,92	8,24
44	43,6	20,1	17,6	8,62	4,96	3,64
45	50,2	24,7	22,2	13,96	7,97	5,94
46	47,9	23,4	20,1	13,00	6,94	6,06
47	48,2	23,5	19,6	10,62	6,55	4,00
48	45,6	21,1	17,1	9,33	4,92	4,36
49	42,6	20,2	20,5	10,47	5,46	4,92
50	44,4	23,0	19,5	11,73	6,25	5,48
	Length		Height	Total weight	Weight soft body	Weight shell
Average	48,1		21,0	13,83	7,47	6,30
Stdev	6,8		2,6	4,48	2,26	2,30
Min	12,6		16,2	6,43	3,63	2,68
Max	60,0		28,1	27,80	14,29	13,43

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	24.8.2005		
Length:	4-6 cm		Sampled by:	Marine. Inst.		
Location:	Eyri, Hvalfjörður		Date of preparation:	May 2006		
Coordinates:	642050-214390		IFL#:	SN-2006-33		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	55,7	26,8	22,5	17,14	9,78	7,21
2	44,6	19,8	18,7	8,21	4,78	3,42
3	49,7	22,9	20,2	11,92	6,85	5,01
4	4,4	21,2	18,5	9,36	5,18	4,10
5	44,6	20,8	17,3	8,88	4,54	4,27
6	40,6	20,5	15,5	6,78	3,80	2,93
7	45,8	22,0	17,0	8,68	4,85	3,73
8	40,7	18,9	14,7	5,82	3,12	2,51
9	45,0	22,4	15,2	8,02	4,51	3,45
10	47,0	22,4	18,8	10,61	6,08	4,52
11	54,5	26,7	24,2	16,34	8,97	7,23
12	54,3	25,2	21,0	14,39	9,31	4,98
13	45,6	20,4	17,6	8,51	4,39	4,03
14	39,8	19,5	15,0	5,76	3,26	2,48
15	40,6	18,9	17,9	7,08	4,09	2,94
16	41,9	20,0	18,1	8,18	4,16	3,96
17	40,8	19,8	15,2	6,34	3,56	2,70
18	41,7	18,5	17,3	6,74	4,30	2,36
19	41,2	19,6	15,0	6,17	3,70	2,42
20	47,4	22,1	18,7	10,73	6,14	4,56
21	59,3	29,1	24,1	20,75	10,87	9,84
22	60,2	30,7	24,5	23,40	14,17	9,11
23	52,4	22,4	21,4	12,46	6,08	6,35
24	46,0	22,0	18,0	9,20	5,31	3,80
25	40,4	17,9	16,0	6,06	3,62	2,43
26	52,7	24,7	21,4	15,14	7,10	8,03
27	51,4	24,3	21,0	12,94	7,78	5,12
28	46,5	21,7	18,3	10,57	5,92	4,63
29	50,4	22,4	21,4	13,01	6,95	6,03
30	41,3	18,4	15,2	5,97	3,11	2,70
31	61,6	27,6	25,8	24,42	12,58	11,54
32	51,0	23,9	22,6	14,50	8,09	6,26
33	55,5	26,2	19,6	15,06	8,12	6,77
34	57,9	26,7	23,5	19,72	11,43	8,01
35	56,2	27,0	22,0	18,56	10,60	7,82
36	41,4	21,0	17,6	8,24	4,21	3,73
37	49,0	21,7	20,8	11,32	6,35	4,82
38	42,0	21,0	16,5	7,80	3,79	3,87
39	48,2	21,1	17,9	10,55	5,69	4,74
40	42,9	21,5	17,1	8,40	4,73	3,56
41	52,3	24,5	20,0	13,80	7,91	5,61
42	58,0	26,0	26,4	22,33	11,54	10,52
43	53,4	24,6	22,4	16,19	9,07	7,00
44	53,5	25,3	23,6	19,07	8,92	9,88
45	50,7	24,0	20,8	14,54	7,62	6,74
46	53,1	24,0	19,5	13,05	7,22	5,66
47	43,3	20,4	19,1	8,95	4,34	4,38
48	47,0	23,6	17,5	10,53	6,02	4,42
49	41,8	21,2	15,0	6,86	3,88	2,89
50	47,5	21,4	17,9	9,59	5,35	4,18
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	47,5	22,7	19,3	11,77	6,47	5,19
Stdev	8,7	2,9	3,1	4,96	2,72	2,31
Min	4,4	17,9	14,7	5,76	3,11	2,36
Max	61,6	30,7	26,4	24,42	14,17	11,54

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	23.8.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Hvítanes, Hvalfjörður		Date of preparation:	May 2006		
Coordinates:	642185-212970		IFL#:	SN-2006-32		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	43,0	20,8	17,1	7,51	4,08	3,31
2	46,3	21,2	20,9	12,25	5,96	6,22
3	39,3	18,4	11,4	5,47	3,07	2,24
4	50,0	23,7	21,4	12,46	7,13	5,10
5	54,2	27,4	21,3	16,68	9,39	7,11
6	42,1	22,1	18,4	8,85	4,53	4,14
7	40,5	22,2	20,0	8,95	4,84	4,05
8	41,7	18,5	17,7	7,14	3,60	3,33
9	42,2	21,0	16,4	7,46	4,10	3,17
10	43,8	22,5	20,7	10,54	5,91	4,46
11	45,0	21,7	21,5	11,63	5,93	5,58
12	49,5	23,2	22,9	14,79	8,22	6,29
13	38,7	20,2	16,5	6,34	3,43	2,82
14	37,8	18,4	15,9	6,06	2,94	2,74
15	37,9	18,2	18,6	7,34	3,64	3,32
16	54,0	26,4	23,3	17,20	9,09	8,03
17	42,6	18,9	18,5	8,98	5,01	3,86
18	42,0	19,6	19,0	8,33	4,40	3,86
19	44,1	22,9	19,3	10,31	5,83	4,47
20	42,4	19,7	20,0	8,78	4,97	3,59
21	48,8	25,5	19,6	13,30	7,33	5,88
22	48,0	23,7	21,7	14,32	6,83	7,39
23	41,4	21,4	20,8	9,34	5,20	4,03
24	45,7	23,9	19,9	11,38	6,28	4,93
25	41,4	22,4	16,1	7,57	4,34	3,17
26	44,2	24,4	17,8	8,83	5,22	3,45
27	39,7	21,0	16,8	8,03	4,19	3,81
28	42,5	22,9	20,4	10,76	6,14	4,51
29	37,7	18,9	15,8	6,56	3,18	3,12
30	37,9	17,5	17,2	7,24	2,81	4,03
31	39,8	16,9	20,1	9,03	3,80	5,11
32	38,7	19,5	15,4	5,90	3,46	2,33
33	58,6	30,4	25,1	21,36	11,91	9,32
34	38,6	20,4	15,3	6,12	3,45	2,60
35	46,2	19,8	22,5	13,23	6,06	7,14
36	47,3	25,9	19,7	14,18	5,70	8,35
37	38,9	21,8	17,7	8,02	4,24	3,74
38	46,1	21,8	19,8	11,24	5,30	5,90
39	43,5	22,4	17,8	8,74	5,00	3,65
40	47,7	19,9	21,6	11,55	6,05	5,37
41	51,2	28,3	21,7	16,49	8,89	7,46
42	40,4	20,6	18,1	8,79	4,62	4,14
43	37,5	19,6	16,7	5,92	3,44	2,41
44	36,9	17,8	14,0	4,44	2,64	1,69
45	38,7	18,9	15,4	5,70	3,21	2,42
46	37,8	20,1	15,3	5,85	3,36	2,45
47	37,0	15,7	19,6	5,95	3,15	2,70
48	37,2	18,3	14,2	4,39	2,38	1,83
49	36,5	19,4	19,0	7,74	4,00	3,69
50	36,0	19,5	16,8	5,72	3,10	2,45
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	42,8	21,3	18,7	9,50	5,03	4,34
Stdev	5,2	3,0	2,7	3,69	1,99	1,83
Min	36,0	15,7	11,4	4,39	2,38	1,69
Max	58,6	30,4	25,1	21,36	11,91	9,32

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	22.8.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Hvasshraun		Date of preparation:	May 2006		
Coordinates:	640125-220900		IFL#:	SN-2006-31		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	44,1	21,7	17,8	9,00	4,71	4,19
2	39,8	19,8	16,3	6,27	3,56	2,55
3	43,6	22,2	18,6	10,36	4,90	5,38
4	42,0	20,0	18,4	7,59	3,90	3,57
5	45,0	22,5	19,5	8,27	4,33	3,87
6	43,5	20,6	16,4	10,07	5,51	4,47
7	40,7	21,8	16,9	8,09	4,30	3,60
8	41,1	21,2	16,0	7,44	4,24	3,13
9	46,8	19,8	17,0	8,75	4,36	4,14
10	41,2	17,2	16,7	6,52	3,19	2,99
11	41,7	21,2	17,3	8,17	4,65	3,47
12	45,6	21,5	21,3	12,58	6,20	6,26
13	43,2	20,8	19,2	8,88	5,00	3,77
14	39,8	21,0	18,1	8,10	4,43	3,60
15	41,1	22,9	15,2	6,67	3,15	3,24
16	40,3	21,2	16,9	7,33	3,85	3,30
17	41,1	18,6	17,1	7,12	4,01	3,11
18	40,9	21,8	15,7	7,48	3,92	3,49
19	43,2	20,2	18,9	8,99	4,79	4,16
20	40,8	19,8	16,2	6,76	3,74	2,89
21	43,6	20,1	17,0	7,59	4,27	3,28
22	45,1	20,2	18,1	9,40	4,78	4,12
23	41,4	19,5	18,0	7,82	4,19	3,50
24	42,6	21,2	16,2	7,76	4,21	3,43
25	43,1	20,0	19,2	8,89	4,50	4,21
26	43,2	22,4	17,5	9,19	4,82	4,21
27	43,7	21,6	16,9	8,18	4,39	3,61
28	45,8	20,9	19,6	10,02	5,17	4,77
29	43,6	20,4	17,1	8,75	3,90	4,48
30	44,0	22,4	17,8	9,59	5,06	4,59
31	45,6	23,6	19,8	11,00	6,42	4,42
32	48,6	23,6	20,6	13,45	7,08	4,56
33	46,1	20,7	19,0	10,23	5,76	4,90
34	46,2	19,6	19,0	9,67	5,02	3,83
35	46,9	23,0	19,5	4,36	6,23	4,35
36	44,4	21,3	18,4	9,28	5,40	5,56
37	47,0	22,0	19,5	10,15	5,75	4,85
38	47,4	23,3	18,3	11,50	5,93	5,79
39	47,8	22,2	18,4	9,88	4,97	4,85
40	50,6	21,8	20,6	12,46	6,56	5,79
41	44,8	20,7	19,3	8,79	5,00	3,70
42	43,6	20,7	16,6	8,06	4,15	3,75
43	44,8	21,2	21,3	11,45	6,01	5,31
44	41,0	20,3	18,2	8,38	4,75	3,60
45	43,8	23,2	17,7	9,29	5,07	3,83
46	40,3	23,9	18,5	10,39	5,44	4,84
47	40,7	22,4	17,1	8,52	4,73	3,69
48	43,2	20,7	18,0	8,81	4,67	4,13
49	39,4	19,0	17,7	7,39	3,74	3,51
50	40,8	20,2	16,9	7,68	4,12	3,52
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	43,5	21,2	18,0	8,85	4,78	4,08
Stdev	2,6	1,4	1,4	1,71	0,88	0,82
Min	39,4	17,2	15,2	4,36	3,15	2,55
Max	50,6	23,9	21,3	13,45	7,08	6,26

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	22.8.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Straumur, Straumsvík		Date of preparation:	May 2006		
Coordinates:	640254-220270		IFL#:	SN-2006-40		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	55,0	27,4	23,8	20,45	10,75	9,50
2	47,8	22,2	20,7	10,89	7,01	3,80
3	51,5	23,8	21,6	15,27	8,47	6,73
4	49,3	22,2	20,2	13,77	6,54	7,12
5	53,4	25,0	22,2	15,52	8,85	6,56
6	49,1	20,6	19,2	10,43	6,23	4,16
7	51,1	22,5	10,0	13,26	7,86	5,34
8	49,7	21,5	19,4	10,80	6,79	3,96
9	44,7	19,3	18,8	9,40	4,99	4,14
10	39,7	19,4	17,2	6,29	3,34	2,81
11	44,4	20,7	18,7	9,62	5,03	4,48
12	40,5	19,4	18,7	7,99	4,79	3,18
13	41,9	20,3	19,5	9,51	4,77	4,66
14	40,1	18,7	18,3	8,44	4,36	3,97
15	41,0	19,1	17,3	7,35	4,19	3,11
16	51,0	22,7	20,7	13,21	7,56	5,60
17	43,3	23,1	19,6	10,54	5,90	4,57
18	53,2	24,2	18,8	12,16	7,41	4,69
19	44,3	22,1	18,8	9,13	5,84	3,16
20	52,0	25,1	23,4	17,57	10,33	17,48
21	44,0	20,8	19,9	9,82	5,65	4,00
22	46,9	21,6	18,9	9,31	5,00	4,20
23	46,1	21,9	19,3	10,22	5,31	4,71
24	59,9	24,4	23,4	18,13	10,87	7,21
25	56,3	26,5	22,5	18,40	10,64	7,50
26	43,5	19,2	17,7	7,54	3,33	4,02
27	41,8	20,1	18,2	7,49	3,59	3,58
28	43,6	18,1	17,9	7,97	3,60	4,05
29	42,9	16,9	17,3	7,70	4,37	3,08
30	40,6	19,3	18,6	6,74	2,94	3,61
31	50,5	21,6	22,2	14,77	7,83	6,84
32	57,8	24,3	24,2	20,31	11,43	8,70
33	45,7	22,5	20,2	11,23	7,18	4,01
34	44,5	21,2	19,4	10,82	5,66	5,02
35	52,2	21,5	23,3	16,79	9,08	7,60
36	50,3	22,4	20,4	13,16	7,29	5,87
37	41,4	20,2	19,4	10,75	6,14	4,55
38	44,5	22,3	20,8	10,97	6,35	4,61
39	44,3	19,5	19,1	8,99	5,42	3,51
40	41,0	19,3	15,0	7,22	3,66	3,38
41	40,2	19,4	16,1	7,38	4,07	3,25
42	48,8	20,2	22,3	13,99	7,35	6,56
43	55,8	24,7	22,5	17,28	9,99	7,18
44	59,6	26,4	25,3	20,36	10,93	9,34
45	53,5	24,4	22,5	15,30	9,59	5,64
46	53,0	25,8	20,4	14,22	8,93	5,21
47	49,3	22,0	22,2	13,67	8,28	5,34
48	43,0	19,8	17,8	8,36	4,77	3,56
49	43,9	19,7	19,1	9,11	5,21	3,83
50	46,0	21,4	17,8	9,80	5,22	4,42
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	47,5	21,7	19,8	11,79	6,61	5,27
Stdev	5,5	2,4	2,6	3,91	2,34	2,43
Min	39,7	16,9	10,0	6,29	2,94	2,81
Max	59,9	27,4	25,3	20,45	11,43	17,48

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	5.9.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Mjoifjordur I (head)		Date of preparation:	May 2006		
Coordinates:	651115-140012		IFL#:	SN-2006-37		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	57,50	26,1	21,0	16,05	9,67	6,27
2	55,30	25,9	19,4	13,65	8,45	5,13
3	49,30	24,7	19,6	12,22	6,81	5,21
4	43,00	20,8	17,0	7,36	4,33	2,97
5	46,20	21,9	19,0	9,57	5,35	4,20
6	53,40	25,5	23,3	15,39	9,23	6,17
7	51,50	23,2	25,8	15,97	9,68	6,22
8	54,40	24,0	25,5	18,13	9,63	8,44
9	49,30	23,8	18,5	10,58	6,47	4,05
10	41,50	20,6	16,5	6,92	3,86	2,94
11	48,50	22,5	23,0	13,19	8,09	5,04
12	50,70	24,0	21,7	14,55	8,38	6,15
13	47,90	24,0	22,2	14,99	7,23	7,65
14	47,20	22,5	20,9	11,56	6,52	4,99
15	47,30	22,3	22,0	13,13	6,98	6,14
16	40,60	22,8	21,0	9,70	5,58	4,08
17	46,40	23,9	19,0	10,37	6,18	4,16
18	42,00	20,6	20,0	9,16	5,02	4,05
19	44,40	21,0	19,6	8,17	4,72	3,37
20	42,50	20,5	18,6	8,50	4,74	3,75
21	52,10	24,8	19,5	12,74	7,32	5,36
22	51,30	25,6	23,9	16,25	9,17	7,04
23	51,30	24,5	20,8	12,50	7,61	4,85
24	48,10	21,1	20,0	10,66	6,59	4,06
25	51,90	26,6	18,9	12,40	7,42	4,98
26	50,40	23,8	21,6	13,28	8,11	5,17
27	49,50	23,2	19,0	10,39	6,37	4,06
28	46,30	20,6	18,7	9,26	5,88	3,33
29	43,80	21,4	16,5	8,49	4,42	3,99
30	41,9	21,3	19,0	8,95	5,05	3,86
31	55,4	27,8	23,3	17,68	11,34	6,27
32	52,6	26,9	23,6	16,89	10,07	6,73
33	55,6	25,0	23,5	15,94	9,63	5,99
34	50,4	23,6	20,5	11,59	7,60	3,89
35	52,7	24,3	21,2	13,23	8,66	4,52
36	49,30	24,5	19,5	12,06	7,12	4,85
37	55,80	27,2	23,8	16,78	10,54	6,22
38	53,30	25,9	20,6	14,19	8,50	5,65
39	41,10	21,1	18,4	8,00	4,58	3,38
40	45,00	21,9	19,5	9,10	4,77	4,18
41	53,50	25,6	22,1	15,07	9,27	5,57
42	46,00	22,7	22,4	12,25	7,09	5,00
43	50,40	23,9	21,5	12,54	7,66	4,66
44	43,00	20,9	21,2	10,58	6,11	4,44
45	50,90	24,5	21,2	12,95	7,82	5,07
46	52,10	25,0	22,6	14,24	8,83	5,27
47	46,20	23,4	20,9	11,50	6,67	4,75
48	53,50	25,6	22,1	15,68	9,12	6,40
49	51,10	24,9	22,9	14,91	8,56	6,23
50	45,80	21,5	20,2	10,70	6,21	4,45
	Length		Height	Total weight	Weight soft body	Weight shell
Average	49,0	23,6	20,9	12,40	7,30	5,02
Stdev	4,4	2,0	2,1	2,91	1,83	1,20
Min	40,6	20,5	16,5	6,92	3,86	2,94
Max	57,5	27,8	25,8	18,13	11,34	8,44

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	5.9.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Mjoifjordur II, Hofsa		Date of preparation:	May 2006		
Coordinates:	651220-134850		IFL#:	SN-2006-35		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	43,30	22,90	19,50	9,56	5,35	4,13
2	47,70	23,90	18,10	10,62	5,82	4,67
3	47,70	21,50	21,40	12,82	6,04	6,71
4	46,50	21,50	19,10	10,46	5,90	4,46
5	46,10	22,70	17,40	9,71	4,99	4,57
6	47,00	22,40	21,00	12,94	6,48	6,41
7	40,30	20,00	16,00	6,38	3,58	2,77
8	43,30	20,70	19,10	8,15	4,38	3,59
9	41,40	20,30	16,50	6,54	3,58	2,91
10	40,40	21,00	18,20	7,40	3,69	3,64
11	42,20	20,80	18,30	8,80	4,51	4,08
12	41,20	20,60	17,00	6,69	3,46	2,98
13	45,70	19,80	16,00	6,52	3,60	2,74
14	45,51	21,60	17,60	7,29	3,11	4,02
15	41,20	21,20	17,70	6,31	2,66	3,33
16	45,70	21,60	18,30	9,85	4,99	4,50
17	45,50	21,30	18,80	10,39	4,39	5,33
18	45,60	20,80	15,40	6,48	3,67	2,67
19	42,40	20,40	18,50	7,77	4,64	3,04
20	43,90	20,30	18,90	9,59	4,91	4,53
21	42,90	23,80	13,50	9,84	5,21	4,53
22	43,70	19,40	18,20	8,04	4,59	3,31
23	42,90	21,10	17,60	7,98	4,67	3,20
24	41,60	20,20	17,50	8,22	4,06	3,98
25	44,40	23,00	16,00	7,01	3,12	3,55
26	45,00	22,70	16,10	8,59	4,10	4,12
27	43,20	21,70	17,10	8,85	4,88	3,48
28	40,10	19,70	17,60	7,53	3,73	3,69
29	40,40	21,30	17,20	7,91	4,24	3,52
30	44,20	23,50	18,50	10,26	5,50	4,49
31	5,00	22,10	19,90	13,08	6,46	6,47
32	59,00	26,90	22,30	17,89	10,62	7,14
33	49,00	25,50	18,80	13,22	7,58	4,66
34	46,00	22,20	18,90	10,24	5,74	4,43
35	43,00	21,80	16,40	8,76	4,18	4,34
36	41,30	18,50	15,90	6,53	3,34	2,87
37	44,80	22,10	18,60	9,66	5,63	3,79
38	42,20	19,70	18,00	8,42	4,47	3,88
39	45,80	23,10	18,00	11,02	5,75	5,15
40	44,50	23,10	19,00	10,54	5,37	4,98
41	43,80	21,90	18,20	9,75	5,51	4,21
42	40,80	20,50	17,50	7,93	4,32	3,46
43	42,50	20,00	17,70	7,70	4,54	2,96
44	44,70	21,20	17,00	8,83	4,84	3,94
45	43,10	20,90	17,60	8,78	3,98	4,45
46	45,40	20,00	18,50	8,82	5,05	3,67
47	45,90	22,10	18,20	9,45	5,42	3,89
48	48,30	22,60	18,60	11,02	6,22	4,68
49	45,90	23,80	17,90	10,45	5,89	4,45
50	39,90	21,10	16,70	7,59	4,04	3,40
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	43,44	21,62	17,92	9,16	4,86	4,12
Stdev	6,37	1,57	1,51	2,19	1,32	1,01
Min	5,00	18,50	13,50	6,31	2,66	2,67
Max	59,00	26,90	22,30	17,89	10,62	7,14

