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MONITORING OF THE MARINE BIOSPHERE AROUND ICELAND IN 2004-2005

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Skýrsluágrip Rannsóknastofnunar fiskiðnaðarins

Icelandic Fisheries Laboratories Report Summary

Titill / Title	Mengunarvöktun í lífríki sjávar við Ísland 2004 og 2005/ Monitoring of the marine biosphere around Iceland 2004 and 2005		
Höfundar / Authors	*Eva Yngvadóttir, Anna Mikaelsdóttir, Ingibjörg Jónsdóttir og, Þuríður Ragnarsdóttir*		
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Ágrip á íslensku:

Í þessari skýrslu eru birtar niðurstöður árlegs vöktunarverkefnis á vegum Umhverfisráðuneytisins fyrir árin 2004 og 2005. Markmiðið með þessari vöktun er að uppfylla skuldbindingar Íslands varðandi Oslóar- og Parísarsamninginn (OSPAR), auk AMAP (Artic Monitoring Assessment Program). Gögnin hafa verið send í gagnabanka Alþjóðlahafrannsóknarráðsins (ICES).

Hafrannsóknarstofnun sér um að afla sýna og Rannsóknastofnun fiskiðnaðarins hefur umsjón með undirbúningi sýna og mælingum á snefilefnum í lífríki hafsins. Sýnin eru mæld á Rf og á Rannsóknastofu í lyfja- og eiturefnafræði.

Mæld voru ýmis ólífræn snefilefni og klórlífræn efni í þorski veiddum í árlegu vorralli Hafró í mars 2005 og í kræklingi sem safnað var á 11 stöðum í kringum landið í ágúst/sept 2004. Vöktun í lífríki sjávar við Ísland hófst 1989.

Lykilorð á íslensku: *OSPAR, AMAP, vöktun á lífríki sjávar, ólífræn snefilefni, klórlífræn efni, þorskur, kræklingur.*

Summary in English:

This report contains the results of the annual monitoring of the biosphere around Iceland in 2004 and 2005. The purpose of 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. The data has been submitted to the ICES databank (ices.dk), collection of data began 1989.

The Icelandic Fisheries Laboratories (IFL) 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 the IFL and at the Department of Pharmacology and Toxicology at the University of Iceland.

Trace metals and organochlorines were analysed in cod *(Gadus morhua)* caught in March 2005 and in blue mussel *(Mytilus edulis)* collected in August/Sept 2004. Marine monitoring began in Iceland 1989.

English keywords: *OSPAR, AMAP, monitoring, trace metals, organochlorine compounds, cod (Gadus Morhua), blue mussel (Mytilus edulis).*

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APPENDICES

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 2004, as well as for cod (*Gadus morhua*), collected in Icelandic territorial waters in 2005. 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 Icelandic Fisheries Laboratories (IFL) 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 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 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) and dab (20-35 cm length, 3 samples) was carried out in the annual bottom trawl survey in March 2005. Blue mussel, 4-6 cm length, was collected from 11 sites around the country in August/September 2004. Sampling sites for cod, dab and blue mussel are shown in figure I 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).