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	5.9.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Mjoifjordur III, Daltangi		Date of preparation:	May 2006		
Coordinates:	651612-133430		IFL#:	SN-2006-36		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	47,6	22,6	17,3	9,77	5,32	4,32
2	46,4	22,1	20,3	12,13	5,80	6,28
3	41,3	19,6	16,8	7,12	3,82	3,11
4	45,5	18,8	17,4	8,65	3,18	4,90
5	47,7	23,2	19,2	9,35	3,99	4,99
6	39,9	20,5	19,2	9,96	5,16	4,62
7	40,3	16,8	18,3	6,66	3,43	3,08
8	42,1	20,0	16,8	7,18	3,54	3,61
9	42,8	20,9	16,1	7,58	3,74	3,55
10	41,5	20,6	16,2	6,43	3,44	2,67
11	48,1	21,2	19,3	12,26	5,64	6,51
12	48,6	23,7	18,0	11,12	6,53	4,60
13	49,2	21,2	19,6	11,45	5,90	5,49
14	47,2	22,4	19,3	10,94	5,44	5,43
15	40,6	18,4	19,4	7,49	4,19	3,25
16	42,9	21,4	15,2	7,03	3,89	3,13
17	40,7	19,7	16,0	8,08	3,78	4,23
18	41,2	20,0	17,9	6,51	3,64	2,90
19	43,0	21,4	17,3	8,58	4,33	4,22
20	39,4	18,9	17,1	6,99	3,69	3,26
21	43,7	20,3	18,2	9,33	5,02	4,30
22	46,7	21,5	18,6	9,03	4,82	4,12
23	43,1	20,1	15,8	6,82	2,92	3,85
24	44,0	21,8	18,6	10,01	5,09	4,86
25	39,8	19,8	17,1	7,06	3,65	3,36
26	49,9	24,9	19,2	11,99	6,61	5,35
27	38,6	19,0	15,1	6,26	3,46	2,74
28	40,4	21,2	15,8	7,44	3,91	3,49
29	42,6	21,1	16,5	7,72	4,58	3,12
30	43,4	19,9	19,8	10,40	5,16	5,15
31	48,5	24,2	24,3	17,55	7,35	10,12
32	42,7	20,9	17,0	7,83	4,35	3,45
33	42,9	20,8	15,4	5,12	2,53	2,58
34	39,6	17,8	18,5	7,94	3,72	4,2
35	49,6	21,5	21,9	12,68	7,20	5,44
36	46,7	21,8	20,1	10,26	5,41	4,85
37	39,0	20,2	15,8	6,29	3,11	3,15
38	42,8	20,9	17,3	8,41	4,20	4,17
39	43,9	21,5	17,3	8,67	5,11	3,57
40	40,6	20,4	18,1	7,29	3,53	3,69
41	41,3	23,3	18,8	9,42	5,65	3,70
42	49,5	26,2	20,3	14,47	7,92	6,44
43	52,3	25,8	17,9	12,65	7,28	5,33
44	48,7	21,2	20,7	12,03	6,26	5,67
45	44,0	21,5	19,6	10,19	5,09	5,09
46	47,1	21,8	18,4	9,84	5,96	3,82
47	51,3	24,3	21,3	14,09	8,05	5,96
48	53,7	24,7	21,7	16,89	8,51	8,34
49	42,3	19,1	14,1	6,73	3,68	2,99
50	41,7	18,7	16,4	7,00	3,97	3,00
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	44,3	21,2	18,1	9,33	4,85	4,40
Stdev	3,8	2,0	2,0	2,75	1,46	1,46
Min	38,6	16,8	14,1	5,12	2,53	2,58
Max	53,7	26,2	24,3	17,55	8,51	10,12

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	23.8.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Hvalstod, Hvalfjordur		Date of preparation:	May 2006		
Coordinates:	642383-212721		IFL#:	SN-2006-34		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	49,3	24,4	21,7	14,48	7,34	7,05
2	40,1	20,8	17,6	7,54	4,45	3,00
3	41,8	20,7	17,3	7,87	4,24	3,52
4	42,4	21,5	18,1	8,53	4,74	3,67
5	45,0	22,0	19,3	10,35	5,37	4,88
6	56,1	25,5	20,1	16,60	8,88	7,65
7	59,5	27,3	24,4	21,18	11,66	9,43
8	55,7	27,9	20,8	17,67	9,88	7,73
9	55,2	26,7	22,8	18,08	10,30	7,71
10	50,0	24,4	21,5	12,54	7,24	5,23
11	59,3	26,3	27,2	26,40	12,37	13,92
12	44,5	22,4	17,5	8,84	5,27	3,55
13	46,8	23,8	20,5	11,61	6,62	4,92
14	46,5	21,8	19,9	10,56	5,22	5,25
15	43,4	24,1	19,3	10,11	5,90	4,17
16	60,3	25,1	23,7	19,38	11,93	7,41
17	59,1	25,2	23,1	19,16	10,86	8,22
18	61,0	24,5	23,1	20,11	11,72	8,33
19	43,3	21,4	17,3	8,24	4,64	3,50
20	41,2	21,9	15,9	7,11	4,00	2,97
21	56,5	24,7	27,5	22,05	11,77	10,14
22	52,0	27,3	20,3	14,51	8,00	6,39
23	47,1	22,6	17,3	9,25	5,25	3,95
24	42,4	22,1	18,3	8,92	4,85	4,05
25	45,8	21,5	22,0	13,05	6,99	6,03
26	40,5	22,0	16,6	7,50	4,35	3,13
27	41,0	19,4	17,7	7,32	3,92	3,37
28	47,3	22,4	19,8	11,52	5,88	5,59
29	51,2	24,2	18,8	12,86	7,19	5,64
30	45,1	22,5	17,7	8,93	5,12	3,82
31	59,5	26,9	25,6	22,39	12,97	9,33
32	57,5	27,7	23,3	20,11	11,94	8,01
33	54,3	25,5	23,3	16,95	9,58	7,3
34	46,6	23,1	19,1	9,57	5,48	4,04
35	51,4	22,7	20,7	12,66	6,71	5,91
36	62,3	28,9	27,5	29,70	15,41	14,14
37	53,6	22,8	22,4	15,50	8,30	7,24
38	47,7	23,8	19,2	10,60	6,07	4,46
39	51,2	24,9	21,9	14,33	7,97	6,24
40	42,0	22,2	16,5	7,37	4,24	3,11
41	40,7	19,2	16,6	6,49	3,86	2,60
42	57,7	25,6	23,7	18,56	10,47	7,94
43	58,4	26,0	24,6	22,27	12,29	9,96
44	47,1	22,0	19,3	11,05	6,50	4,55
45	40,3	21,0	15,2	6,45	3,43	2,90
46	42,4	21,2	16,8	7,81	4,65	3,08
47	40,5	19,3	18,4	7,24	4,25	2,95
48	43,4	21,3	17,3	8,07	4,52	3,50
49	43,4	21,6	16,9	7,46	4,41	3,04
50	50,8	24,3	23,2	14,68	8,49	6,17
	Length	Width	18,0	Total weight	Weight soft body	Weight shell
Average	49,2	23,5	20,4	13,23	7,35	5,81
Stdev	6,9	2,4	3,2	5,75	3,09	2,73
Min	40,1	19,2	15,2	6,45	3,43	2,60
Max	62,3	28,9	27,5	29,70	15,41	14,14

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	23.8.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Dvergasteinn, Álftafjörður		Date of preparation:	May 2006		
Coordinates:	655989-230215		IFL#:	SN-2006-39		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	53,5	24,6	24,0	19,09	8,46	9,96
2	49,1	23,5	19,5	11,32	6,45	4,72
3	50,7	26,0	16,4	10,35	5,22	4,52
4	49,0	23,0	21,4	13,42	7,20	6,11
5	45,1	21,7	17,5	8,87	4,75	4,01
6	45,1	22,8	17,6	8,14	4,31	3,69
7	45,9	24,3	19,9	10,61	6,24	4,28
8	50,4	24,7	20,1	11,29	7,09	4,11
9	48,2	24,8	21,2	13,34	7,32	5,77
10	40,0	20,6	16,3	6,29	3,60	2,60
11	49,8	26,1	19,7	11,97	7,34	4,59
12	48,1	23,3	21,0	11,96	7,00	4,94
13	47,7	22,0	20,4	10,61	5,82	4,74
14	48,0	23,6	19,3	11,27	6,62	4,58
15	42,9	20,3	15,7	6,60	4,03	2,47
16	58,1	26,2	24,8	22,80	12,02	10,66
17	51,6	22,8	26,3	16,19	7,47	8,61
18	51,3	25,2	21,0	13,87	8,18	5,62
19	49,9	24,1	21,9	12,78	7,66	5,09
20	46,8	22,9	17,7	8,99	5,34	3,61
21	40,6	19,6	16,6	7,06	3,71	3,26
22	40,4	18,5	16,7	6,29	3,53	2,62
23	49,6	24,2	20,2	11,62	6,91	4,64
24	46,4	23,1	17,8	8,07	4,93	3,09
25	48,3	24,2	19,6	12,17	6,62	5,45
26	42,5	22,0	15,1	5,83	2,94	2,73
27	41,8	21,7	15,2	6,36	3,53	2,77
28	44,5	22,6	19,2	10,41	5,66	4,75
29	43,1	22,2	16,2	7,22	3,75	3,27
30	43,2	21,4	18,2	8,50	4,42	3,73
31	47,1	26,0	19,0	11,21	5,80	5,20
32	48,3	22,1	18,2	10,17	5,57	4,52
33	44,5	22,3	17,3	8,72	4,98	3,38
34	55,0	25,8	22,0	14,96	8,78	6,06
35	43,6	20,5	16,6	6,21	3,06	2,99
36	43,3	20,0	16,5	7,25	4,39	2,81
37	43,8	25,2	19,3	13,99	7,75	6,21
38	46,3	22,4	17,4	8,25	5,04	3,13
39	42,5	20,9	16,6	6,86	4,20	2,61
40	44,1	21,1	19,1	8,50	5,26	3,57
41	44,6	21,3	17,1	8,07	4,72	3,29
42	50,0	23,4	19,9	12,05	7,21	4,72
43	44,0	22,3	17,6	8,94	4,61	4,10
44	49,8	23,8	20,7	12,63	7,01	5,56
45	45,9	21,6	17,1	8,62	5,21	3,32
46	48,8	22,4	21,2	9,16	4,10	5,02
47	43,0	20,3	17,7	7,15	4,06	3,01
48	50,1	25,8	19,1	13,31	7,90	5,30
49	43,3	21,1	17,4	7,94	4,86	3,12
50	46,5	23,5	19,9	10,46	6,15	4,29
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	46,7	22,9	18,9	11,95	5,78	4,46
Stdev	3,8	1,9	2,4	11,55	1,79	1,72
Min	40,0	18,5	15,1	5,83	2,94	2,47
Max	58,1	26,2	26,3	88,50	12,02	10,66

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	22.8.2005		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Grímsey		Date of preparation:	May 2006		
Coordinates:	663300-180170		IFL#:	SN-2006-30		
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	54,2	21,4	22,3	19,44	9,36	9,41
2	52,2	23,9	21,0	14,06	7,56	6,29
3	52,0	24,5	27,2	19,79	9,81	9,81
4	48,1	23,0	20,8	15,63	6,54	8,70
5	58,2	27,2	25,4	21,82	11,31	10,18
6	51,2	23,8	22,9	12,15	2,15	8,88
7	59,9	30,5	25,0	24,37	12,63	11,12
8	56,4	25,5	21,2	17,46	7,61	8,75
9	56,7	25,3	21,1	15,01	6,13	7,31
10	52,7	25,4	23,8	18,94	8,77	9,54
11	57,3	25,3	22,5	18,86	9,62	8,84
12	51,0	25,9	20,3	14,22	7,14	6,78
13	57,0	27,7	22,4	19,38	10,34	8,58
14	51,5	26,5	21,5	16,35	8,87	7,12
15	57,2	24,4	24,2	19,90	9,45	9,99
16	64,8	29,3	26,6	20,51	7,64	12,41
17	67,8	32,2	26,3	28,44	11,10	16,37
18	64,7	31,4	23,7	20,78	10,23	9,91
19	52,3	25,4	24,6	15,45	7,05	7,85
20	61,2	29,3	25,1	18,96	8,90	9,68
21	54,7	23,5	21,6	15,18	8,42	6,37
22	53,5	24,7	23,7	19,90	9,21	10,58
23	55,1	25,9	22,7	18,38	9,03	9,24
24	47,5	24,6	21,0	11,76	5,21	6,45
25	47,1	22,4	19,4	12,40	5,44	6,38
26	55,4	27,1	24,3	17,86	9,01	8,64
27	62,5	28,6	25,1	22,41	12,69	9,57
28	55,1	27,3	20,8	17,68	8,21	9,07
29	54,7	25,5	20,3	14,63	7,40	7,23
30	51,6	22,9	21,5	13,12	7,39	5,73
31	55,2	24,8	23,6	16,96	7,10	9,29
32	52,6	24,2	19,7	14,51	5,77	8,52
33	53,6	27,6	21,2	16,66	8,21	7,84
34	56,8	28,8	22,6	18,77	8,65	9,51
35	53,8	27,1	23,5	16,80	7,99	8,41
36	57,8	25,5	26,2	23,19	10,58	12,08
37	68,1	27,9	23,3	17,56	8,06	8,91
38	59,8	27,7	24,0	19,01	8,7	10,10
39	62,1	29,0	26,7	21,34	9,33	11,84
40	62,3	29,0	26,6	23,30	10,75	12,38
41	51,4	23,2	24,4	14,76	6,58	7,87
42	52,4	24,1	23,2	14,14	5,69	8,09
43	54,8	24,9	24,4	19,24	8,52	9,55
44	56,5	28,1	25,4	17,97	8,35	9,41
45	53,2	23,6	21,1	14,66	6,01	8,12
46	46,8	24,7	19,2	11,24	4,60	6,22
47	48,8	24,1	20,7	12,25	560,00	6,12
48	64,1	30,0	24,3	20,19	10,05	10,02
49	60,8	29,0	24,4	22,35	12,40	9,70
50	58,4	27,9	22,8	21,80	11,07	10,36
	Length		Height		Weight soft body	Weight shell
Average	55,9	26,2	23,1	17,83	19,45	9,02
Stdev	5,1	2,5	2,1	3,65	78,03	1,96
Min	46,8	21,4	19,2	11,24	2,15	5,73
Max	68,1	32,2	27,2	28,44	560,00	16,37

Appendix II.

Biological measurements of Cod (*Gadus morhua*) 2006

Species:	Cod (<i>Gadus Morhua</i>)	exped./station		date	n
Location:	North- Northvest off Iceland (2)	TP1-2006-25	665203 232958	3.3.2006	25
Lenght:	30-45cm				
Ship:	Páll Pálsson ÍS-102				
Expd.leader:	Jón Sólmundsson				

Group	exped.-station	Weight jar IFL g	Weight jar and liver g	Weight liver g	Weight ungutted fish, g	Sex 0=female 1=male	Lenght cm	Weight gutted fish, g	Weight fillets g	Age
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H 1	25	101,52	111,08	9,56	258	1	32,0	242,3	68	3
	25	102,69	117,52	14,83	287	1	32,0	252,9	61	3
	25	97,94	113,21	15,27	399	1	36,0	330,3	67	3
	25	97,78	113,48	15,70	337	1	34,0	302,0	77	3
	25	97,92	114,62	16,70	452	0	37,0	406,1	104	3
	25	110,64	128,91	18,27	540	0	38,0	449,2	116	3
	25	98,58	117,79	19,21	423	1	36,0	348,4	92	3
	25	98,16	118,01	19,85	516	0	39,0	444,0	137	3
			Sum	129,39	3212,0		284,0	2775,2	722,0	24,0
			Average	16,17	401,5		35,5	346,9	90,3	3,0
			STDEV	3,25	102,2		2,6	80,6	27,0	0,0
			Min	9,56	258,0		32,0	242,3	61,0	3
			Max	19,85	540,0		39,0	449,2	137,0	3

H 2	25	97,96	119,00	21,04	683	0	42,0	565,3	150	3
	25	97,87	121,03	23,16	552	0	39,0	464,1	138	4
	25	97,52	122,44	24,92	383	1	35,0	334,2	99	3
	25	98,79	123,96	25,17	463	1	36,0	382,0	93	3
	25	98,43	127,86	29,43	463	0	36,0	372,7	127	3
	25	98,93	128,70	29,77	515	1	38,0	431,7	104	3
				Sum	153,49	3059,0		226,0	2550,0	711,0
			Average	25,58	509,8		37,7	425,0	118,5	3,2
			STDEV	3,45	102,2		2,6	82,6	23,2	0,4
			Min	21,04	383,0		35,0	334,2	93,0	3
			Max	29,77	683,0		42,0	565,3	150,0	4

H 3	25	98,36	129,56	31,20	598	0	39,0	485,9	132	3	
	25	98,49	129,76	31,27	592	0	40,0	497,4	293	3	
	25	106,90	140,72	33,82	574	1	40,0	500,9	147	3	
	25	98,04	136,04	38,00	699	0	42,0	542,5	136	4	
				Sum	134,29	2463,00		161,0	2026,7	708,0	13,0
				Average	33,57	615,75		40,3	506,7	177,0	3,3
			STDEV	3,19	56,43		1,3	24,7	77,6	0,5	
			Min	31,20	574,00		39,0	485,9	132,0	3	
			Max	38,00	699,00		42,0	542,5	293,0	4	

H 4	25	111,04	151,25	40,21	560	0	40,0	466,0	120	4
	25	101,45	143,82	42,37	604	1	38,0	464,2	135	3
	25	99,09	142,59	43,50	610	1	39,0	494,5	173	3
	25	102,30	146,18	43,88	633	1	41,0	549,3	130	4
	25	98,65	148,20	49,55	726	1	42,0	586,3	122	4
	25	98,45	148,38	49,93	555	0	40,0	478,3	137	4
				Sum	269,44	3688,0		240,0	3038,6	817,0
			Average	44,91	614,7		40,0	506,4	136,2	3,7
			STDEV	3,96	62,3		1,4	50,1	19,3	0,5
			Min	40,21	555,0		38,0	464,2	120,0	3
			Max	49,93	726,0		42,0	586,3	173,0	4

H 5	25	99,20	159,16	59,96	751	0	43,0	628,4	336	4
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H1, H2, H3, H4, H5			Sum	746,57	13173,0		954,00	11018,90	3294,00	82,0
			Average	29,86	526,9		38,16	440,76	131,76	3,3
			STDEV	13,18	130,7		3,00	100,91	62,11	0,5
			Min	9,56	258,0		32,00	242,30	61,00	3
			Max	59,96	751,0		43,00	628,40	336,00	4

Species:	Cod (<i>Gadus Morhua</i>)	exped./station		date	n
Location:	North-Northwest of Iceland (1)	B3-2006-105	665997 164980	3.3.2006	10
Lenght:	30-45cm	B3-2006-109	665997 182118	4.3.2006	15
Ship:	Bjarni Sæmundsson		665997 175263		25
Expd.leader:	Björn Evar Steinsson				

Group	exped.-station	Weight jar IFL g	Weight jar and liver g	Weight liver g	Weight ungutted fish, g	Sex 0=female 1=male	Lenght cm	Weight gutted fish, g	Weight fillets g	Age
H 1	105	98,72	102,78	4,06	260	0	31,0	233	54	3
	105	98,62	102,74	4,12	305	1	33,0	265	73	3
	105	102,79	108,37	5,58	538	1	41,0	469	112	4
	109	98,48	104,06	5,58	343	1	35,0	308	81	3
	109	98,92	105,33	6,41	251	1	33,0	216	51	3
	105	107,06	114,03	6,97	405	1	38,0	361	100	3
			Sum	32,72	2102,0		211,0	1852,0	471,0	19,0
			Average	5,45	350,3		35,2	308,7	78,5	3,2
			STDEV	1,18	108,0		3,7	94,5	24,4	0,4
			Min	4,06	251,0		31,0	216,0	51,0	3
			Max	6,97	538,0		41,0	469,0	112,0	4
H 2	109	97,68	107,39	9,71	530	0	37,0	373	90	3
	109	97,74	108,33	10,59	395	0	37,0	346	89	3
	109	98,13	109,43	11,30	552	1	38,0	405	109	3
	105	101,86	113,81	11,95	695	0	42,0	599	146	4
	109	99,26	111,31	12,05	392	0	37,0	346	91	3
	105	102,44	117,89	15,45	564	0	42,0	505	126	4
			Sum	71,05	3128,0		233,0	2574,0	651,0	20,0
			Average	11,84	521,3		38,8	429,0	108,5	3,3
			STDEV	1,97	114,6		2,5	102,1	23,4	0,5
			Min	9,71	392,0		37,0	346,0	89,0	3
			Max	15,45	695,0		42,0	599,0	146,0	4
H 3	105	98,03	115,40	17,37	500	1	41,0	434	103	6
	109	98,76	116,15	17,39	458	1	38,0	395	101	3
	105	97,96	116,47	18,51	642	1	43,0	571	166	4
	105	97,73	117,3	19,57	662	1	43,0	576	193	4
	109	98,79	119,21	20,42	494	1	39,0	426	112	3
				Sum	93,26	2756,0		204,0	2402,0	675,0
			Average	18,65	551,2		40,8	480,4	135,0	4,0
			STDEV	1,34	93,7		2,3	86,2	41,9	1,2
			Min	17,37	458,0		38,0	395,0	101,0	3
			Max	20,42	662,0		43,0	576,0	193,0	6
H 4	105	97,80	118,94	21,14	730	1	44,0	652	180	4
	109	97,91	120,72	22,81	450	0	38,0	392	95	3
	109	102,94	125,98	23,04	586	0	42,0	516	151	3
	109	98,20	121,53	23,33	660	1	42,0	557	172	4
	109	98,48	122,02	23,54	534	1	40,0	461	121	3
	109	98,56	122,79	24,23	520	0	41,0	448	130	4
			Sum	138,09	3480,0		247,0	3026,0	849,0	21,0
			Average	23,02	580,0		41,2	504,3	141,5	3,5
			STDEV	1,04	101,5		2,0	92,1	32,3	0,5
			Min	21,14	450,0		38,0	392,0	95,0	3
			Max	24,23	730,0		44,0	652,0	180,0	4
H 5	109	102,86	137,14	34,28	461	0	39,0	385	97	4
H 6	109	98,88	145,10	46,22	646	0	44,0	531	98	4
H1, H2, H3, H4, H5, H6			Sum	415,62	12573,0		978,0	10770,0	2841,0	88,00
			Average	16,62	502,9		39,1	430,8	113,6	3,52
			STDEV	9,95	132,6		3,5	114,6	37,1	0,71
			Min	4,06	251,0		31,0	216,0	51,0	3,00
			Max	46,22	730,0		44,0	652,0	193,0	6,00