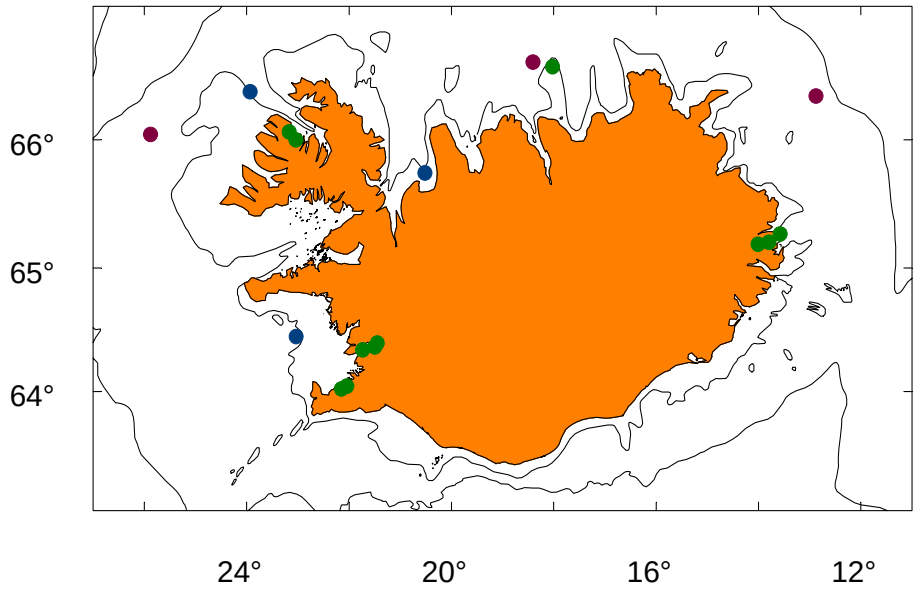

Figure 1. Locations for sampling of cod (Gadus morhua) (red dots), dab (Limanda limanda) (blue dots) 2005 and blue mussel (Mytilus edulis) (green dots) 2004.

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 and dab in the range of 20-35 cm, each sample containing 25 ± 5 individuals. No further work was done with the dab samples in this project due to lack of funding and the samples are currently being kept frozen at the IFL. 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, 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, 2004 (***Mytilus edulis***)	11	50	Whole soft body		Cd, Cu, Zn, Pb,As, Se, Hg	X*	dry matter and fat
Cod, 2005 (***Gadus morhua***)	3	25	Flesh Liver	3 16	Hg Cd, Cu, Zn, Pb, As, Se	X*	dry matter and fat dry matter and fat
Labels: Cod-N-NW (1) 05 Cod-N-NW (2) 05 Cod-NE 05							

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

The metals were analysed by using cold vapour atomic absorption (Hg), FAA/impact bead using D_2-background correction (Cd, Cu, Zn, Pb) and hydride generation (As, Se) atomic absorption. The organochlorine compounds were analysed by GC-ECD using HP5890 Series II with an automatic injector (HP7673). A detailed description of the analyses of metals, 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 has participated in Quasimeme annually with satisfactory results. Also, IFL participated in Quash with satisfactory results. The average field blank (C_B), derived from the sample field blanks, and three times its standard deviation ($3xS_B$), 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 2004 and 2005 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)* 1990-2005, (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 (2004) and cod (2005) 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 1991-2004, 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, 1990-2004. 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. Lead was detected below the limits of detection in all cases. 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 1990-2005. Figures 7a-f in appendix VIII show average concentrations (ww), of heavy metals in cod from different sampling sites, 1990-2005. Mercury is measured in the flesh. 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 costal 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 (2004) and cod (2005) 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 1991-2004. The sample from Mjoifjordur, Hofsa was contaminated probably during the sample preparation and therefore the results from these measurements are not presented in this report. 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

Figures 8 in appendix VIII show 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 1991-2005. Figures 9a-e in appendix VIII show average concentrations (ww), of some organic compounds in cod from different sampling sites, 1991-2005. The sum of seven PCBs (PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180) are 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 2004 and 2005. 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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UIPT: Kristín Ólafsdóttir.

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Appendix I.

Biological measurements of Blue mussel (*Mytilus edulis*)

2004

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**4.8.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Úlfsá/Sigurðarbúð, Skutulsfjordur**	Date of preparation:	Sept. 2005
Coordinates:	660360-230996	IFL#:	SN-2005-339

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	42,8	19,1	19,2	9,12	4,26	4,69
2	45,6	22,1	18,1	9,55	5,38	4,08
3	52,1	25,9	22,8	16,58	9,36	7,19
4	42,6	20,6	17,0	7,82	4,18	3,42
5	45,8	20,9	17,5	9,39	4,41	4,72
6	43,9	22,5	17,6	8,82	4,83	3,79
7	44,7	23,6	17,7	9,80	5,46	4,18
8	47,7	21,8	20,5	12,56	6,78	5,74
9	43,3	21,4	18,2	9,01	4,60	4,17
10	48,0	22,5	20,6	12,72	6,41	6,21
11	53,3	25,7	24,8	21,62	9,91	11,63
12	45,1	22,9	18,6	9,34	5,52	3,70
13	45,8	21,9	19,4	10,59	5,66	4,75
14	42,8	20,7	18,8	9,84	4,62	4,92
15	46,7	23,1	19,7	11,76	6,90	4,72
16	54,8	27,5	22,5	17,67	7,87	6,68
17	46,8	21,7	18,5	9,68	5,60	3,76
18	46,6	25,1	16,5	9,54	5,10	4,03
19	42,1	22,1	17,4	8,90	4,64	4,17
20	41,5	22,2	17,1	9,75	5,48	4,17
21	42,1	19,1	18,4	8,50	4,40	4,03
22	45,5	21,7	19,1	10,88	5,51	5,32
23	46,1	21,8	19,9	10,10	5,77	4,26
24	55,2	25,7	24,0	19,29	11,17	8,00
25	48,3	22,0	20,3	13,39	6,40	6,86
26	45,3	23,8	18,0	10,06	5,51	4,40
27	50,0	23,3	19,7	11,99	6,94	4,87
28	46,8	23,2	18,9	10,50	6,53	3,94
29	47,2	21,3	18,0	10,13	5,28	4,66
30	41,7	19,7	16,5	6,79	3,73	2,95
31	41,2	21,0	17,6	8,88	3,83	4,87
32	41,0	20,4	18,5	8,88	4,36	4,17
33	45,3	21,0	17,9	10,41	5,24	5,08
34	45,1	21,8	18,5	10,03	5,07	4,68
35	41,0	20,7	16,8	8,15	4,37	3,69
36	43,7	21,5	17,4	8,73	4,64	3,87
37	41,9	20,8	15,7	6,67	3,94	2,63
38	40,3	19,2	17,1	7,69	3,6	3,85
39	44,7	19,9	18,0	9,80	4,85	4,86
40	41,1	19,0	17,0	7,34	4,00	3,25
41	40,0	20,2	15,4	6,47	3,64	2,73
42	41,6	21,0	17,0	7,59	4,53	3,01
43	47,2	23,5	18,2	12,14	6,50	5,49
44	40,4	20,2	16,0	7,21	3,67	3,32
45	49,1	25,1	21,6	14,04	7,74	6,17
46	55,2	25,1	22,4	17,07	9,46	7,53
47	47,8	24,5	17,0	9,89	5,82	4,01
48	47,3	21,7	19,5	10,57	5,77	4,64
49	51,3	24,2	21,6	16,01	8,19	7,64
50	52,7	24,3	22,8	16,14	8,05	7,87
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	45,8	22,2	18,8	10,79	5,71	4,87
Stdev	4,1	2,0	2,1	3,36	1,74	1,66
Min	40,0	19,0	15,4	6,47	3,60	2,63
Max	55,2	27,5	24,8	21,62	11,17	11,63

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**31.8.2004**
Length:	4-6 cm	Sampled by:	Marine. Inst.
Location:	**Eyri, Hvalfjordur**	Date of preparation:	Sept. 2005
Coordinates:	642050-214390	IFL#:	SN-2005-333