Species:	Cod (<i>Gadus Morhua</i>)	exped./station	date	n
Location:	Northeast of Iceland	TBR1-2006-40	661680 125283 5.3.2006	25
Lenght:	30-45cm			
Ship:	Brettingur NS-50			
Expd.leader:	Valur Bogason			

Group	exped.-station	Weight jar IFL g	Weight jar and liver g	Weight liver g	Weight ungutted fish, g	Sex 0=female 1=male	Lenght cm	Weight gutted fish, g	Weight fillets g	Age
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H 1	40	98,52	101,94	3,42	268	1	32	244	178	3
	40	98,72	103,44	4,72	210	1	30	189	49	3
	40	101,95	107,46	5,51	301	1	33	271	60	3
	40	107,36	113,28	5,92	390	1	36	356	89	3
	40	98,97	108,70	9,73	483	1	40	437	114	3
			Sum	29,30	1652,0		171,0	1497,0	490,0	15,0
		Average	5,86	330,4		34,2	299,4	98,0	3,0	
		STDEV	2,36	107,3		3,9	97,7	51,4	0,0	
		Min	3,42	210,0		30,0	189,0	49,0	3	
		Max	9,73	483,0		40,0	437,0	178,0	3	

H 2	40	102,96	115,10	12,14	659	0	45	600	165	4
	40	102,46	115,67	13,21	545	1	42	495	139	4
	40	98,22	113,38	15,16	637	1	45	575	148	4
	40	112,08	131,01	18,93	684	0	44	619	181	4
	40	106,29	125,58	19,29	554	0	40	496	153	4
			Sum	78,73	3079,0		216,0	2785,0	786,0	20,0
		Average	15,75	615,8		43,2	557,0	157,2	4,0	
		STDEV	3,26	62,8		2,2	58,3	16,3	0,0	
		Min	12,14	545,0		40,0	495,0	139,0	4	
		Max	19,29	684,0		45,0	619,0	181,0	4	

H 3	40	97,84	118,82	20,98	651	0	43	586	154	4
	40	107,54	129,46	21,92	566	0	41	502	211	5
	40	106,68	131,47	24,79	617	1	42	548	160	4
	40	97,94	123,23	25,29	662	1	44	594	188	4
	40	98,36	125,73	27,37	548	1	42	481	148	4
	40	98,92	128,09	29,17	621	0	43	550	147	4
	40	106,58	136,33	29,75	616	0	42	548	202	4
		Sum	179,27	4281,0		297,0	3809,0	1210,0	29,0	
		Average	25,61	611,6		42,4	544,1	172,9	4,1	
		STDEV	3,38	41,5		1,0	41,0	26,9	0,4	
		Min	20,98	548,0		41,0	481,0	147,0	4	
		Max	29,75	662,0		44,0	594,0	211,0	5	

H 4	40	107,30	139,12	31,82	614	1	42	533	135	4
	40	107,39	139,46	32,07	739	0	45	653	174	4
	40	98,76	131,39	32,63	601	1	42	515	126	4
	40	106,96	144,54	37,58	744	1	43	647	195	4
			Sum	134,10	2698,0		172,0	2348,0	630,0	16,0
			Average	33,53	674,5		43,0	587,0	157,5	4,0
		STDEV	2,72	77,6		1,4	73,2	32,5	0,0	
		Min	31,82	601,0		42,0	515,0	126,0	4	
		Max	37,58	744,0		45,0	653,0	195,0	4	

H 5	40	97,72	139,82	42,10	629	1	42	542	153	4
	40	97,54	145,71	48,17	688	1	43	589	190	4
			Sum	90,27	1317,0		85,0	1131,0	343,0	8,0
			Average	45,14	658,5		42,5	565,5	171,5	4,0
			STDEV	4,29	41,7		0,7	33,2	26,2	0,0
			Min	42,10	629,0		42,0	542,0	153,0	4,0
		Max	48,17	688,0		43,0	589,0	190,0	4,0	

H 6	40	98,22	153,87	55,65	731	1	44	620	174	4
	40	102,05	159,12	57,07	662	1	44	557	181	4
			Sum	112,72	1393,0		88,0	1177,0	355,0	8,0
			Average	56,36	696,5		44,0	588,5	177,5	4,0
			STDEV	1,00	48,8		0,0	44,5	4,9	0,0
			Min	55,65	662,0		44,0	557,0	174,0	4,0
		Max	57,07	731,0		44,0	620,0	181,0	4,0	

H1, H2, H3, H4, H5, H6		Sum	624,39	14420,00		1029,00	12747,00	3814,00	96,00
		Average	24,98	576,80		41,16	509,88	152,56	3,84
		STDEV	15,15	143,50		4,08	123,18	40,72	0,47
		Min	3,42	210,00		30,00	189,00	49,00	3,00
		Max	57,07	744,00		45,00	653,00	211,00	5,00

Appendix III.

Quality assurance in metal analysis and persistent organochlorines analysis

Table 2. Results for trace metals in certified reference materials and recoveries of additions to tissue homogenates of blue mussel (*Mytilus edulis*) for the year 2005.

Analyte	QTM72BT Quasimeme R46 µg/g	I Z-scoreI	Mussel Tissue ERM-CE278 mg/kg	I Z-score*I	TORT-2 NRCC mg/kg	I Z-score*I	Recovery,%	MLOD** mg/kg
As	<i>Measured</i>		6.29 ± 0.29		20.4 ± 0.8			0,3
	<i>Certified</i>	1,60	6.07 ± 0.13	0,29	21,6 ± 1,8	0,44	104,1	
Cd	<i>Measured</i>		0.35 ± 0.03		26.7 ± 1.6			0,03
	<i>Certified</i>	0,10	0.348 ± 0.007	0,05	26,7 ± 0,6	0,00	94,4	
Cu	<i>Measured</i>		9.11 ± 0.68		85.7 ± 5.8			0,6
	<i>Certified</i>	-0,80	9.45 ± 0.13	0,29	106 ± 10	1,5	93,1	
Hg	<i>Measured</i>		0.208 ± 0.007		0.30 ± 0.01			0,03
	<i>Certified</i>	0,60	0,196 ± 0,009	0,49	0,27 ± 0,03	0,88	100,4	
Pb	<i>Measured</i>		1.99 ± 0.07		0.30 ± 0.02			0,03
	<i>Certified</i>	1,60	2.00 ± 0.04	0,04	0,35 ± 0,13	1,14	95,5	
Se	<i>Measured</i>		1.92 ± 0.11		6.75 ± 0.98			0,3
	<i>Certified</i>	1,90	1.84 ± 0.10	0,35	5,63 ± 0,67	1,59	105,2	
Zn	<i>Measured</i>		84.7 ± 4.5		176 ± 9			1,5
	<i>Certified</i>	0,50	83.1 ± 1.7	0,14	180 ± 6	0,17	101,9	

* Z-score ((measured value-certified value)/certified value*0,125)

** MLOD is on dry weight basis

Table 3. Results for trace metals in certified reference materials and recoveries of additions to tissue homogenates of cod for the year 2006

Analyte		DORM-2 NRC-CNRC mg/kg	Z-score	DOLT-3 NRC-CNRC mg/kg	Z-score*	TORT-2 NRCC mg/kg	Z-score*	Recovery,%	MLOD** mg/kg
As	<i>Measured</i>	19.6 ± 0.6		11.0 ± 0.5		22.4 ± 0.4			0,3
	<i>Certified</i>	18.0 ± 1.1	0,71	10.2 ± 0.5	0,62	21,6 ± 1,8	0,29	92,8	
Cd	<i>Measured</i>	0.045 ± 0.002		18.9 ± 1.0		26.2 ± 0.4			0,03
	<i>Certified</i>	0.043 ± 0.008	0,37	19.4 ± 0.6	0,22	26,7 ± 0,6	0,15	93,5	
Cu	<i>Measured</i>	2.25 ± 0.21		29.9 ± 0.8		97.7 ± 2.8			0,6
	<i>Certified</i>	2.34 ± 0.16	0,3	31.2 ± 1.0	0,33	106 ± 10	0,63	108,6	
Hg	<i>Measured</i>	5.1 ± 0.4		3.51 ± 0.25		0.35 ± 0.05			0,03
	<i>Certified</i>	4.64 ± 0.26	0,79	3.37 ± 0.14	0,33	0,27 ± 0,03	2,4	96,4	
Pb	<i>Measured</i>	0.064 ± 0.005		0.30 ± 0.04		0.26 ± 0.02			0,03
	<i>Certified</i>	0.065 ± 0.007	0,12	0.319 ± 0.045	0,47	0,35 ± 0,13	2,05	90,1	
Se	<i>Measured</i>	1.43 ± 0.05		7.4 ± 0.4		6.1 ± 0.1			0,3
	<i>Certified</i>	1.4 ± 0.09	0,17	7.06 ± 0.48	0,38	5,63 ± 0,67	0,67	92,4	
Zn	<i>Measured</i>	23.0 ± 1.7		85.7 ± 4.1		173 ± 5			1,5
	<i>Certified</i>	25.6 ± 2.3	0,81	86.6 ± 2.4	0,08	180 ± 6	0,31	89,9	

* Z-score ((measured value-certified value)/certified value*0,125)

** MLOD is on dry weight basis

Table 4. Qualitative assurance. Persistent organochlorines (ng/g ww) in a certified mussel sample from quasimeme, that were analysed with the mussel samples from 2005.

Blue mussel 2005								assign			
chemical	CRM	weight basis	anal. 1	anal. 2	anal. 3	mean	SD	value	time	Z	Det. Lim.
CB28	QOR076BT	wet weight	0,24	0,22	0,22	0,23	0,01	0,20	2 weeks	0,53	0,17
CB31	QOR076BT	wet weight	0,19	0,18	0,18	0,18	0,01	0,18	2 weeks	0,07	0,14
CB52	QOR076BT	wet weight	0,54	0,51	0,53	0,53	0,02	0,51	2 weeks	0,19	0,04
CB101	QOR076BT	wet weight	2,45	2,40	2,65	2,50	0,13	2,35	2 weeks	0,47	0,05
CB105	QOR076BT	wet weight	0,49	0,39	0,45	0,44	0,05	0,40	2 weeks	0,58	0,05
CB118	QOR076BT	wet weight	1,89	1,83	1,92	1,88	0,05	1,80	2 weeks	0,32	0,06
CB138	QOR076BT	wet weight	4,83	4,31	4,42	4,52	0,27	4,28	2 weeks	0,43	0,07
CB153	QOR076BT	wet weight	7,27	6,78	7,43	7,16	0,34	6,87	2 weeks	0,33	0,06
CB156	QOR076BT	wet weight	0,21	0,18	0,21	0,20	0,02	0,19	2 weeks	0,20	0,05
CB180	QOR076BT	wet weight	0,53	0,48	0,51	0,51	0,03	0,45	2 weeks	0,70	0,05
HCB	QOR076BT	wet weight	0,08	0,07	0,07	0,07	0,01	0,07	2 weeks	0,10	0,01
a-HCH	QOR076BT	wet weight	0,04	0,04	0,05	0,04	0,01	0,05	2 weeks	-0,27	0,04
b-HCH	QOR076BT	wet weight	0,02	0,02	0,01	0,02	0,01	0,03	2 weeks	-0,89	0,20
g-HCH	QOR076BT	wet weight	0,06	0,05	0,06	0,06	0,01	0,06	2 weeks	-0,11	0,01
pp'-DDE	QOR076BT	wet weight	1,23	1,30	1,29	1,27	0,04	1,18	2 weeks	0,54	0,03
pp'-DDD	QOR076BT	wet weight	0,55	0,51	0,53	0,53	0,02	0,51	2 weeks	0,23	0,05
pp'-DDT	QOR076BT	wet weight	0,02	0,02	0,02	0,02	0,00	0,27	2 weeks	*	0,05
op'-DDT	QOR076BT	wet weight	0,11	0,09	0,09	0,10	0,01	0,09	2 weeks	*	0,10
transn-chlor	QOR076BT	wet weight	0,13	0,11	0,11	0,12	0,01	0,11	2 weeks	0,26	0,05
* "assigned value" only "indicative". Quasimeme does not assign %error and thus Z-score can not be calculated.											
a- og g-chlordane, oxychlordane and toxaphenes are not certified in this sample by quasimeme											

Table 5. Qualitative assurance. Persistent organochlorines (ng/g ww) in a certified cod liver sample from quasimeme, that were analysed with the cod liver samples from 2006.

Cod liver 2005								assign			
chemical	CRM	weight basis	anal. 1	anal. 2	anal. 3	mean	SD	value	time	Z	Det. Lim.
CB28	QOR063BT	wet weight	12,1	12,6	13,3	12,7	0,60	11,8	3 weeks	0,58	0,20
CB31	QOR063BT	wet weight	3,86	4,18	4,89	4,31	0,53	4,04	3 weeks	0,49	0,20
CB52	QOR063BT	wet weight	26,5	26,4	29,3	27,4	1,66	25,8	3 weeks	0,50	0,10
CB101	QOR063BT	wet weight	94,5	93,0	111	99,4	9,82	96,6	3 weeks	0,23	0,17
CB105	QOR063BT	wet weight	41,3	42,9	47,5	43,9	3,22	41,1	3 weeks	0,55	0,05
CB118	QOR063BT	wet weight	141	135	144	140	4,45	139	3 weeks	0,07	0,05
CB138	QOR063BT	wet weight	256	274	296	275	20,0	259	3 weeks	0,50	0,05
CB153	QOR063BT	wet weight	359	377	304	346	38,2	359	3 weeks	-0,28	0,05
CB156	QOR063BT	wet weight	19,0	19,6	21,4	20,0	1,24	19,21	3 weeks	0,33	0,05
CB180	QOR063BT	wet weight	74,1	78,7	88,1	80,3	7,12	77,6	3 weeks	0,27	0,05
HCB	QOR063BT	wet weight	10,9	10,2	10,7	10,6	0,33	10,4	3 weeks	0,17	0,02
a-HCH	QOR063BT	wet weight	1,90	1,86	1,99	1,92	0,07	1,92	3 weeks	-0,01	0,05
b-HCH	QOR063BT	wet weight	1,50	1,57	1,63	1,57	0,07	1,88	3 weeks	-1,10	0,20
g-HCH	QOR063BT	wet weight	0,13	0,19	0,13	0,15	0,03	1,49*	3 weeks		0,05
pp'-DDE	QOR063BT	wet weight	155	160	171	162	8,10	155	3 weeks	0,33	0,10
pp'-DDD	QOR063BT	wet weight	39,8	39,2	42,6	40,6	1,83	39,27	3 weeks	0,26	0,10
pp'-DDT	QOR063BT	wet weight	0,49	0,66	0,49	0,55	0,10	6,39*	3 weeks		0,20
op'-DDT	QOR063BT	wet weight	0,44	0,50	0,72	0,55	0,15	28,52*	3 weeks		0,20
transn-chlor	QOR063BT	wet weight	18,5	18,5	21,1	19,4	1,48	17,89	3 weeks	0,64	0,05
* "assigned value" only "indicative". Quasimeme does not assign %error and thus Z-score can not be calculated.											
a- og g-chlordane, oxychlordane and toxaphenes are not certified in this sample by quasimeme											

Table 6. Detection limits* (ng/g)

chemical	Detection limits	
	mussel ng/sample dw	Cod liver ng/sample ww
a-HCH	0,038	0,05
HCB	0,010	0,02
b-HCH	0,200	0,20
g-HCH	0,010	0,05
PCB-31	0,140	0,20
PCB-28	0,166	0,20
PCB-52	0,036	0,10
oxychlorane	0,050	0,17
gamma-Chl.	0,050	0,05
PCB-101	0,052	0,17
alfa-Chl.	0,050	0,05
transnonachlor	0,050	0,05
4,4'-DDE	0,050	0,10
tox 26	0,020	0,10
PCB-118	0,055	0,05
4,4'-DDD	0,046	0,10
2,4'-DDT	0,050	0,20
PCB-153	0,061	0,05
PCB-105	0,050	0,05
4,4'-DDT	0,050	0,20
PCB-138	0,071	0,05
tox 50	0,050	0,10
PCB-156	0,050	0,05
PCB-180	0,050	0,05
tox 62	0,050	0,12
PCB-170	0,050	0,05
PBDE-47	0,100	0,20
PBDE-99	0,100	0,20

*detection limits are 3 x std of blanks, or 3 x noise level or higher when other peaks interfer.

Appendix IV.

**Results of trace metal analysis for
Blue mussel (*Mytilus edulis*) 2005 and
Cod (*Gadus Morhua*) 2006**

Table 7. Results of trace metals in Blue mussel (*Mytilus edulis*) 2005 (dw)

Samples	Fat		Dry matter		Pb, mg/kg		Cd, mg/kg		Cu, mg/kg		Zn, mg/kg		As, mg/kg		Se, mg/kg		Hg, mg/kg	
	%	±	%	±	dw	±	dw	±	dw	±	dw	±	dw	±	dw	±	dw	±
Grimsey 05	0,4	0,06	9,1	0,08	0,658	0,032	4,73	0,26	5,17	0,21	186,1	8,7	12,4	0,6	3,38	0,28	0,096	0,009
Hvasshraun 05	0,3	0,00	7,2	0,05	0,248	0,018	1,65	0,12	6,53	1,03	125,2	8,8	15,8	0,9	3,47	0,12	0,064	0,003
Hvitanes, Hvalfjörður 05	1,3	0,06	15,6	0,21	0,256	0,022	1,95	0,08	10,4	0,3	107,5	3,4	7,60	0,24	3,24	0,22	0,050	0,018
Eyri, Hvalfjörður 05	0,7	0,00	12	0,06	0,069	0,015	1,09	0,03	6,21	0,26	126,4	2,8	9,14	0,27	3,37	0,40	0,046	0,012
Hvalstöð, Hvalfjörður 05	1,0	0,02	13,4	0,03	0,065	0,017	1,30	0,05	5,11	0,33	90,4	2,2	6,62	0,11	2,71	0,21	0,050	0,013
Mjóifjörður, Hofsá 05	0,3	0,02	7	0,01	0,527	0,199	4,10	0,13	8,23	0,88	205,4	6,4	13,3	0,5	4,07	0,34	0,099	0,003
Mjóifjörður, Dalatangi 05	0,2	0,05	7,7	0,09	0,198	0,008	2,57	0,20	6,86	0,45	189,3	9,5	20,8	1,1	2,79	0,20	0,149	0,010
Mjóifjörður, head 05	0,5	0,07	8,7	0,04	0,111	0,003	2,77	0,12	6,57	0,24	135,1	5,3	11,6	0,4	4,06	0,29	0,064	0,007
Úlfsá, Skutulsfjörður 05	0,3	0,03	5,6	0,06	0,542	0,021	1,47	0,01	6,09	0,13	124,4	2,2	63,3	1,7	3,15	0,18	0,126	0,005
Dvergasteinn, Álftafjörður 05	0,4	0,04	9,7	0,02	0,122	0,009	3,90	0,10	5,21	0,16	100,1	1,6	14,0	0,2	4,23	0,06	0,054	0,003
Straumur, Straumsvík 05	0,6	0,01	9,6	0,01	0,119	0,003	1,99	0,11	4,43	0,24	95,0	3,5	8,31	0,31	2,72	0,16	0,038	0,003
Limit of detection for samples (MLOD)					0,03		0,03		0,60		1,5		0,3		0,30		0,03	

Table 8. Results of trace metals in liver and flesh of Cod (*Gadus morhua*) 2006 (ww)

Sample	Fat %		Dry matter %		Pb, µg/g	Cd, µg/g		Cu, µg/g		Zn, µg/g		As, µg/g		Se, µg/g		Hg#, µg/g		Dry matter %		Fat %		Hg, ng/g		
	Liver	±	Liver	±	Liver	Liver	±	Liver	±	Liver	±	Liver	±	Liver	±	Liver	±	Flesh*	±	Flesh*	±	Flesh*	±	
COD N-NW (1) 06	Group 1	21.1	NA†	42.3	NA	< 0.03	0.501	0.014	4.93	0.06	24.5	0.4	12.3	0.2	1.69	0.05								
	Group 2	41.0	0.41	59.5	0.38	< 0.03	0.483	0.013	4.02	0.16	18.1	0.5	10.4	0.2	1.22	0.04								
	Group 3	45.5	0.78	57.70	0.31	< 0.03	0.251	0.012	3.56	0.10	15.6	0.6	6.26	0.25	1.01	0.05								
	Group 4	52.0	0.33	62.6	0.08	< 0.03	0.229	0.019	2.69	0.21	13.1	1.0	5.78	0.37	0.812	0.084								
	Group 5	70.7	NA	86.7	NA	< 0.03	0.118	0.006	1.86	0.09	9.07	0.45	5.41	0.08	0.449	0.014								
	Group 6	54.6	0.73	69.6	0.62	< 0.03	0.179	0.008	1.19	0.22	10.1	0.5	3.58	0.22	0.605	0.034								
	Average						0.294		3.043		15.08		7.296		0.965		19.8	19.0	0.4	0.08	0.1	0.187	0.008	
COD N-NW (2) 06	Group 1	50.5	0.30	63.4	0.09	< 0.03	0.272	0.011	2.41	0.15	12.1	0.5	5.48	0.25	0.677	0.044								
	Group 2	57.9	0.25	67.5	0.28	< 0.03	0.202	0.001	2.34	0.23	9.91	0.32	5.09	0.14	0.586	0.039								
	Group 3	62.8	3.94	81.6	0.57	< 0.03	0.148	0.018	1.47	0.15	9.28	0.81	4.92	0.16	0.502	0.048								
	Group 4	65.9	1.02	75.0	0.23	< 0.03	0.104	0.006	1.56	0.16	8.44	0.37	5.13	0.19	0.455	0.014								
	Group 5	59.6	0.73	70.0	0.16	< 0.03	0.105	0.003	2.83	0.09	8.83	0.29	4.67	0.22	0.409	0.027								
	Average						0.166		2.122		9.707		5.057		0.526		19.7	19.2	0.4	0.11	0.1	0.198	0.037	
COD NE 06	Group 1	23.0	NA	42.8	NA	< 0.03	0.350	0.006	4.54	0.11	23.7	0.4	9.09	0.16	1.91	0.05								
	Group 2	42.3	1.23	55.5	0.18	< 0.03	0.389	0.029	4.42	0.37	18.4	1.4	7.90	0.71	1.34	0.12								
	Group 3	58.0	0.24	68.3	0.41	< 0.03	0.189	0.011	2.94	0.29	12.7	0.6	5.01	0.2	0.788	0.051								
	Group 4	60.6	0.01	69.8	0.36	< 0.03	0.208	0.005	2.24	0.04	11.5	0.4	4.52	0.18	0.700	0.013								
	Group 5	64.6	1.38	79.9	0.01	< 0.03	0.107	0.004	2.79	0.34	8.47	0.26	4.20	0.25	0.412	0.022								
	Group 6	63.7	0.01	72.7	0.34	< 0.03	0.105	0.008	2.46	0.12	8.80	0.43	5.27	0.20	0.509	0.039								
	Average						0.225		3.232		13.923		5.998		0.942		13.4	19.0	0.4	0.10	1.1	0.134	0.006	
Average of all measurements						0.23		2.84		13.09		6.18		0.83		17.63						0.17		
Limit of detection for samples (MLOD)						0.03	0.030	0.60		1.5		0.3		0.30		0.03						0.03		

was pooled into one sample

*flesh was pooled into one sample

†NA: not available

Appendix V.

**Results of organochlorine analysis for
Blue mussel (*Mytilus edulis*) 2005 and
Cod (*Gadus morhua*) 2006**

Table 9. Persistent organochlorines in Blue mussel (*Mytilus edulis*, ng/g dw) 2005.

	Grimsey 05	Ulfsá 05	Dvergasteinn 05	Mjóifj. Dalat.05	Mjóifj. Bryggja 05	Mjóifj. Innst 05	Hvalfj. Hvítan. 05	Hvalfj. Hvalst. 05
PCB28	0,29	0,28	<0,17	0,34	0,72	0,29	0,27	0,24
PCB31	0,19	0,25	<0,14	0,25	0,68	0,29	0,16	0,18
PCB52	0,20	0,58	0,24	0,37	0,75	0,31	0,21	0,28
PCB101	0,21	1,00	0,97	0,74	1,11	0,19	0,60	0,93
PCB105	0,10	0,31	0,40	0,32	0,09	0,08	0,17	0,25
PCB118	0,12	0,79	0,97	0,58	1,01	0,08	0,61	0,89
PCB138	0,24	1,14	1,05	0,80	4,44	0,30	1,32	1,90
PCB153	0,40	1,48	1,09	0,90	4,86	0,42	1,67	2,47
PCB156	<0,05	0,13	0,13	0,11	0,18	<0,05	0,06	0,10
PCB170	<0,05	0,07	<0,05	<0,05	0,23	<0,05	0,05	0,09
PCB180	<0,05	0,07	<0,05	<0,05	0,99	<0,05	0,19	0,40
Σ3PCB**	0,76	3,41	3,10	2,29	10,3	0,80	3,60	5,26
HCB	0,13	0,19	0,05	0,10	0,22	0,10	0,15	0,32
a-HCH	0,37	0,29	0,28	0,46	0,44	0,47	0,50	0,75
b-HCH	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
g-HCH	0,21	0,14	<0,1	0,39	0,30	0,35	0,23	0,31
p,p'-DDE	0,67	0,84	0,38	0,44	1,98	0,39	0,72	0,90
p,p'-DDD	0,09	0,11	0,06	<0,05	0,31	0,10	0,15	0,14
p,p'-DDT	<0,05	0,12	<0,05	<0,05	0,40	<0,05	<0,05	<0,05
o,p'-DDT	<0,2	<0,2	<0,2	<0,2	0,37	<0,2	<0,2	<0,2
PCB153/DDE	0,6	1,8	2,9	2,0	2,5	1,1	2,3	2,8
transnonachlor	0,25	0,31	0,28	0,31	0,65	0,24	0,24	0,37
a-chlordan	<0,05	0,17	0,19	0,13	0,47	0,24	0,24	0,34
g-chlordan	<0,05	<0,05	0,05	<0,05	0,15	0,06	<0,05	0,08
oxychlordan	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05
Tox-26	0,20	0,19	0,25	0,19	0,51	0,23	0,19	0,31
Tox-50	0,34	0,32	0,48	0,38	1,09	0,50	0,36	0,46
Tox-62	0,06	0,05	0,07	0,06	0,15	0,10	<0,05	<0,05
PBDE-47	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
PBDE-99	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
% extracted fat	0,30	0,22	0,34	0,26	0,31	0,32	1,3	0,79
% fat (IFL)	0,4	0,3	0,4	0,2	0,3	0,5	1,3	1,0
% dw (IFL)	9,1	5,6	9,7	7,7	7,0	8,7	15,6	13,4

*PCB # 118, 138 and 153

Table 9. cont. Persistent organochlorines in Blue mussel (*Mytilus edulis*, ng/g dw) 2005.

	Hvalfj. Eyri 05	Hvassahraun 05			Straumur 05		
		A	B	mean*	A	B	mean**
PCB28	0,21	0,21	0,23	0,22	0,26	0,30	0,28
PCB31	0,18	0,28	0,28	0,28	0,23	0,28	0,26
PCB52	0,28	0,38	0,38	0,38	0,39	0,44	0,41
PCB101	0,95	0,53	0,49	0,51	0,99	1,13	1,06
PCB105	0,27	0,08	0,09	0,09	0,27	0,31	0,29
PCB118	0,91	0,25	0,27	0,26	0,84	0,98	0,91
PCB138	1,89	0,46	0,67	0,56	1,99	2,31	2,15
PCB153	2,27	0,67	0,83	0,75	2,29	2,72	2,51
PCB156	0,10	0,07	0,07	0,07	0,13	0,12	0,12
PCB170	<0,05	<0,05	<0,05	<0,05	0,06	0,05	0,05
PCB180	0,13	<0,05	<0,05	<0,05	0,14	0,10	0,12
Σ3PCB**	5,07	1,37	1,77	1,57	5,12	6,01	5,56
HCB	0,17	0,07	0,08	0,07	0,13	0,15	0,14
a-HCH	0,42	0,29	0,27	0,28	0,43	0,47	0,45
b-HCH	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
g-HCH	0,25	0,29	0,32	0,31	0,28	0,36	0,32
p,p'-DDE	0,87	0,52	0,43	0,48	0,91	1,02	0,96
p,p'-DDD	0,24	0,09	0,07	0,08	0,32	0,41	0,36
p,p'-DDT	0,06	0,10	0,06	0,08	0,41	0,53	0,47
o,p'-DDT	<0,2	<0,2	<0,2	<0,2	0,32	0,35	0,34
	2,6	1,3	1,9	1,6	2,5	2,7	2,6
transnonachlor	0,29	0,15	0,14	0,14	0,25	0,28	0,26
a-chlordan	0,28	0,11	0,11	0,11	0,26	0,28	0,27
g-chlordan	0,06	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05
oxychlordan	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05
Tox-26	0,32	0,12	0,12	0,12	0,29	0,32	0,31
Tox-50	0,44	0,22	0,21	0,21	0,49	0,53	0,51
Tox-62	0,05	0,07	<0,05	<0,06	0,06	0,10	0,08
PBDE-47	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
PBDE-99	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
% extracted fat	0,64	0,22	0,19	0,21	0,50	0,51	0,51
% fat (IFL)	0,7			0,3			0,6
% dw (IFL)	12,0			7,2			9,6

*PCB # 118, 138 and 153

**Mean of two analysis A and B performed one week apart

Table 10. Persistent organochlorines in cod liver from 2006 (ng/g ww).

	COD N-NW(2)	COD N-NW(2)		COD N-NW(2)	COD N-NW(2)	COD N-NW(2)	COD N-NW(2)
	H1	H2 A	H2 B	H2**	H3	H4	H5
PCB28	1,5	1,6	2,6	2,1	1,4	1,5	1,6
PCB31	1,1	1,1	1,4	1,2	1,1	1,0	0,98
PCB52	4,6	4,9	5,0	4,9	3,9	5,0	4,6
PCB101	6,8	7,5	9,2	8,4	5,5	5,8	6,2
PCB105	2,4	2,5	3,0	2,8	2,3	2,3	2,2
PCB118	6,9	7,0	7,0	7,0	5,1	6,1	5,6
PCB138	14,0	15,7	15,8	15,8	12,0	13,5	14,4
PCB153	17,3	20,2	21,5	20,9	14,1	14,5	15,2
PCB156	1,4	1,3	1,4	1,3	0,90	1,1	1,03
PCB170	1,3	1,3	1,2	1,2	0,85	1,0	1,1
PCB180	4,3	4,3	4,5	4,4	2,8	3,0	3,4
Σ7PCB*	55,3	61,2	65,7	63,4	44,9	49,4	50,9
HCB	15,7	15,8	15,2	15,5	14,9	16,9	15,2
a-HCH	3,2	3,5	3,8	3,6	3,6	3,7	3,7
b-HCH	0,68	0,76	0,68	0,72	0,52	0,80	0,84
g-HCH	0,67	0,70	0,72	0,71	0,67	0,73	0,76
p,p'-DDE	36,9	38,3	39,9	39,1	29,0	29,4	27,1
p,p'-DDD	11,7	13,3	13,4	13,3	11,2	12,1	11,7
p,p'-DDT	10,3	11,8	11,8	11,8	8,8	10,6	10,0
o,p'-DDT	2,8	2,6	4,3	3,5	1,2	3,8	4,1
ΣDDT	61,6	66,0	69,3	67,7	50,2	55,9	52,9
transnonachlor	17,9	18,4	20,3	19,3	14,8	16,9	16,5
a-chlordan	17,8	18,2	20,2	19,2	14,7	18,0	17,1
g-chlordan	5,8	5,8	6,8	6,3	4,8	5,8	5,7
oxychlordan	3,4	3,5	4,2	3,8	3,1	3,5	3,4
ΣCHL	44,9	45,9	51,5	48,7	37,4	44,3	42,8
Tox-26	16,9	18,0	19,7	18,9	15,5	18,3	17,8
Tox-50	32,1	35,3	35,7	35,5	29,6	32,8	31,4
Tox-62	10,7	12,4	13,4	12,9	10,2	12,3	11,6
% extracted fat	51,3	56,9	56,9	56,9	55,8	59,3	55,4

*PCB # 28, 52, 101, 118, 138, 153 and 180

**Mean of two different analysis performed one week apart

Table 10. cont. Persistent organochlorines in cod liver from 2006 (ng/g ww).

	COD N-NW(1)		COD N-NW(1)		COD N-NW(1)	COD N-NW(1)	COD N-NW(1)	COD N-NW(1)
	H1	H2	H3 A	H3 B	H3**	H4	H5	H6
PCB28	1,0	2,7	1,8	1,6	1,7	2,0	1,6	2,0
PCB31	0,39	1,2	1,0	0,84	0,93	0,90	1,1	1,3
PCB52	3,3	8,0	4,7	4,0	4,4	5,7	5,6	6,4
PCB101	7,4	15,6	10,2	8,8	9,5	9,7	7,6	9,3
PCB105	3,3	6,6	3,8	4,0	3,9	3,6	2,6	2,7
PCB118	9,0	9,1	5,3	5,6	5,5	6,3	3,8	5,4
PCB138	15,8	29,8	19,7	20,2	19,9	17,2	12,2	17,9
PCB153	24,2	42,6	30,0	32,3	31,2	23,3	16,8	22,4
PCB156	1,4	2,6	1,5	1,4	1,5	1,6	0,99	1,5
PCB170	1,7	2,8	2,0	2,6	2,3	1,5	0,79	1,8
PCB180	5,7	9,7	7,2	7,4	7,3	5,1	2,9	6,0
Σ7PCB*	66,2	117,5	78,9	79,9	79,4	69,3	50,4	69,5
HCB	4,0	15,3	10,5	9,4	9,9	15,3	13,2	14,8
a-HCH	2,0	4,4	3,6	3,6	3,6	4,0	5,1	4,3
b-HCH	0,44	0,92	0,70	0,46	0,58	0,73	0,95	0,80
g-HCH	0,44	1,1	0,86	0,78	0,82	0,93	1,2	0,98
p,p'-DDE	38,9	74,5	41,2	45,9	43,5	40,1	30,0	46,8
p,p'-DDD	9,2	18,6	10,4	9,6	10,0	14,3	12,5	14,1
p,p'-DDT	9,7	18,5	10,5	9,2	9,9	13,1	8,7	13,1
o,p'-DDT	4,2	10,1	3,9	3,9	3,9	6,8	5,1	8,8
ΣDDT	62,0	121,7	65,9	68,5	67,2	74,2	56,3	82,9
transnonachlor	20,3	40,6	23,3	23,9	23,6	23,4	16,8	21,0
a-chlordan	13,9	29,7	16,6	15,4	16,0	21,5	19,6	21,4
g-chlordan	3,9	8,6	5,1	4,3	4,7	6,9	6,5	7,2
oxychlordan	3,2	7,0	4,5	5,1	4,8	4,5	3,7	4,5
ΣCHL	41,3	85,9	49,5	48,6	49,1	56,3	46,5	54,2
Tox-26	16,3	34,2	18,6	18,9	18,8	23,2	19,1	22,7
Tox-50	25,3	49,7	28,3	30,8	29,5	37,4	34,1	38,8
Tox-62	8,9	15,1	9,5	9,5	9,5	12,8	9,6	13,7
% úrhlotuð fita	24,9	41,6	46,2	46,4	46,3	51,4	66,2	55,1

*PCB # 28, 52, 101, 118, 138, 153 and 180

**Mean of two different analysis performed one week apart

Table 10. cont. Persistent organochlorines in cod liver from 2006 (ng/g ww).

	COD NE		COD NE		COD NE		COD NE	COD NE	COD NE
	H1	H2	H3	H4 A	H4 B	H4**			
PCB28	1,3	2,2	2,1	2,1	2,3	2,2	1,8	1,9	
PCB31	0,34	0,76	0,85	1,2	1,3	1,2	1,2	0,89	
PCB52	4,1	6,7	6,3	6,2	6,0	6,1	5,2	5,7	
PCB101	8,1	12,9	10,0	10,1	10,3	10,2	7,1	7,7	
PCB105	3,8	4,7	3,4	3,3	3,7	3,5	2,5	2,5	
PCB118	8,6	12,6	9,2	9,2	9,0	9,1	5,8	7,5	
PCB138	14,5	20,4	17,2	18,2	17,3	17,7	12,3	14,8	
PCB153	22,3	30,0	20,3	21,2	20,1	20,6	16,0	19,1	
PCB156	1,6	2,2	1,8	1,7	1,6	1,6	1,0	1,4	
PCB170	1,5	2,1	1,5	1,5	1,5	1,5	0,71	1,1	
PCB180	4,3	6,7	4,9	4,7	4,8	4,7	2,7	3,6	
Σ7PCB*	63,2	91,3	70,0	71,5	69,7	70,6	50,8	60,4	
HCB	7,4	14,3	16,1	17,4	14,0	15,7	17,0	16,6	
a-HCH	1,9	3,7	5,1	5,0	4,5	4,8	5,6	5,1	
b-HCH	0,27	0,69	0,98	0,96	0,85	0,91	0,76	1,0	
g-HCH	0,47	0,86	1,2	1,2	1,1	1,16	1,3	1,2	
p,p'-DDE	42,4	53,9	41,2	45,0	42,0	43,5	27,5	33,7	
p,p'-DDD	8,5	16,1	14,3	14,5	13,1	13,8	11,7	13,2	
p,p'-DDT	3,0	14,2	14,4	14,3	13,1	13,7	9,4	12,2	
o,p'-DDT	4,0	7,0	7,2	9,9	9,0	9,5	5,9	6,7	
ΣDDT	57,9	91,3	77,0	83,6	77,2	80,4	54,4	65,7	
transnonachlor	21,2	29,3	23,0	23,5	22,3	22,9	16,2	19,4	
a-chlordan	15,7	24,4	22,6	24,1	22,2	23,2	18,6	21,3	
g-chlordan	3,8	6,6	7,0	7,5	7,1	7,3	6,5	6,9	
oxychlordan	3,1	5,0	3,8	4,0	4,1	4,0	3,4	3,6	
ΣCHL	43,9	65,3	56,4	59,0	55,7	57,4	44,7	51,1	
Tox-26	17,4	27,0	23,4	23,2	21,3	22,2	19,3	21,4	
Tox-50	24,3	42,1	41,4	40,7	37,6	39,1	32,9	37,0	
Tox-62	7,1	12,1	16,2	17,1	14,2	15,7	14,6	15,6	
% úrhluðuð fita	23,0	42,7	58,6	59,0	58,4	58,7	64,4	62,5	

*PCB # 28, 52, 101, 118, 138, 153 and 180

**Mean of two different analysis performed one week apart

Appendix VI.

Graphs of biological variation in Cod (*Gadus morhua*) 1990-2006

Biological variation in 30-45 cm Cod (*Gadus morhua*) from Icelandic waters in March 1990-2006

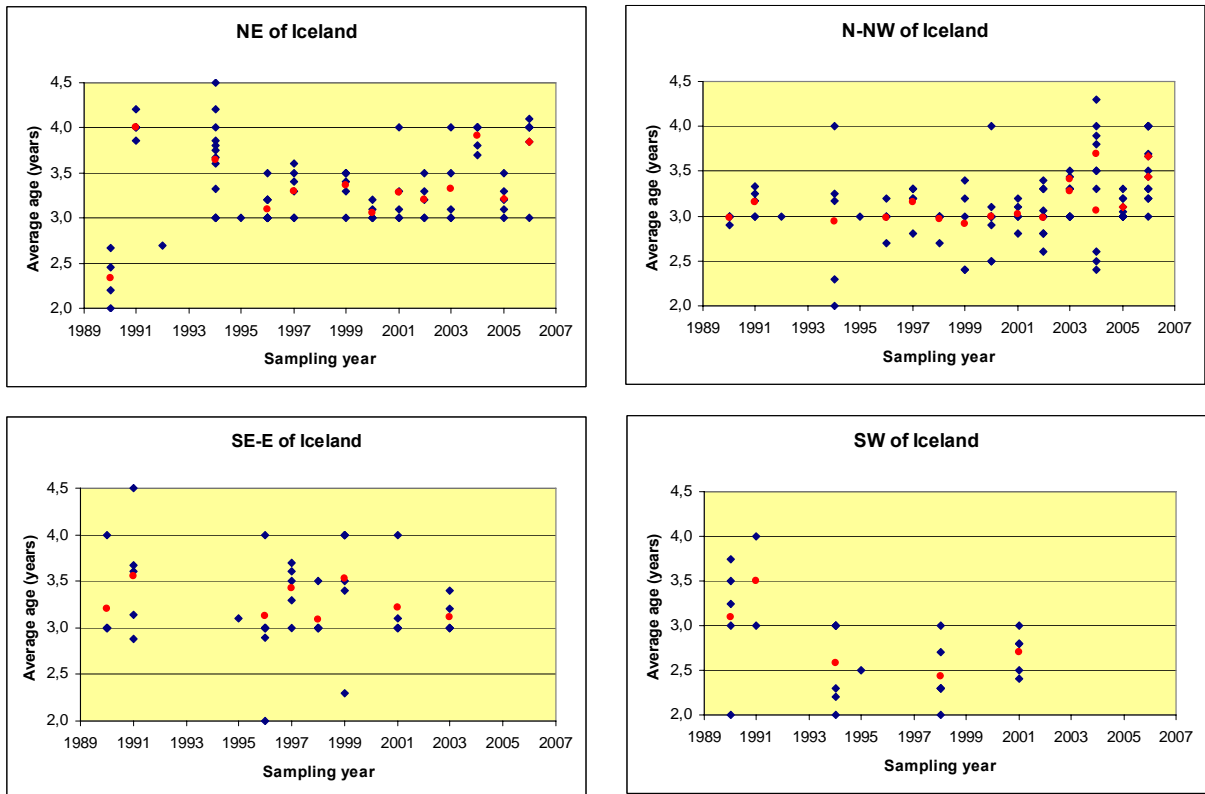


Figure 2a. Average age in 30-45 cm Cod (*Gadus morhua*) from Icelandic waters in March 1990-2006. The red dots represent the average values.