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	59,1	27,2	26,9	23,98	12,78	10,98
2	54,3	24,5	20,0	15,77	8,74	6,66
3	55,4	26,0	22,0	15,71	9,49	6,12
4	45,1	19,8	18,4	9,56	4,66	4,46
5	43,1	19,2	16,1	7,70	4,13	3,25
6	48,2	20,7	19,7	10,59	6,29	4,13
7	47,6	19,7	17,8	9,18	5,01	3,85
8	47,7	22,1	18,0	9,78	5,10	4,43
9	47,7	21,6	18,3	9,44	5,35	3,77
10	45,4	20,7	17,2	8,89	4,89	3,91
11	47,8	21,7	18,3	10,08	5,20	4,61
12	43,3	20,7	16,7	7,64	4,52	3,00
13	45,7	21,9	17,0	8,64	4,87	3,64
14	41,4	20,5	14,7	6,27	3,47	2,63
15	46,0	21,6	18,5	8,93	5,38	3,20
16	40,0	19,0	15,6	6,12	3,41	2,57
17	42,1	19,9	16,1	6,41	3,66	2,62
18	42,9	21,9	18,7	10,39	5,94	4,33
19	44,4	21,0	17,1	8,30	4,37	3,56
20	42,0	21,0	15,7	6,55	3,74	2,64
21	46,1	20,7	15,9	8,02	4,72	3,23
22	45,9	18,8	17,6	6,99	4,26	2,69
23	40,3	20,8	16,9	6,71	4,12	2,52
24	42,3	19,9	15,7	6,04	3,47	2,48
25	42,4	20,5	16,3	7,12	4,12	2,94
26	41,9	20,0	16,7	7,55	4,05	3,31
27	43,5	20,0	15,8	6,97	4,07	2,80
28	42,6	20,4	16,5	7,51	4,05	3,31
29	41,7	19,2	16,1	6,73	3,52	3,51
30	40,5	18,9	15,2	5,90	3,47	2,64
31	42,5	19,8	14,9	6,64	3,87	2,71
32	42,4	19,1	17,2	7,27	3,92	3,08
33	41,3	17,8	15,6	4,91	2,48	2,35
34	40,5	18,2	15,6	5,87	3,20	2,59
35	41,4	20,6	14,7	6,01	3,51	2,37
36	40,0	17,5	14,2	5,06	2,87	2,10
37	40,1	17,8	14,3	4,87	2,89	1,92
38	40,2	18,5	13,4	5,05	2,74	2,18
39	40,0	18,6	13,2	4,65	2,40	2,13
40	40,2	19,1	15,6	5,88	3,18	2,63
41	40,1	17,9	16,2	5,59	3,13	2,41
42	40,3	18,5	15,2	5,69	3,49	2,16
43	42,4	18,0	15,5	6,14	3,62	2,40
44	40,2	17,8	16,6	6,52	3,78	2,72
45	40,6	18,1	15,2	5,82	3,29	2,42
46						
47						
48						
49						
50						
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	43,7	20,2	16,7	7,90	4,43	3,33
Stdev	4,2	2,0	2,3	3,42	1,88	1,53
Min	40,0	17,5	13,2	4,65	2,40	1,92
Max	59,1	27,2	26,9	23,98	12,78	10,98

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**13.8.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Hvítanes, Hvalfjörður**	Date of preparation:	Sept. 2005
Coordinates:	642185-212970	IFL#:	SN-2005-334

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	45,8	20,2	24,6	14,37	6,48	7,77
2	43,0	20,3	19,3	10,46	5,02	5,36
3	41,2	19,9	18,4	8,39	4,52	3,74
4	42,0	18,3	20,2	10,04	4,80	5,04
5	40,8	18,7	17,0	8,10	3,65	4,18
6	45,0	19,5	25,7	14,51	7,07	7,23
7	40,1	18,0	17,7	6,33	3,50	2,62
8	41,9	17,8	18,6	8,55	4,23	4,03
9	40,4	16,5	18,4	7,57	3,79	3,62
10	47,9	20,7	22,3	13,64	6,82	6,70
11	41,1	18,0	19,2	8,71	4,31	4,35
12	40,0	18,6	17,3	7,31	3,90	3,32
13	41,1	18,2	19,3	9,30	4,22	4,92
14	49,5	20,5	22,7	14,52	6,70	7,49
15	40,8	17,8	16,9	6,60	3,48	2,99
16	42,6	18,5	21,3	9,65	5,00	4,49
17	40,1	18,5	19,7	9,47	4,21	5,11
18	40,0	16,5	19,1	8,20	3,81	4,19
19	40,2	18,3	17,1	7,01	3,55	3,35
20	40,3	17,8	17,8	7,39	3,41	3,67
21	46,9	20,1	21,1	12,70	6,12	6,36
22	52,4	23,8	25,2	18,99	9,98	8,91
23	40,0	19,0	17,7	7,47	3,66	3,71
24	42,6	19,8	21,0	10,21	4,90	5,13
25	40,8	19,5	18,2	8,50	4,49	3,93
26	40,5	16,6	19,7	8,77	4,20	4,50
27	41,0	17,8	16,4	6,99	3,77	3,11
28	40,1	18,3	20,3	8,20	4,11	3,99
29	40,1	18,0	17,7	7,18	3,93	3,19
30	40,2	17,8	17,5	6,95	3,86	2,98
31	40,1	16,6	18,7	7,33	3,62	3,58
32	40,0	16,0	15,4	5,28	2,70	2,45
33	40,0	16,4	17,2	6,77	3,51	3,14
34	41,7	17,8	17,9	8,54	4,49	3,92
35	40,0	18,0	16,3	6,20	3,63	2,40
36	40,4	17,3	17,3	7,06	3,58	3,29
37	40,1	18,0	17,2	6,66	3,45	2,97
38	40,1	18,2	15,3	5,79	2,86	2,81
39	40,2	17,0	15,8	5,97	2,93	2,88
40	40,0	17,7	14,7	5,14	3,05	2,00
41	40,3	16,4	16,4	6,21	3,30	2,70
42	40,0	17,7	15,9	5,63	3,07	2,51
43	40,0	15,6	15,2	4,38	2,30	1,91
44	40,1	18,4	17,8	7,16	4,12	2,95
45	42,7	19,6	19,0	8,68	4,42	4,08
46	40,0	17,0	16,8	6,57	3,42	2,82
47	40,0	15,1	16,2	4,81	2,12	2,34
48	40,1	18,0	16,9	6,55	3,57	2,89
49	40,2	19,0	15,8	5,96	2,98	2,66
50	48,2	23,6	19,6	11,64	6,41	4,85
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	41,7	18,3	18,5	8,37	4,22	3,98
Stdev	2,8	1,7	2,5	2,91	1,40	1,56
Min	40,0	15,1	14,7	4,38	2,12	1,91
Max	52,4	23,8	25,7	18,99	9,98	8,91

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**30.8.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Hvassahraun**	Date of preparation:	Sept. 2005
Coordinates:	640125-220900	IFL#:	SN-2005-337