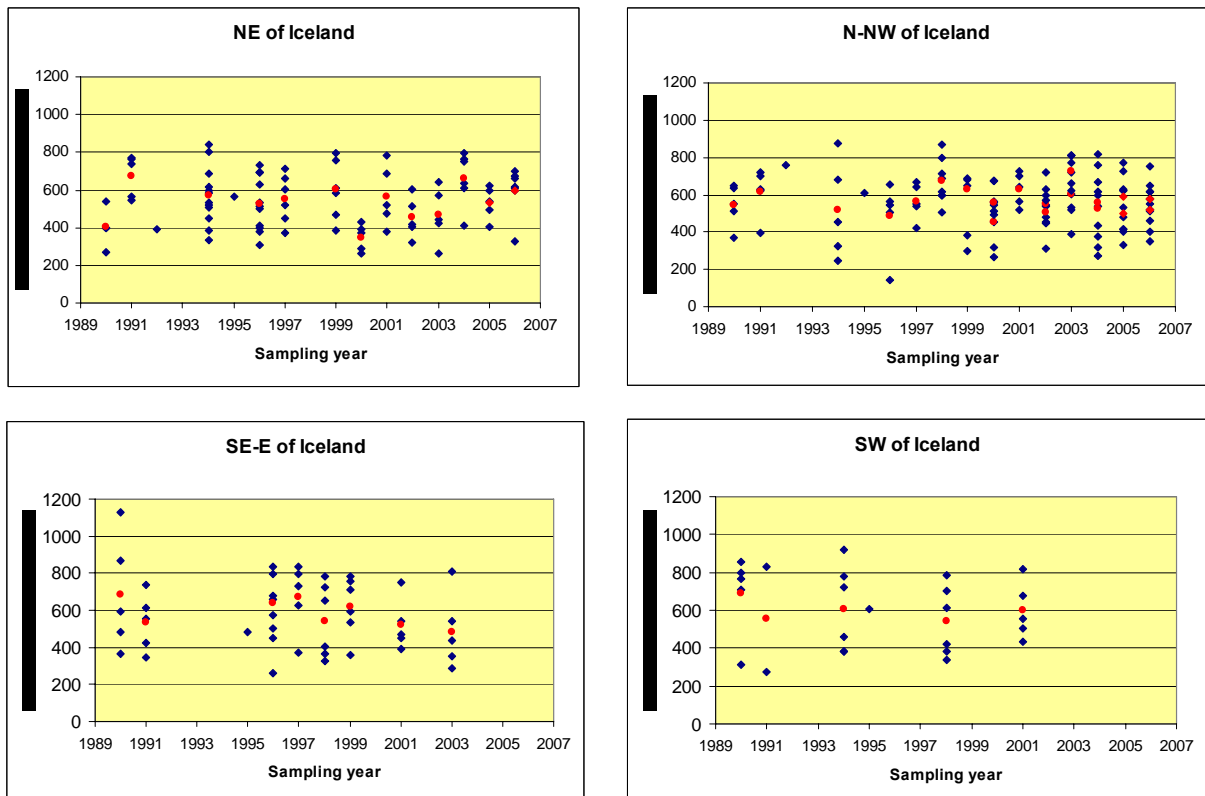


Figure 2b. Average weight ungutted Cod (*Gadus morhua*), 30-45 cm, from Icelandic waters in March 1990-2006. The red dots represent the average values.

Biological variation in 30-45 cm Cod (*Gadus morhua*) from Icelandic waters in March 1990-2006

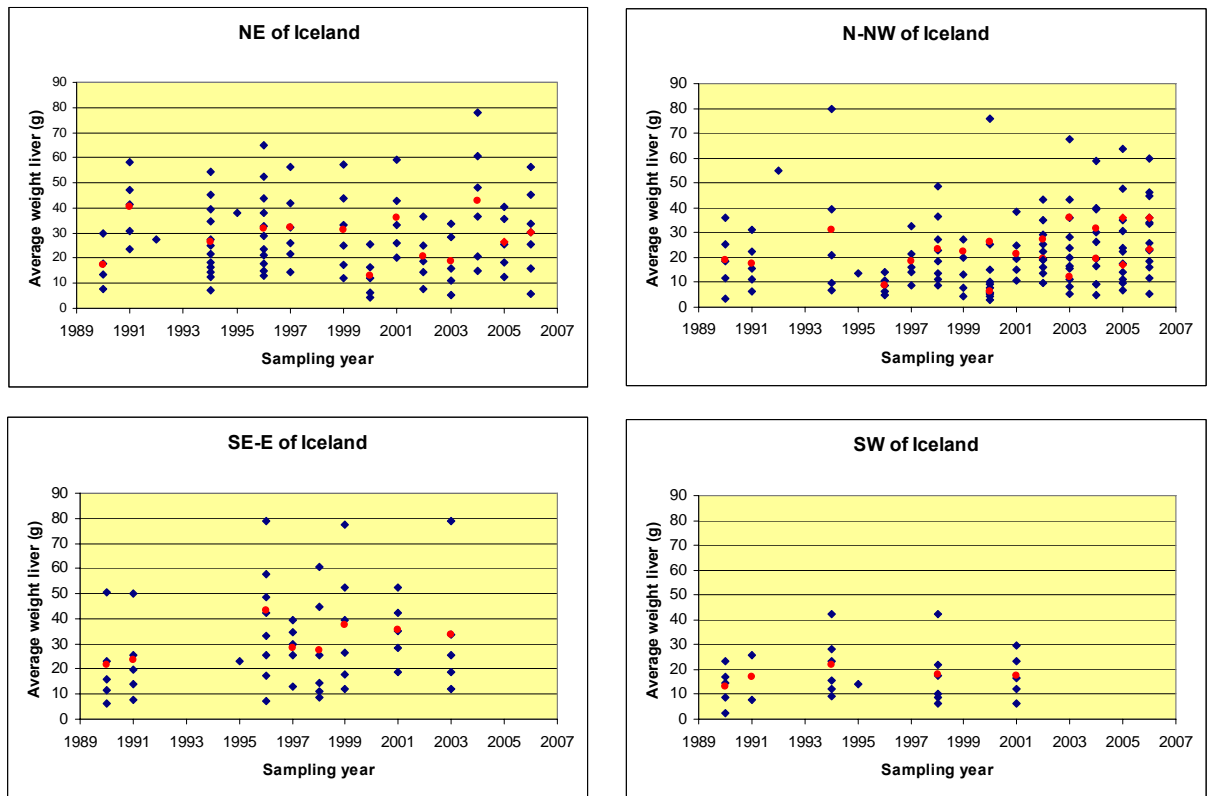


Figure 2c. Average weight liver of Cod (*Gadus morhua*), 30-45 cm, from Icelandic waters in March 1990-2006. The red dots represent the average values.

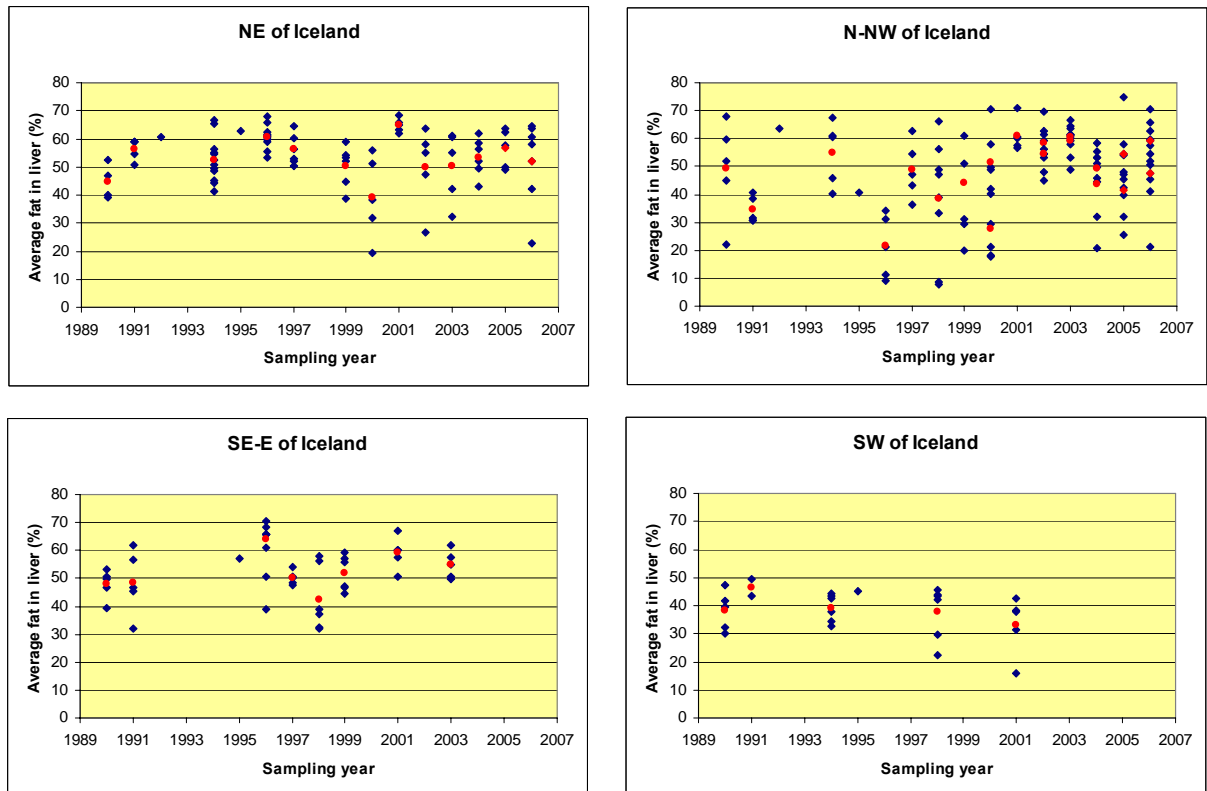


Figure 2d. Average fat (%) in liver of Cod (*Gadus morhua*), 30-45 cm, from Icelandic waters in March 1990-2006. The red dots represent the average values.

Appendix VII.

Graphs of metals and organic compounds in Blue mussel (*Mytilus edulis*) 1990-2005

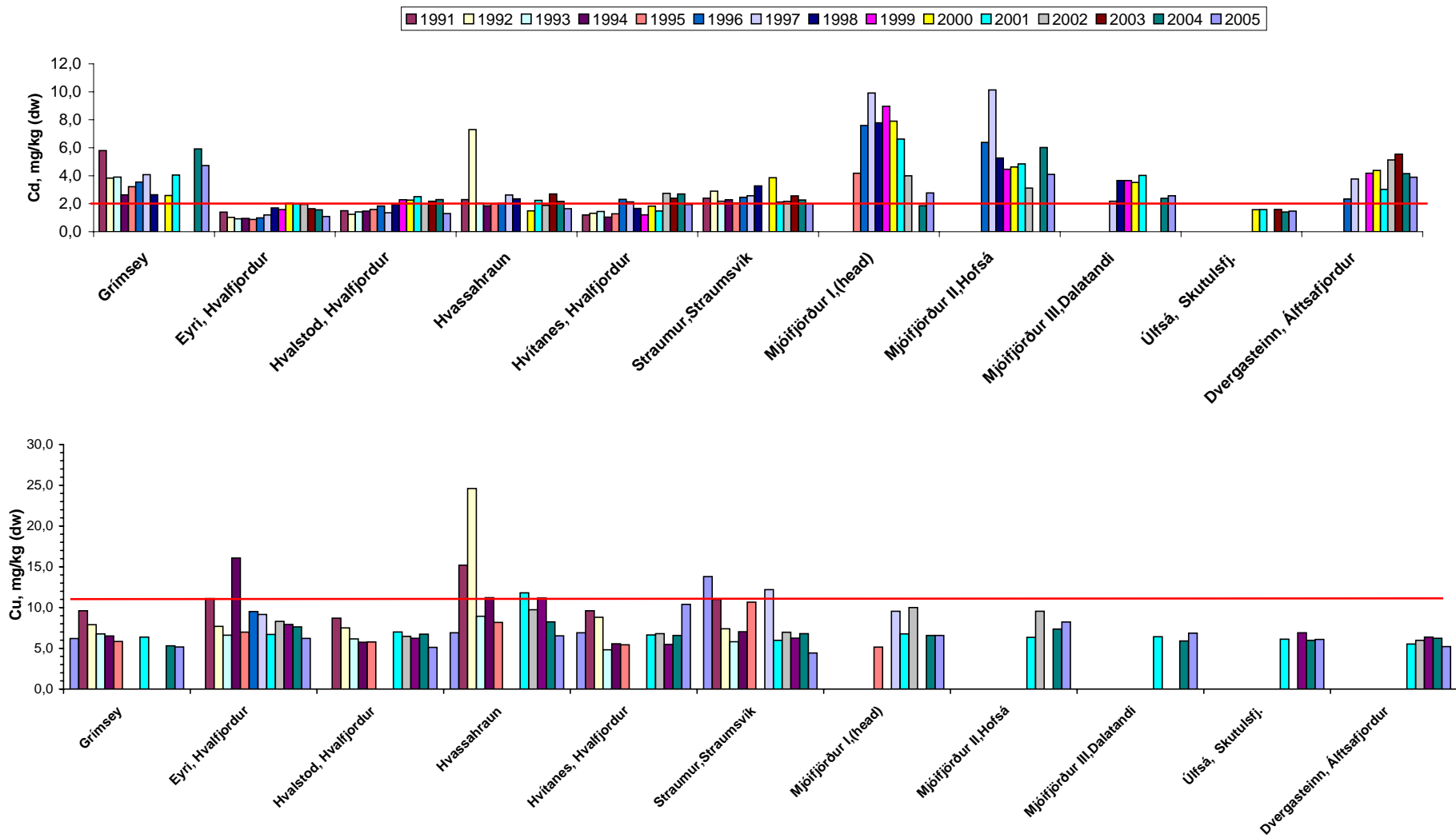


Figure 3a. Cadmium and copper concentration (dw) in Blue mussel (*Mytilus edulis*) around Iceland 1990-2005. Red line indicates ICES 90 75% baseline (11).

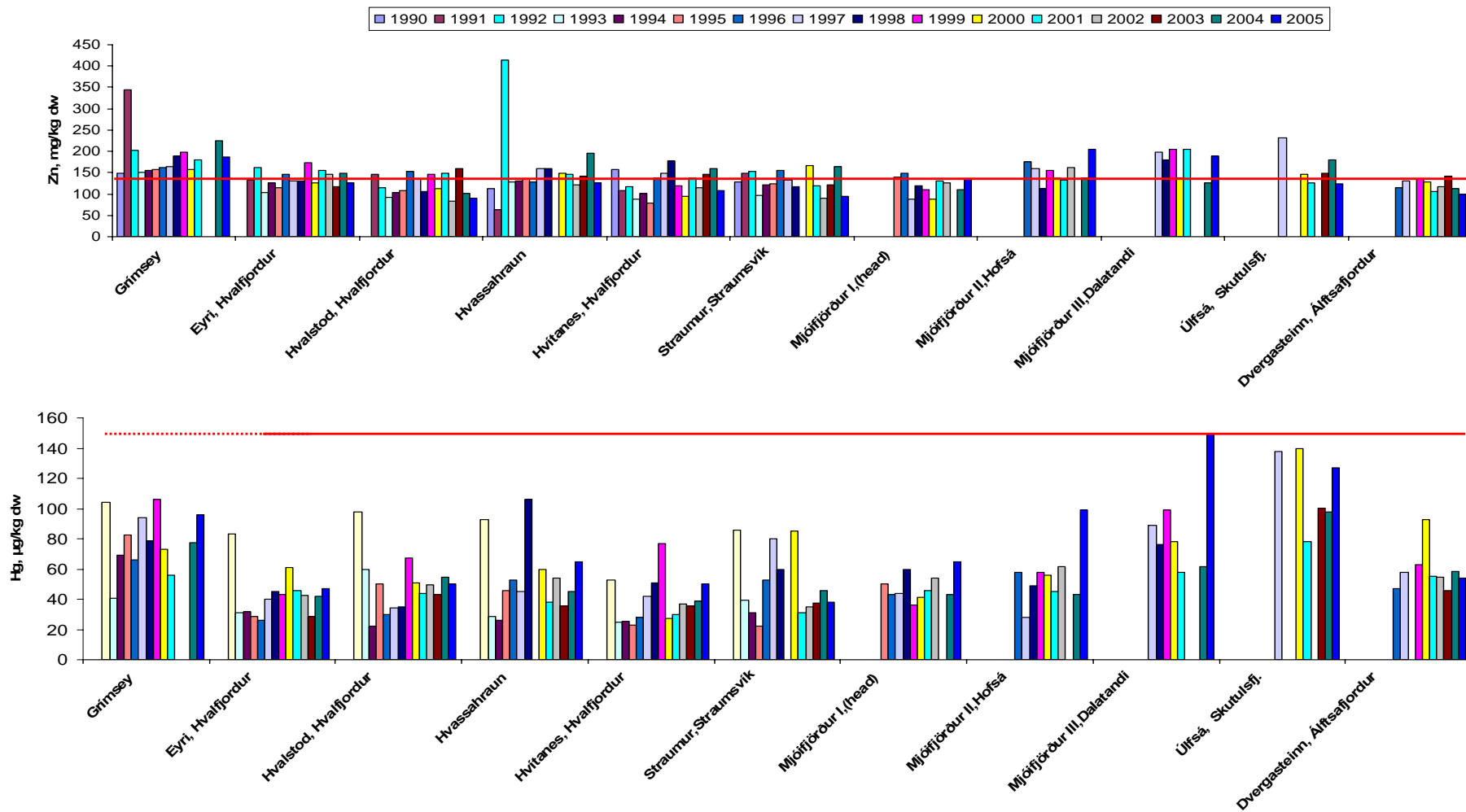


Figure 3b. Zinc and mercury concentration (dw) in Blue mussel (*Mytilus edulis*) around Iceland 1990-2005. Red line indicates ICES 90 75% baseline (11).

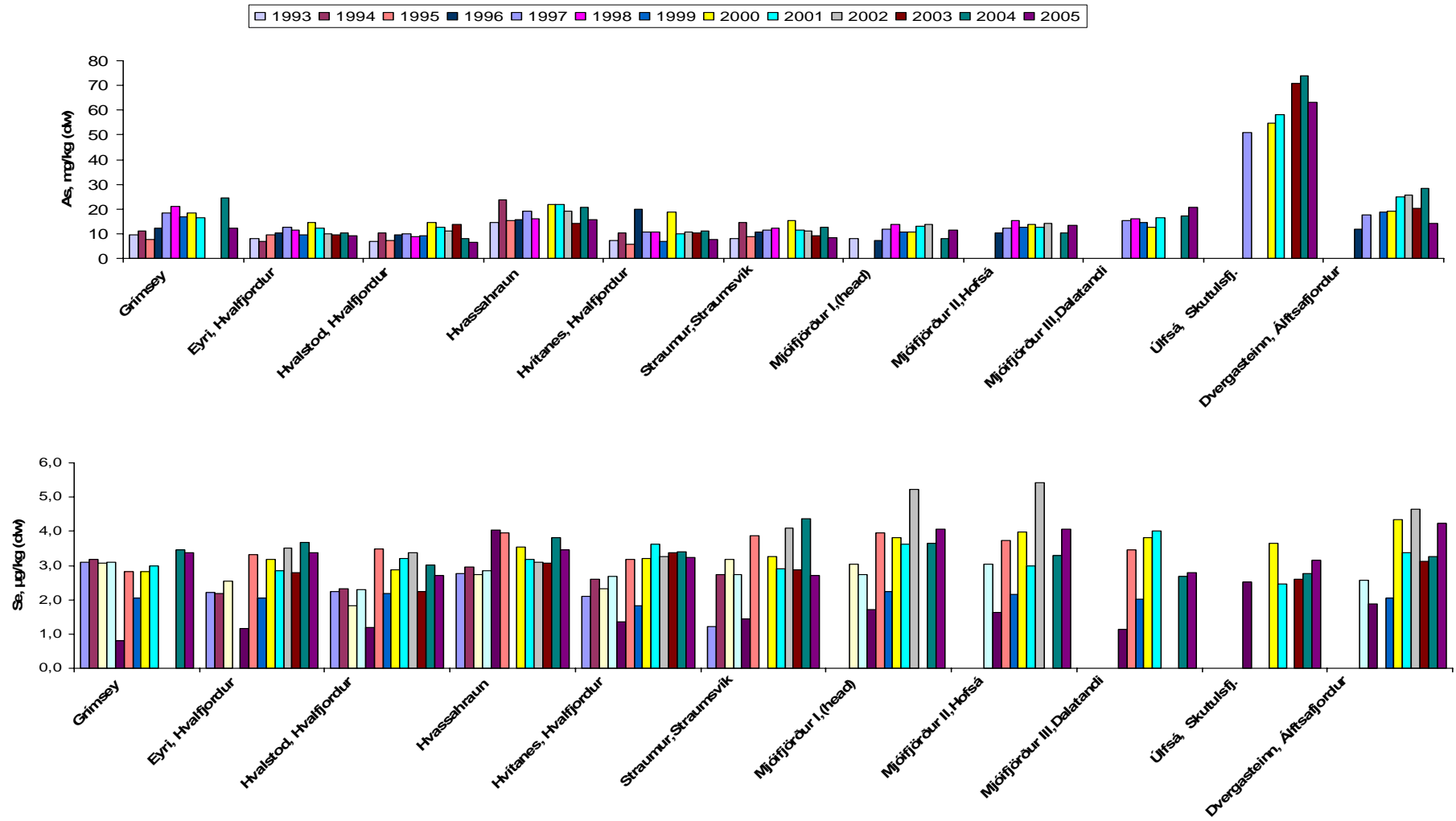


Figure 3c. Arsenic and selenium concentration (dw) in Blue mussel (*Mytilus edulis*) around Iceland 1990-2005.