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	44,7	22,4	16,4	8,97	4,55	4,07
2	44,7	23,5	19,8	11,75	5,86	5,62
3	40,0	21,5	21,6	11,84	5,42	6,15
4	43,8	21,1	19,1	10,25	5,18	4,90
5	47,0	23,6	17,6	9,92	5,86	3,80
6	52,5	24,8	23,9	19,47	9,24	9,59
7	49,2	24,2	20,4	11,80	7,31	4,32
8	53,8	25,3	20,5	15,07	8,74	6,15
9	42,7	22,5	19,0	9,24	5,07	3,95
10	48,2	21,4	22,0	12,91	7,02	5,85
11	45,9	21,5	19,4	10,47	5,82	5,00
12	47,0	22,3	19,6	12,20	6,07	5,96
13	49,7	22,8	20,5	12,49	6,77	5,55
14	46,0	20,6	18,0	9,08	4,59	4,31
15	45,0	21,6	20,0	10,83	5,42	5,10
16	43,9	20,5	19,5	10,51	5,20	5,07
17	41,5	20,3	17,4	7,54	4,32	3,11
18	42,8	19,9	18,4	9,37	4,92	4,33
19	40,4	21,1	16,0	7,32	3,78	3,37
20	41,2	21,2	16,8	7,72	4,56	2,99
21	40,4	20,1	17,6	8,40	3,76	4,30
22	47,6	22,6	18,5	10,28	5,18	4,74
23	43,9	22,6	18,0	9,21	5,18	3,74
24	41,0	22,0	16,1	7,32	3,77	3,18
25	43,0	23,0	17,8	8,69	4,44	3,93
26	46,6	23,5	18,2	9,77	5,90	3,66
27	45,8	19,6	19,0	9,63	5,11	4,48
28	43,5	21,1	16,7	8,45	4,29	4,05
29	40,0	20,1	17,5	7,77	4,23	3,39
30	46,8	22,2	19,8	10,76	5,69	4,96
31	46,5	24,7	19,4	12,38	6,27	5,74
32	40,1	20,0	16,1	6,32	3,45	2,77
33	40,2	22,0	16,5	6,85	4,00	2,67
34	41,2	19,7	15,4	6,53	3,67	2,80
35	40,0	22,3	16,8	8,94	4,48	4,41
36	44,2	22,2	18,3	9,47	4,90	4,30
37	40,1	21,1	17,6	7,16	4,09	2,93
38	45,0	20,5	17,1	8,61	4,53	3,87
39	43,9	21,7	17,5	8,62	4,69	3,75
40	41,8	19,0	19,9	8,70	4,83	3,67
41	43,0	22,4	15,9	7,56	4,58	2,90
42	41,0	19,8	16,5	7,46	3,76	3,57
43	40,5	17,7	16,7	6,74	3,32	3,04
44	44,7	20,2	17,6	8,34	4,23	3,93
45	43,1	20,8	17,2	8,45	3,51	4,18
46	40,4	18,9	18,7	7,61	4,31	3,13
47	42,5	19,6	17,8	8,26	4,44	3,72
48	41,0	21,9	16,9	7,73	4,72	2,91
49	40,3	20,5	16,6	7,21	3,98	3,09
50	40,1	18,6	17,7	7,27	3,74	3,33
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	43,8	21,5	18,2	9,38	4,97	4,21
Stdev	3,3	1,6	1,7	2,40	1,24	1,24
Min	40,0	17,7	15,4	6,32	3,32	2,67
Max	53,8	25,3	23,9	19,47	9,24	9,59

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**30.8.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Straumur, Straumsvík**	Date of preparation:	Sept. 2005
Coordinates:	640260-220250	IFL#:	SN-2005-336

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	48,3	23,6	19,1	11,56	6,72	4,60
2	53,4	25,2	24,5	17,26	10,96	5,90
3	49,7	21,8	18,8	11,04	6,69	4,05
4	47,5	21,6	21,2	11,47	6,75	4,21
5	46,9	24,3	18,5	10,41	5,61	4,46
6	46,3	19,3	18,8	8,65	4,87	3,39
7	47,7	22,3	20,3	11,24	6,53	4,42
8	53,8	26,6	20,7	14,71	8,80	5,64
9	55,0	26,9	21,0	14,80	9,52	5,12
10	49,6	22,2	21,2	12,14	7,11	4,70
11	58,4	28,5	24,7	20,90	12,68	7,65
12	59,8	26,0	26,5	22,05	11,07	7,68
13	51,2	23,9	22,4	15,08	8,94	5,73
14	44,9	23,2	18,1	9,61	5,80	3,56
15	51,4	26,2	21,6	13,52	7,96	5,18
16	55,8	22,9	22,8	16,50	9,30	6,97
17	50,4	21,0	19,1	9,29	5,25	3,64
18	45,5	22,1	16,8	8,07	4,92	2,74
19	50,2	23,4	22,5	15,82	8,67	6,72
20	49,6	24,1	19,8	12,74	7,22	4,79
21	41,8	21,6	21,8	11,64	6,80	4,41
22	44,4	20,2	17,8	8,03	4,91	2,95
23	46,1	22,8	18,4	9,15	5,50	3,44
24	53,0	23,5	20,0	12,48	7,71	4,53
25	46,5	22,5	21,3	11,39	6,65	4,57
26	53,5	24,2	26,7	17,58	10,98	6,09
27	57,5	26,1	23,0	17,16	11,01	6,05
28	48,8	22,8	18,1	10,29	6,04	3,98
29	50,4	22,5	21,0	12,38	7,13	4,89
30	44,9	20,3	17,6	8,92	5,33	3,13
31	44,5	22,2	17,0	8,49	5,05	3,19
32	48,3	19,7	19,5	9,32	6,21	3,00
33	59,4	22,6	20,2	12,83	6,80	5,84
34	45,9	18,4	18,8	8,44	5,16	3,14
35	44,0	21,4	19,9	9,37	5,66	3,46
36	43,2	22,6	17,0	8,10	4,78	3,19
37	40,0	22,0	15,8	7,64	4,48	2,85
38	44,9	22,6	18,3	8,17	5,06	2,99
39	46,3	22,1	17,1	8,54	5,32	2,99
40	42,8	22,8	18,4	8,90	4,88	3,82
41	42,0	20,0	17,8	7,07	4,00	2,79
42	42,9	20,3	15,7	6,98	3,85	2,77
43	44,8	19,5	19,0	9,07	5,52	3,34
44	41,2	18,1	16,8	6,10	3,68	2,10
45	43,8	18,9	18,8	8,76	4,80	3,83
46	40,0	20,3	17,8	7,68	4,47	3,02
47	45,2	20,6	16,6	8,00	4,71	3,07
48	43,7	21,0	13,8	8,40	4,69	3,51
49	47,1	22,1	20,6	11,35	6,71	4,50
50	51,7	25,2	21,4	14,07	8,23	5,68
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	48,1	22,5	19,7	11,26	6,63	4,29
Stdev	5,0	2,3	2,7	3,64	2,15	1,35
Min	40,0	18,1	13,8	6,10	3,68	2,10
Max	59,8	28,5	26,7	22,05	12,68	7,68

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**2.9.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Mjoifjordur I (head)**	Date of preparation:	Sept. 2005
Coordinates:	651115-140012	IFL#:	SN-2005-336