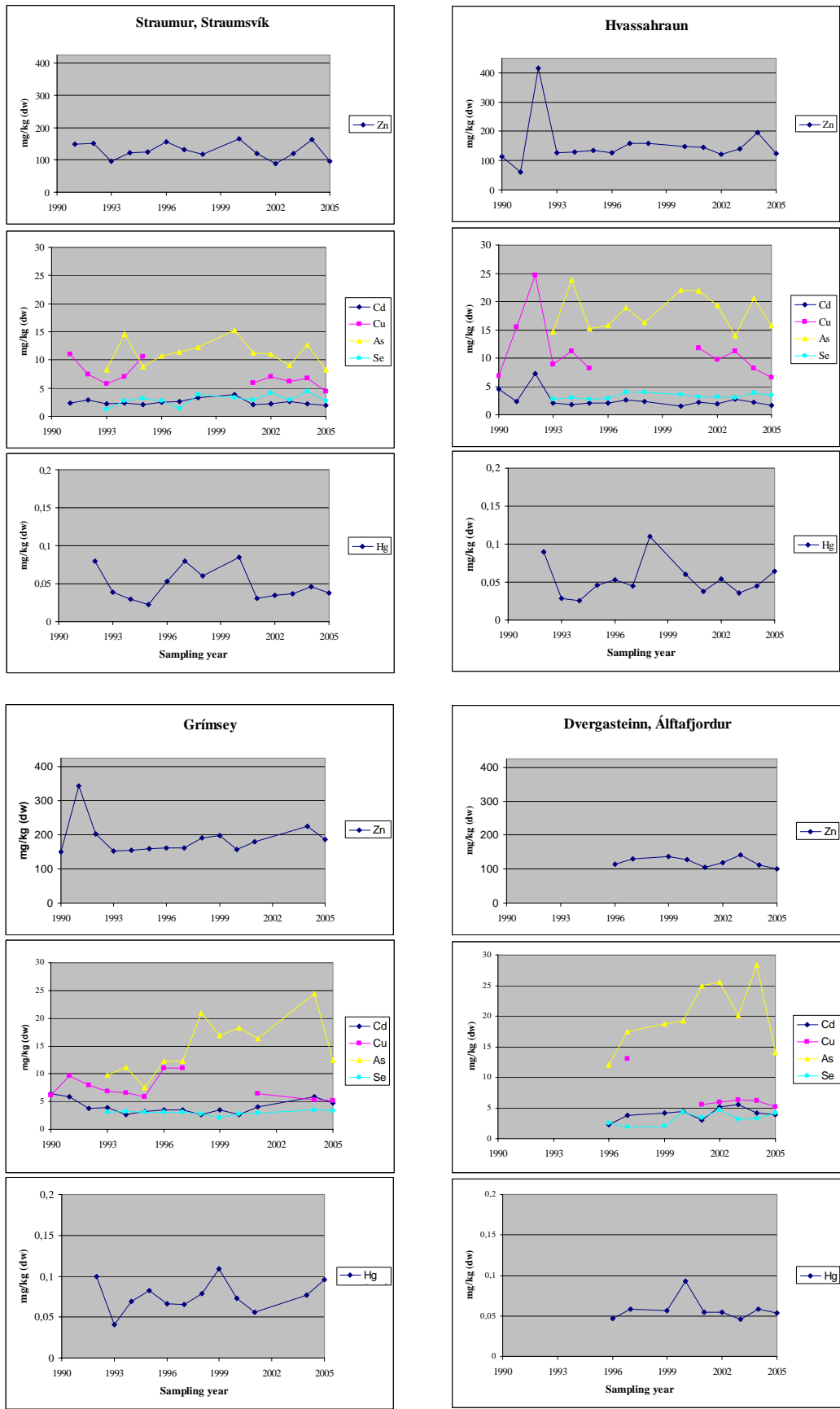


Figure 4a. Concentration of heavy metals (dry weight) in Blue mussel from different sampling sites around Iceland, 1991-2005.

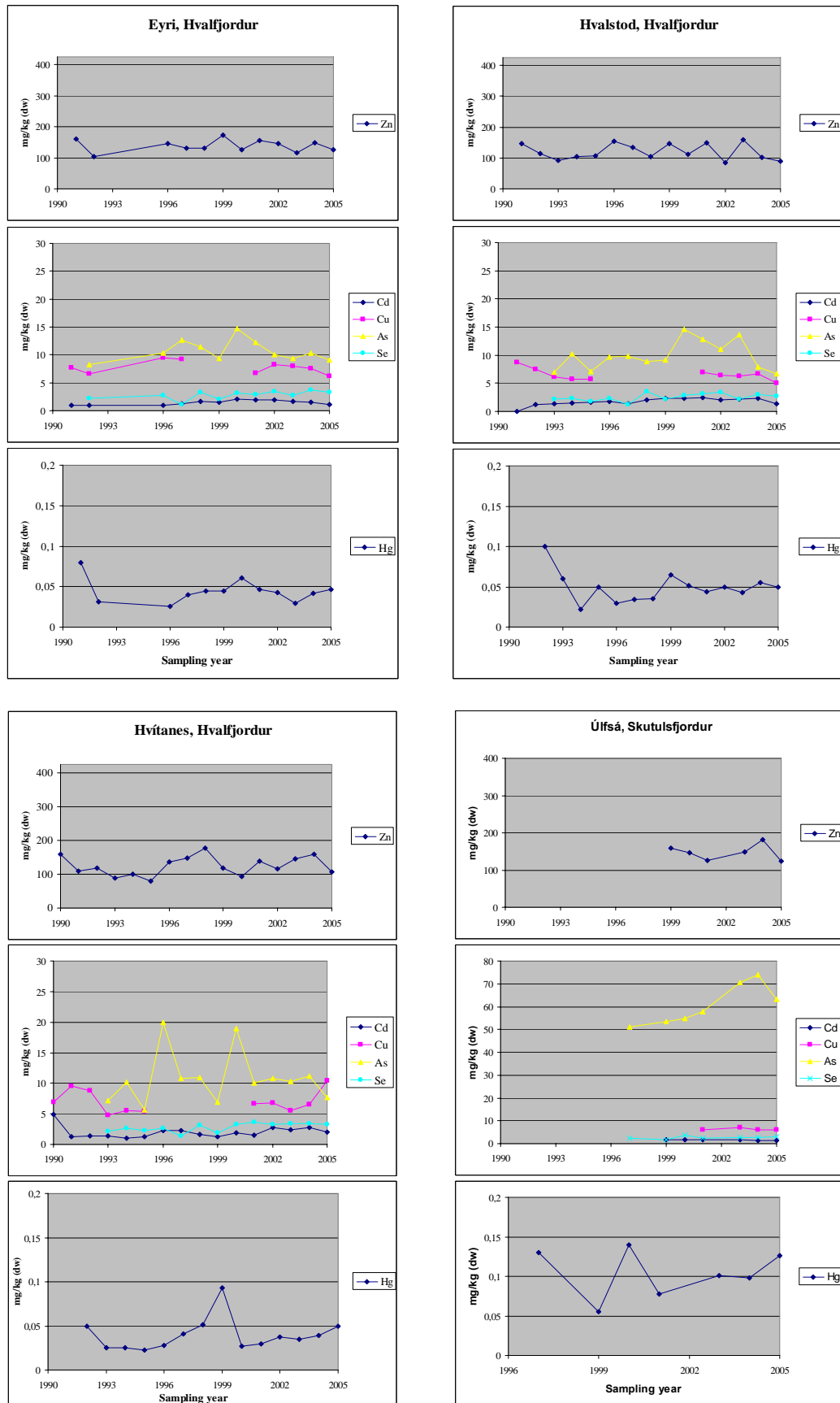


Figure 4b. Concentration of heavy metals (dry weight) in Blue mussel from different sampling sites around Iceland, 1991-2005.

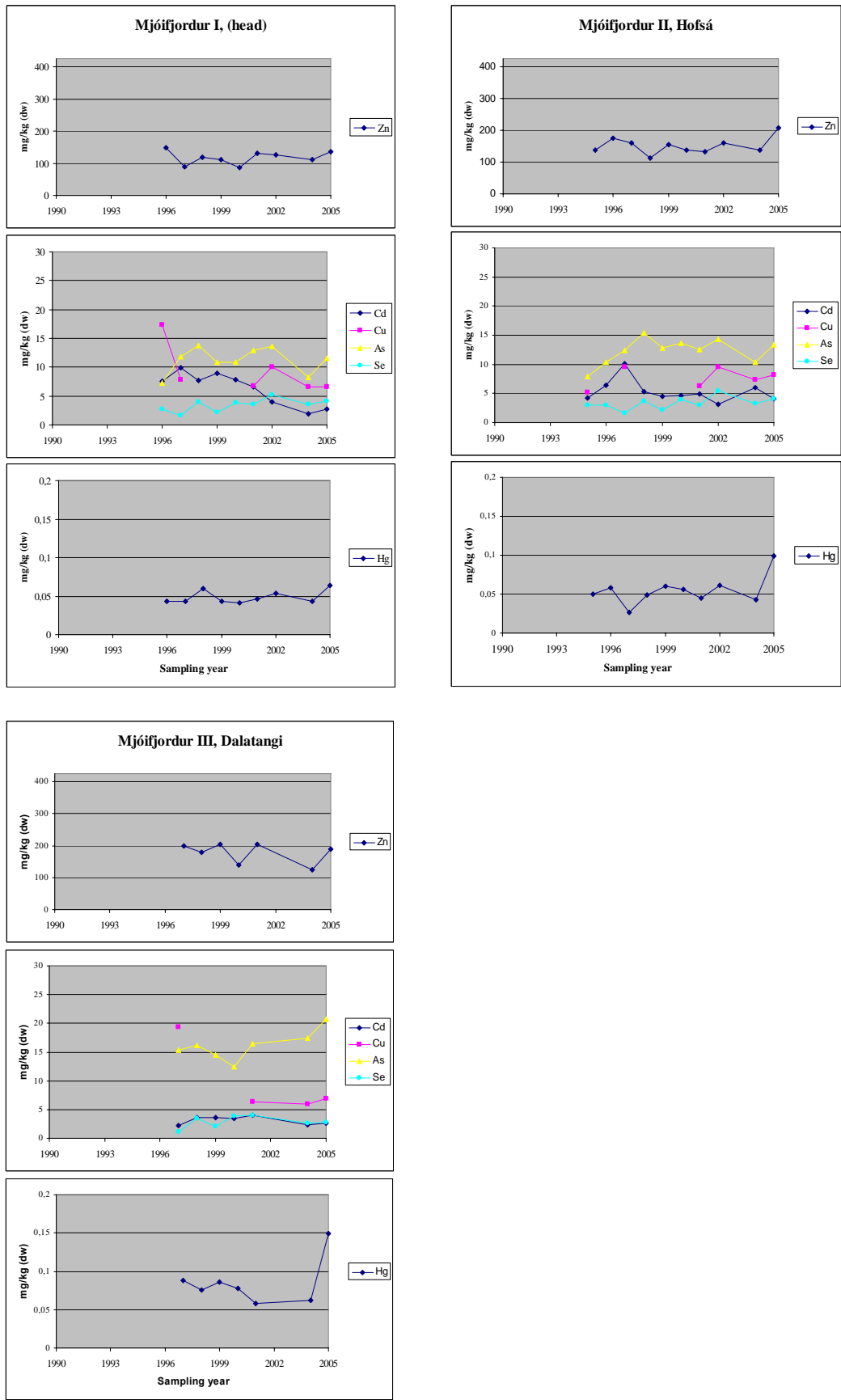


Figure 4c. Concentration of heavy metals (dry weight) in Blue mussel from different sampling sites around Iceland, 1991-2005.

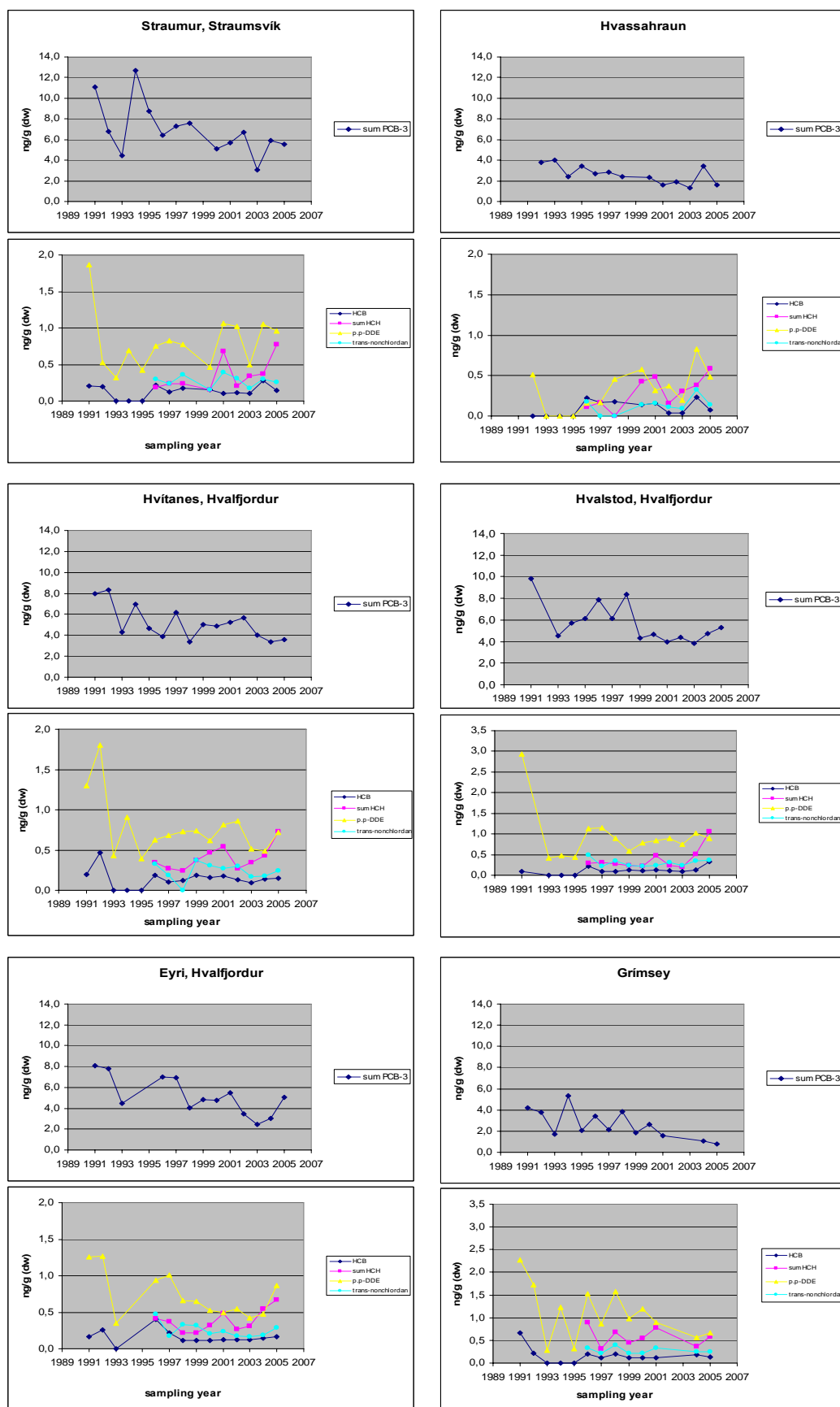


Figure 5a. Concentration of organochlorine compounds (dw) in Blue mussel (*Mytilus edulis*) at different locations 1991-2005.

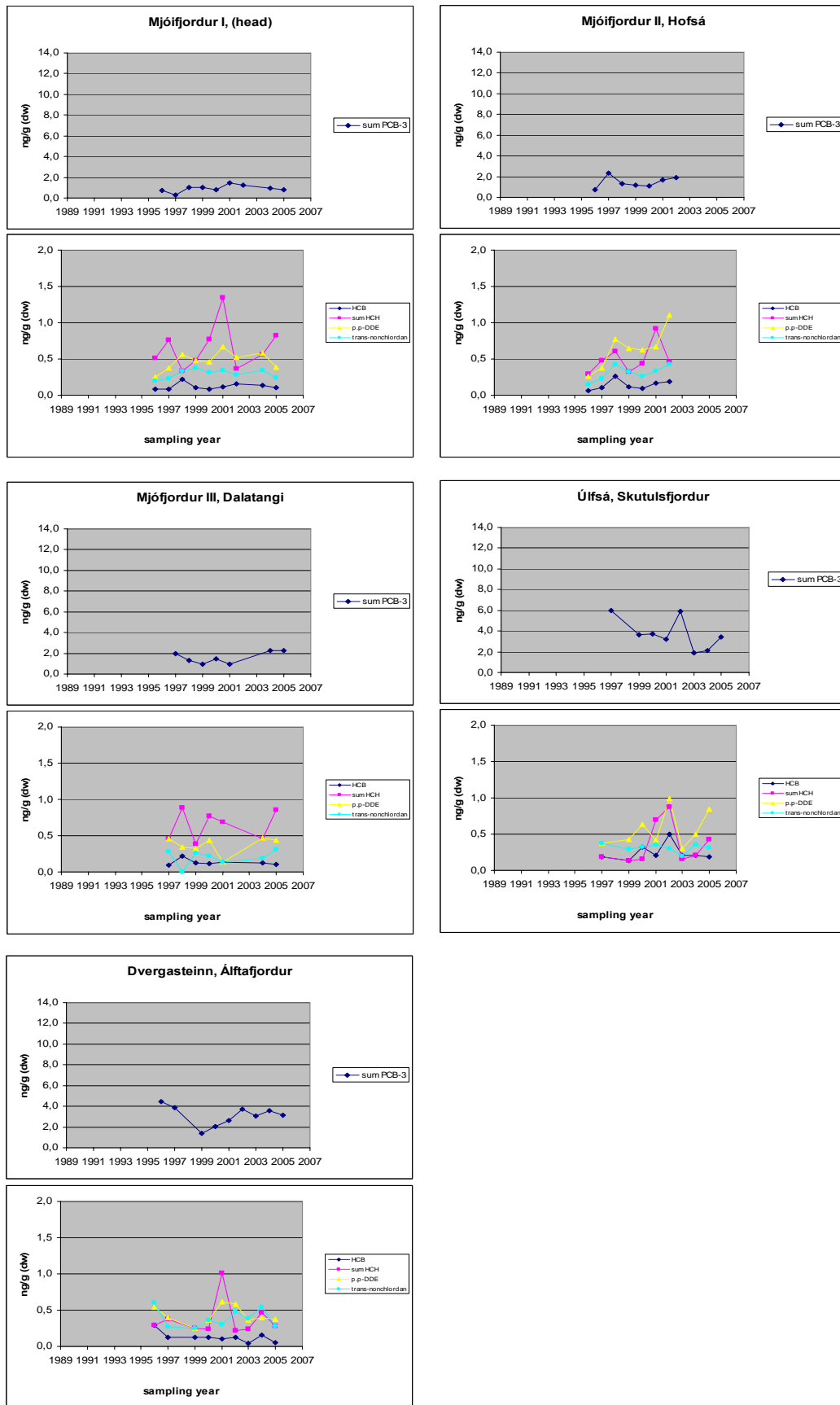


Figure 5b. Concentration of organochlorine compounds (dw) in Blue mussel (*Mytilus edulis*) at different locations 1991-2005.

Appendix VIII.

Graphs of metals and organic compounds in Cod (*Gadus morhua*) 1990-2006

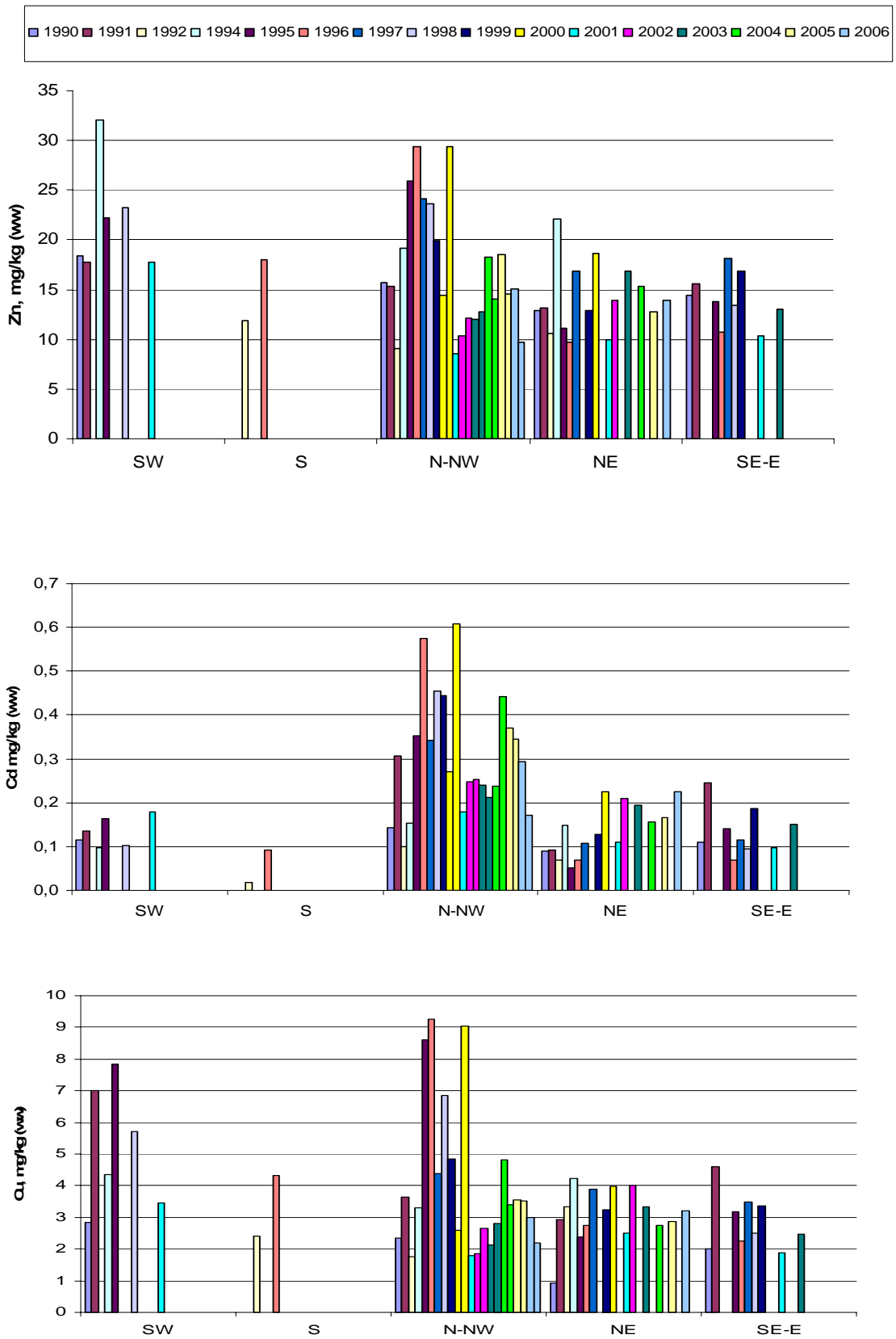


Figure 6a. Heavy metal concentration (ww) in livers of 30-45cm cod (*Gadus morhua*) from Icelandic waters in March 1990-2006.

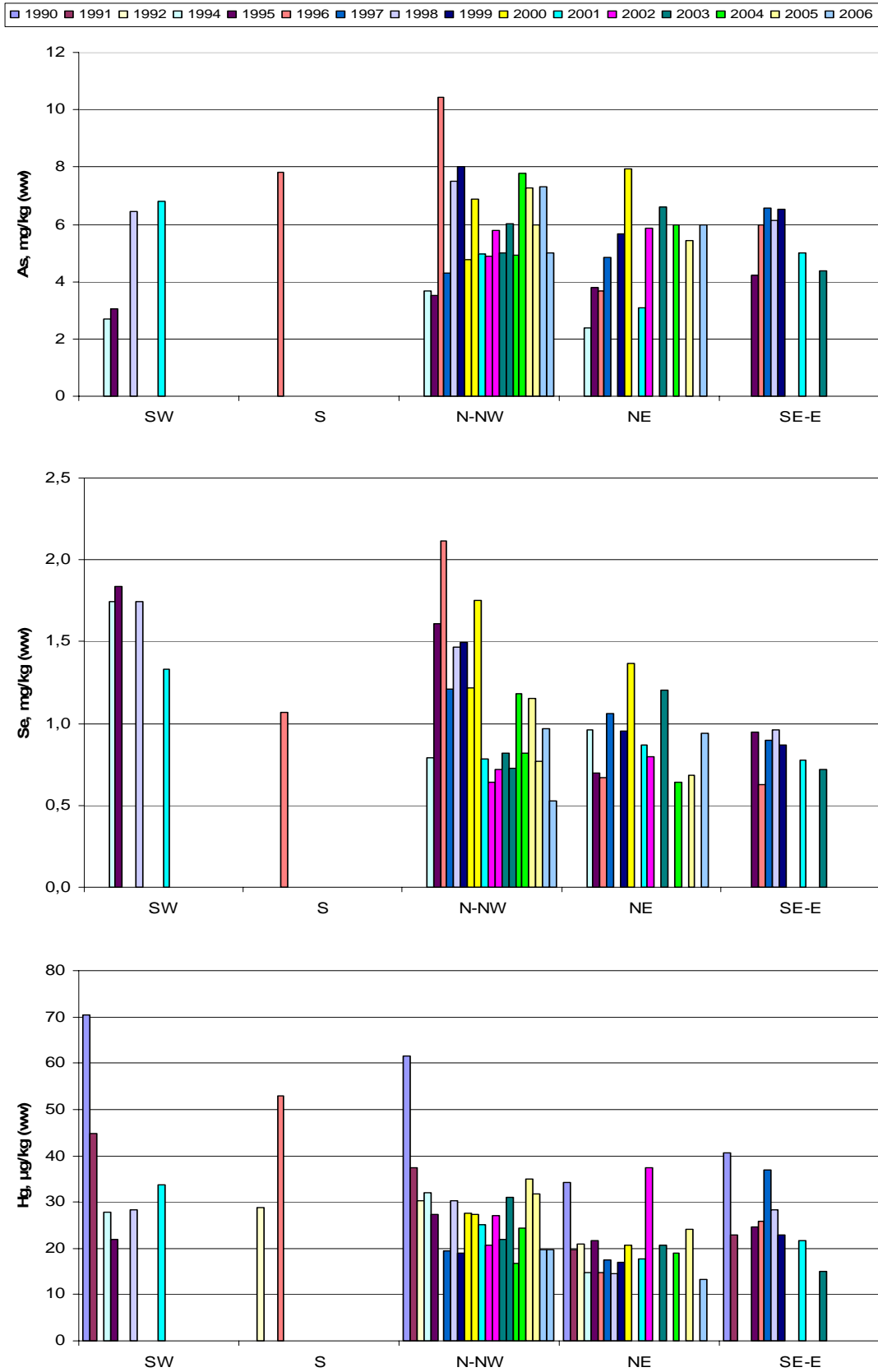


Figure 6b. Heavy metal concentration (ww) in livers of 30-45cm cod (*Gadus morhua*) from Icelandic waters in March 1990-2006. Mercury (Hg) was analysed in the flesh.

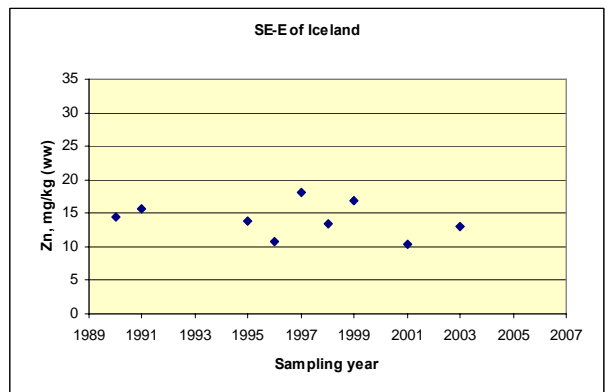
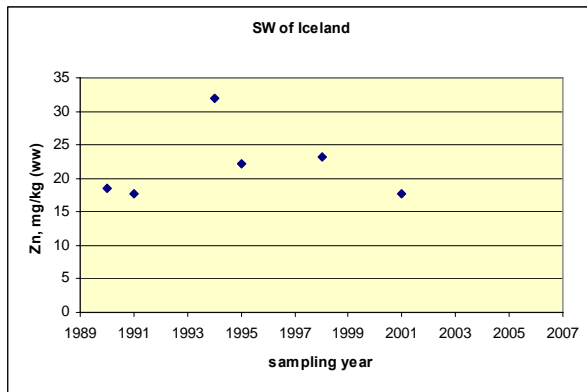
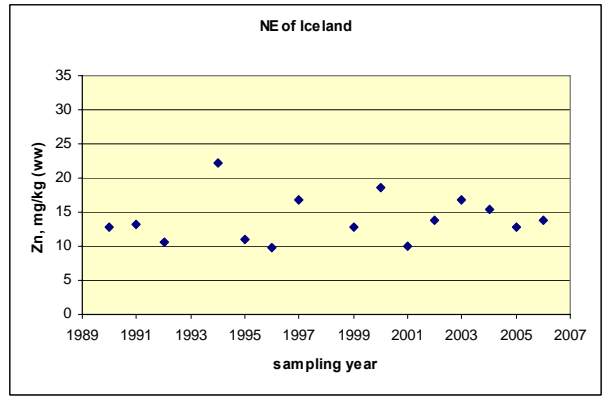
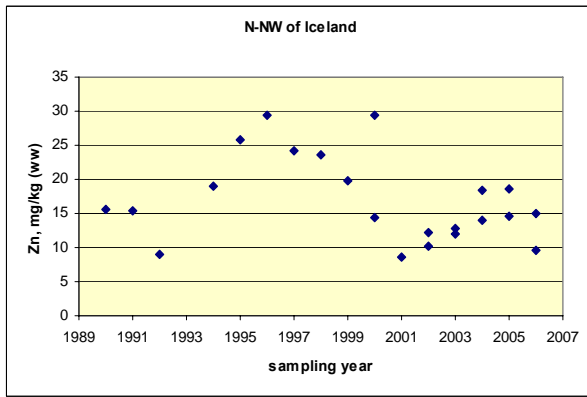


Figure 7a. Average concentration of Zinc (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2006.

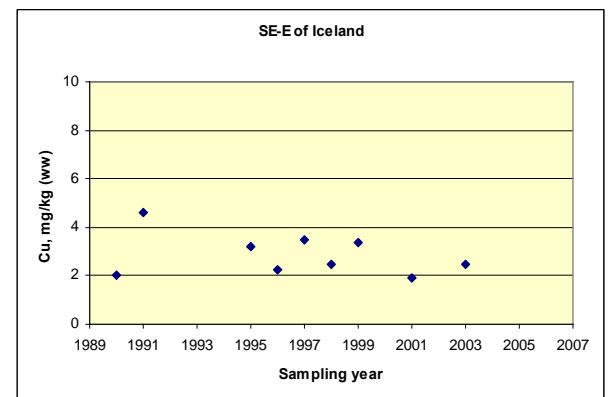
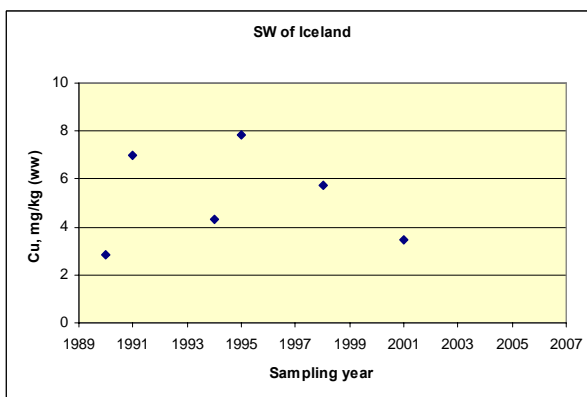
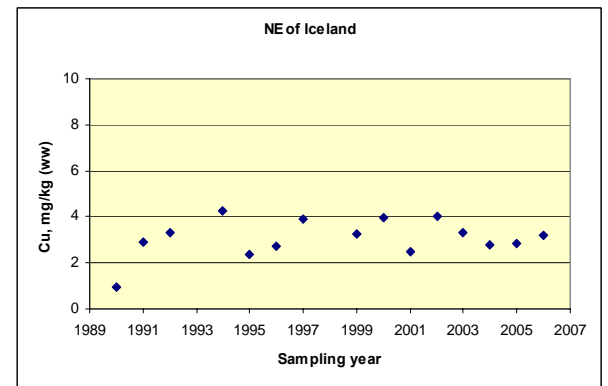
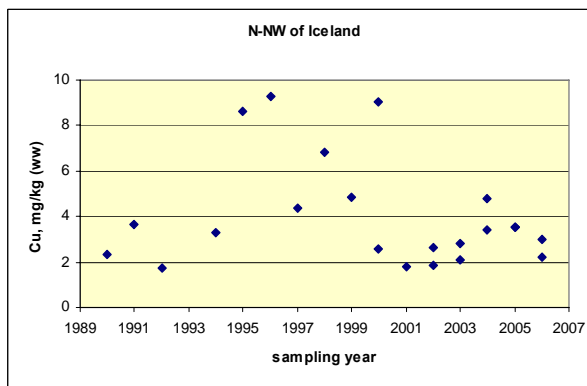


Figure 7b. Average concentration of Copper (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2006.

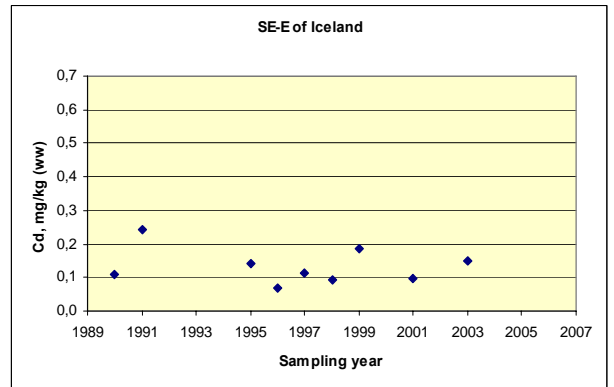
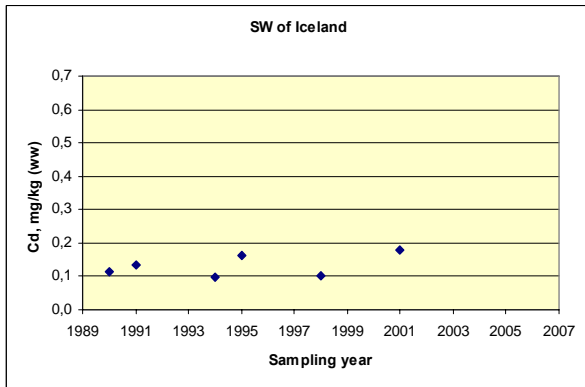
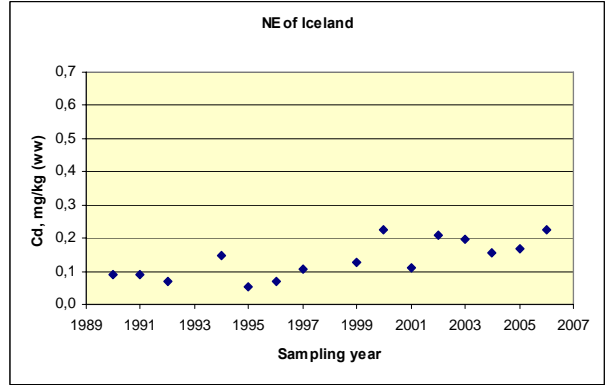
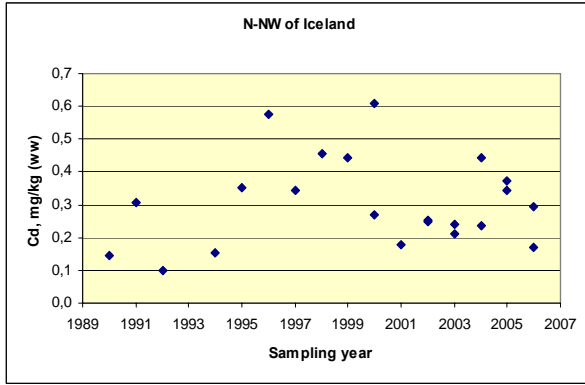


Figure 7c. Average concentration of Cadmium (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2006.

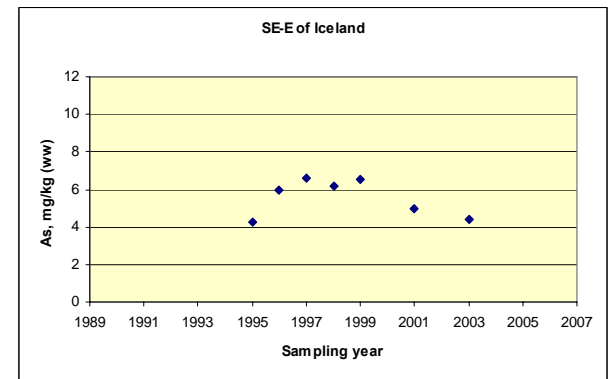
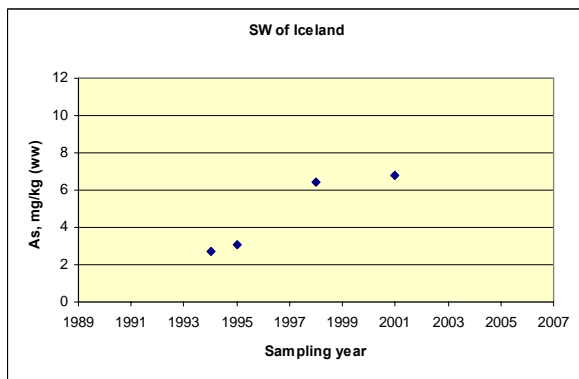
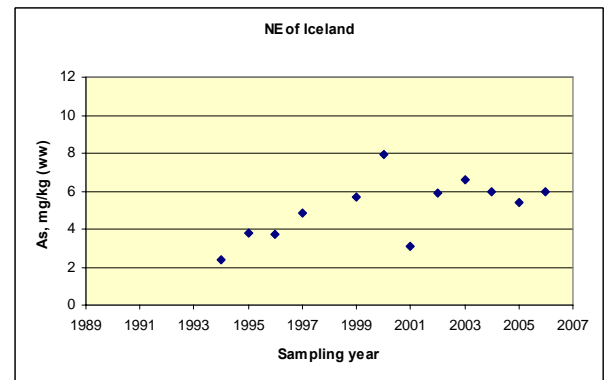
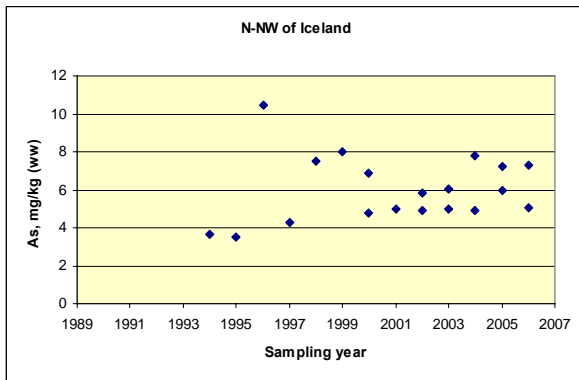


Figure 7d. Average concentration of Arsenic (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2006.

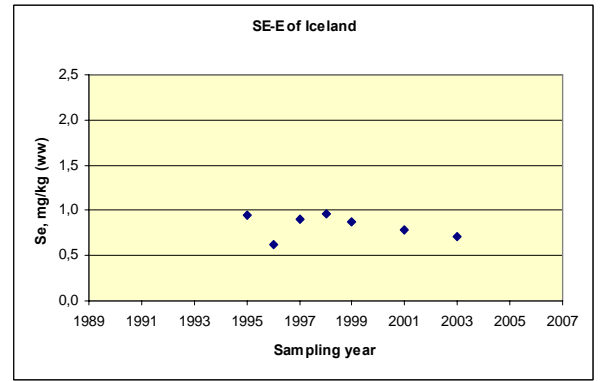
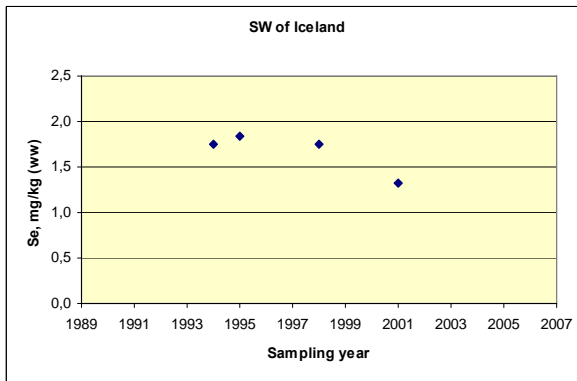
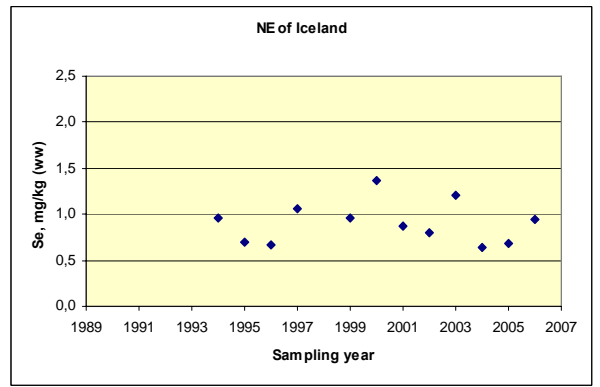
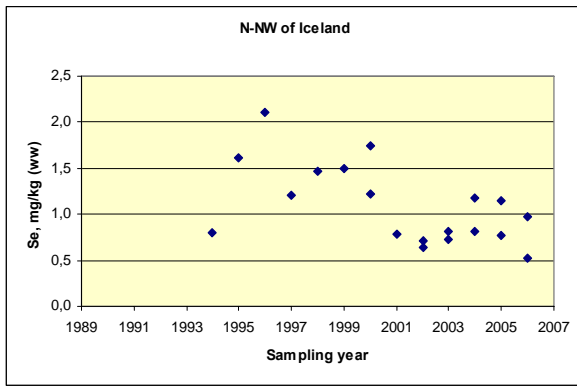


Figure 7e. Average concentration of Selenium (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2006.

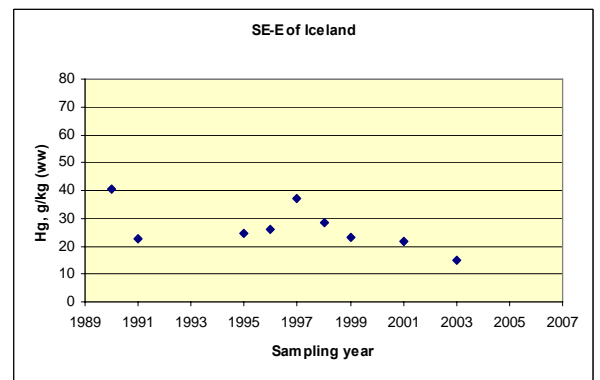
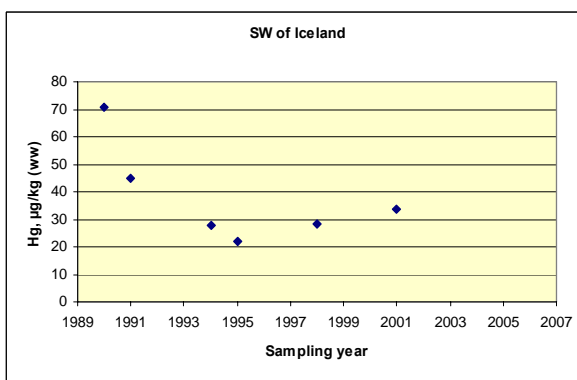
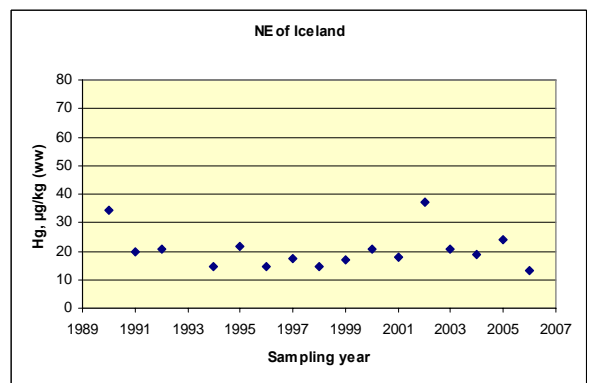
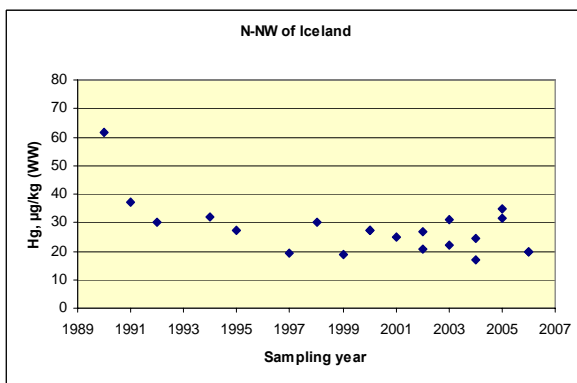


Figure 7f. Average concentration of Mercury (ww) in flesh of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2006.

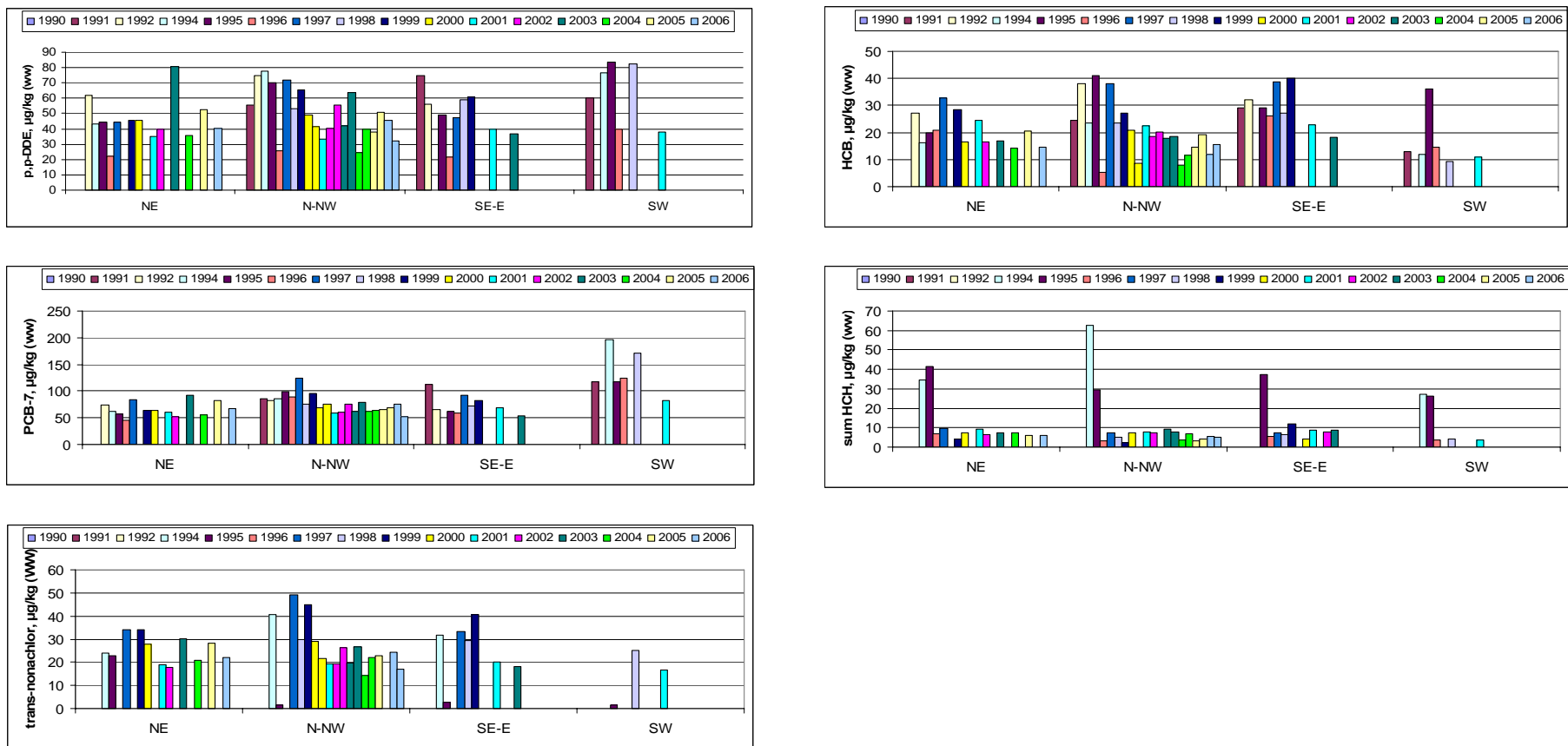


Figure 8. Average concentration of organochlorine compounds (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2006.

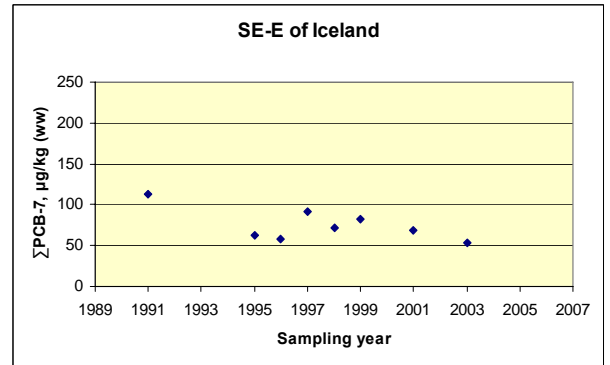
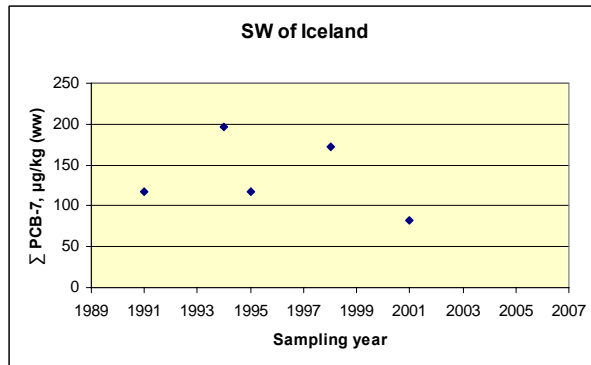
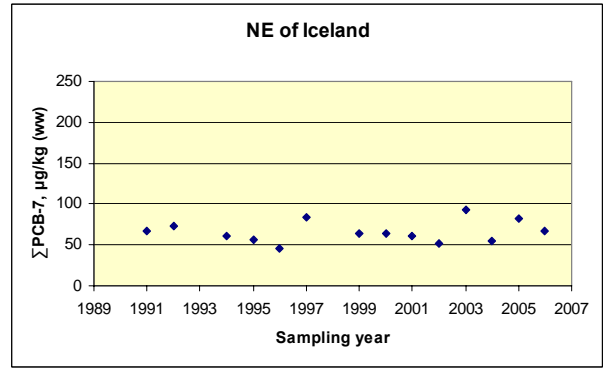
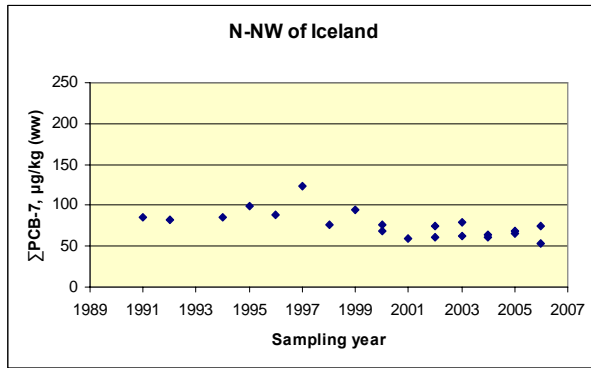


Figure 9a. Average concentration of Σ PCB-7 (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2006.

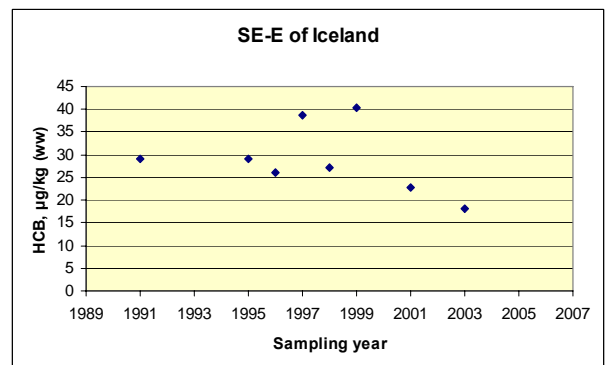
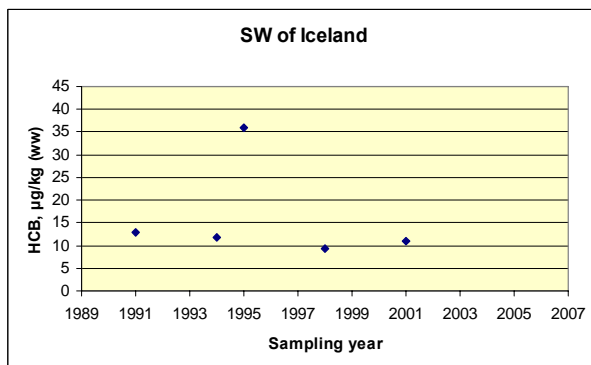
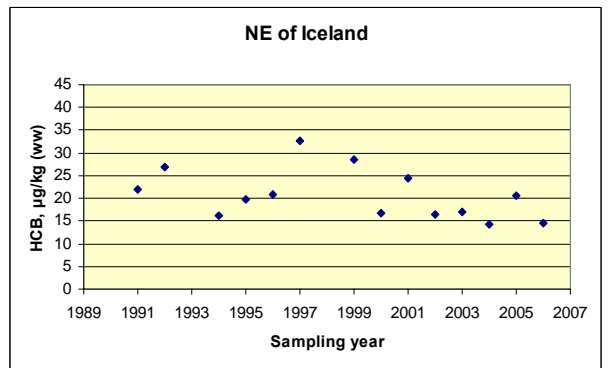
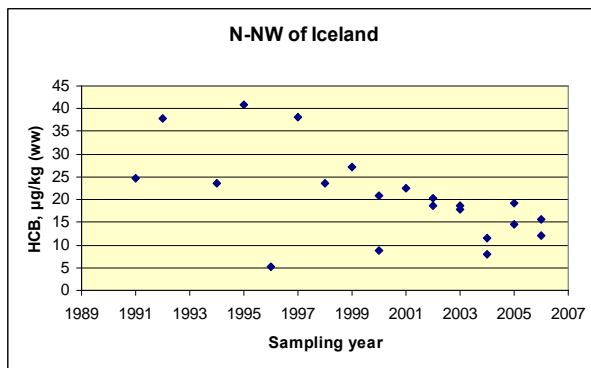


Figure 9b. Average concentration of HCB (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2006.

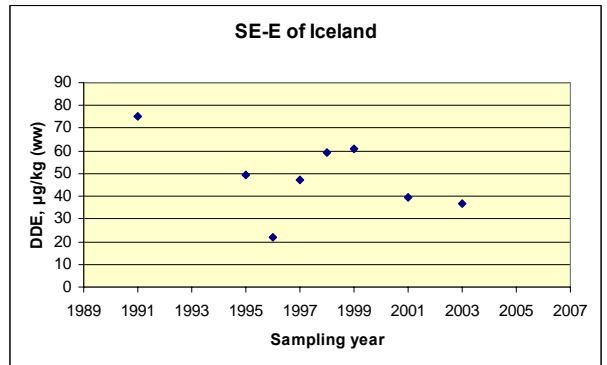
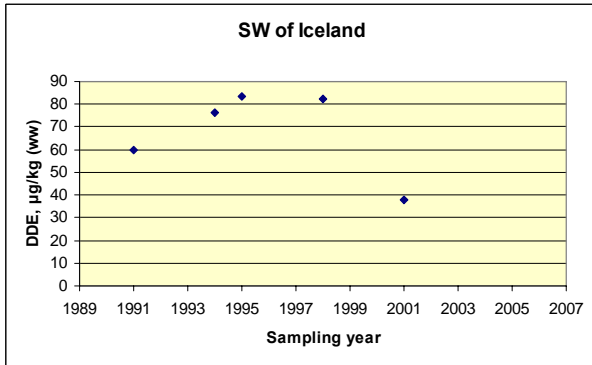
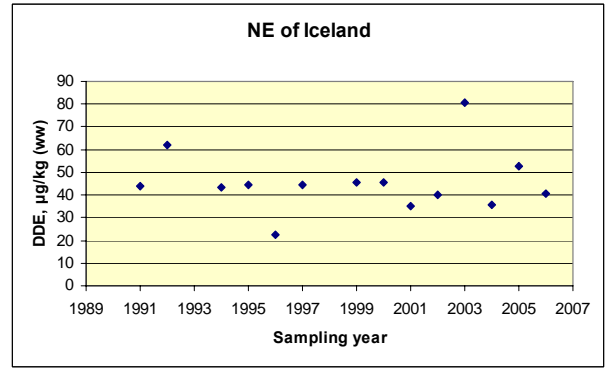
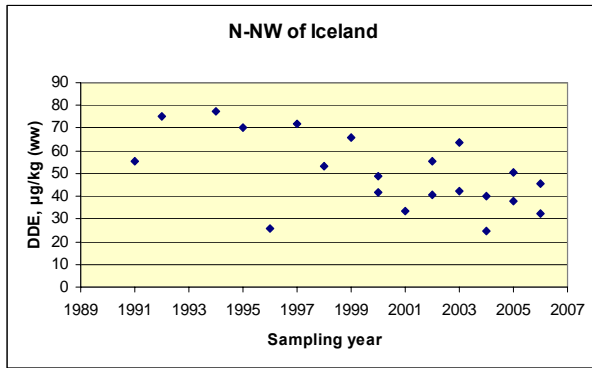


Figure 9c. Average concentration of DDE (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2006.

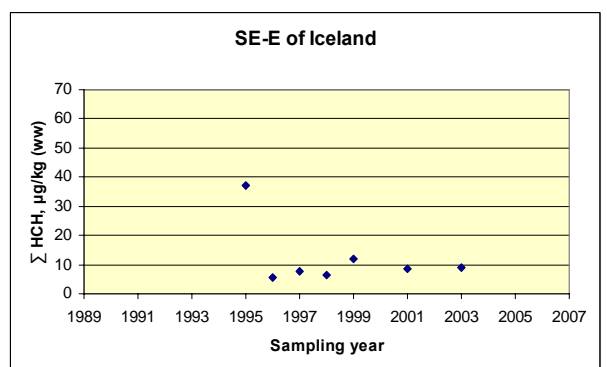
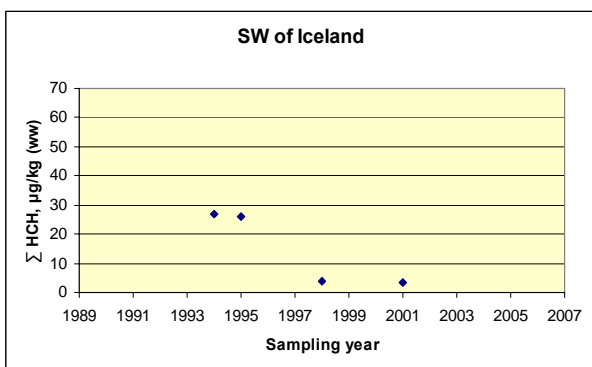
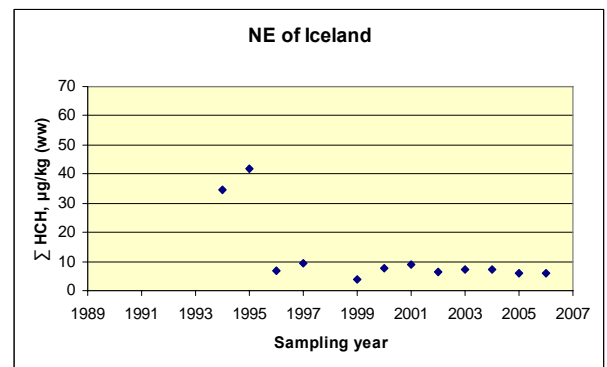
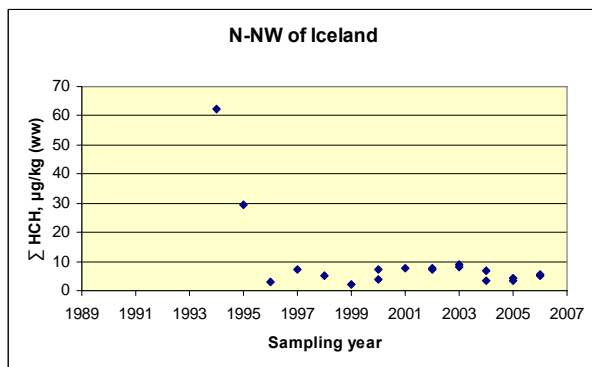


Figure 9d. Average concentration of Σ HCH (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2006.

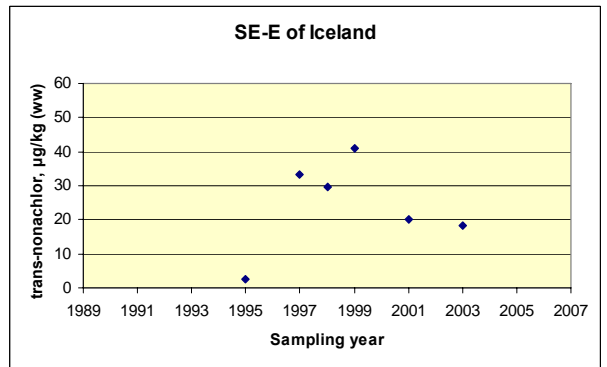
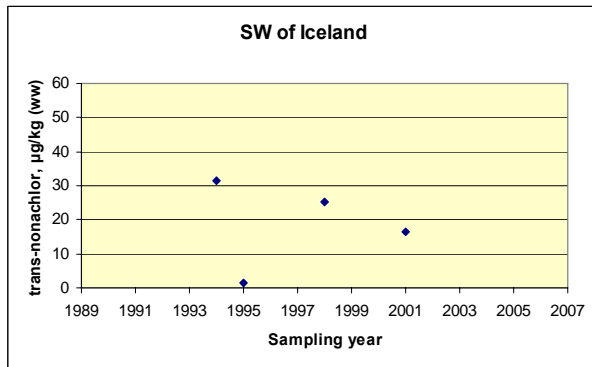
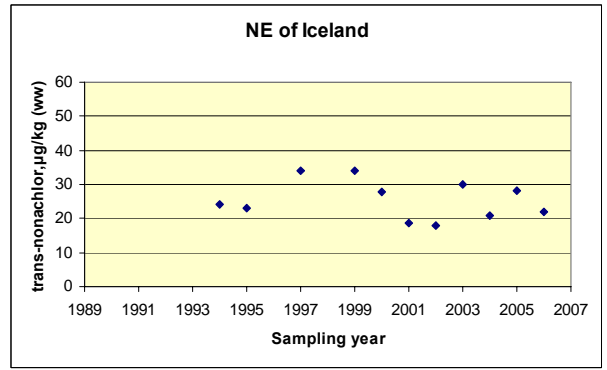
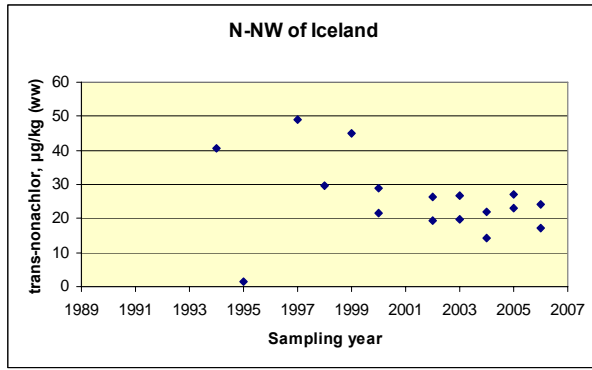


Figure 9e. Average concentration of transnonachlor (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2006.