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	40,0	24,9	21,1	10,06	5,11	3,50
2	51,2	25,5	20,7	13,05	7,62	2,18
3	42,4	20,5	20,6	9,05	4,98	5,48
4	48,2	22,4	18,8	10,01	5,87	5,34
5	53,4	26,3	20,9	14,75	8,62	4,54
6	50,2	26,9	22,1	15,13	8,30	2,49
7	46,4	21,2	20,8	9,26	5,03	3,76
8	51,8	24,4	21,0	13,05	6,85	3,91
9	49,0	24,2	20,6	10,68	6,38	3,27
10	52,8	25,2	21,9	9,80	4,13	3,79
11	49,3	22,6	21,4	9,34	4,07	3,42
12	49,9	24,7	20,1	10,55	5,30	2,90
13	53,0	25,5	21,3	14,50	8,29	3,98
14	46,8	22,6	18,3	9,11	5,73	3,31
15	47,2	22,3	20,7	10,30	6,50	4,83
16	57,3	27,6	22,5	16,88	10,52	4,24
17	50,7	21,7	21,4	12,93	6,88	4,47
18	51,1	25,2	19,7	11,90	6,81	2,25
19	43,6	23,1	19,7	10,22	5,61	3,80
20	42,3	20,8	17,5	7,34	3,87	3,18
21	49,8	22,8	21,6	12,72	7,13	3,42
22	51,6	24,1	20,4	12,40	7,41	3,73
23	47,9	23,8	19,9	11,40	6,75	3,11
24	49,6	23,0	19,1	11,15	6,35	2,47
25	50,0	24,0	20,1	12,16	6,79	2,60
26	48,4	22,6	18,9	9,80	5,87	3,50
27	41,0	20,8	16,5	4,94	2,54	2,18
28	47,7	25,7	19,0	11,87	6,00	5,48
29	47,0	25,0	21,0	12,40	6,70	5,34
30	46,0	23,8	20,6	10,49	5,64	4,54
31	40,0	19,8	17,8	6,48	3,44	2,49
32	49,2	25,2	20,6	9,22	5,07	3,76
33	40,0	23,8	19,1	10,66	5,62	3,91
34	42,5	22,2	18,4	7,97	4,24	3,27
35	43,2	20,9	18,5	9,06	4,74	3,79
36	44,3	22,2	19,0	8,62	4,85	3,42
37	45,8	22,2	17,5	8,19	4,88	2,90
38	48,6	24,3	18,9	10,40	6,00	3,98
39	43,0	21,3	17,6	7,68	4,00	3,31
40	47,3	23,0	22,9	11,80	6,27	4,83
41	50,8	24,6	21,0	11,46	6,52	4,24
42	48,5	24,1	22,0	12,19	7,98	4,47
43	42,3	20,7	17,9	5,58	2,57	2,25
44	40,1	24,0	18,9	10,56	6,37	3,80
45	44,4	20,6	16,9	8,24	4,74	3,18
46	40,5	20,7	17,8	7,54	3,90	3,42
47	50,3	23,8	18,7	10,23	6,06	3,73
48	41,4	21,2	16,4	6,87	3,58	3,11
49	41,2	20,2	16,8	4,86	2,16	2,47
50	40,0	20,0	19,0	6,25	2,97	2,60
	Length		**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	46,8	23,2	19,7	10,22	5,67	3,60
Stdev	4,4	1,9	1,7	2,60	1,70	0,88
Min	40,0	19,8	16,4	4,86	2,16	2,18
Max	57,3	27,6	22,9	16,88	10,52	5,48

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**1.9.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Mjoifjordur II, Hofsa**	Date of preparation:	Sept. 2005
Coordinates:	651220-134850	IFL#:	SN-2005-342

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	53,70	25,80	19,90	15,32	8,02	7,00
2	57,40	28,10	27,50	22,02	11,56	10,19
3	57,30	29,10	29,20	20,81	8,90	9,56
4	57,40	28,40	28,50	20,91	10,94	9,80
5	54,20	24,90	24,50	14,78	7,68	6,72
6	46,40	23,40	23,50	9,34	4,43	4,64
7	60,00	29,80	27,90	32,85	17,95	14,45
8	60,00	30,40	24,10	26,76	14,38	12,04
9	55,50	27,00	19,90	15,14	7,62	7,14
10	53,40	25,20	22,40	16,54	9,16	7,22
11	49,30	25,10	20,00	13,20	6,40	6,45
12	60,00	25,50	27,80	19,58	8,81	10,36
13	57,00	26,10	21,80	17,81	10,18	7,34
14	56,20	27,00	19,50	14,04	8,14	5,50
15	53,90	27,20	21,10	15,74	8,42	6,89
16	56,90	28,60	23,80	21,17	10,62	10,17
17	53,70	28,70	21,80	16,37	8,86	7,15
18	50,80	25,90	20,30	13,88	7,27	6,27
19	53,40	28,80	19,60	15,55	7,88	7,34
20	52,70	24,30	21,00	14,58	7,80	6,65
21	57,10	26,60	25,30	20,03	8,16	11,62
22	55,40	28,40	20,20	17,68	8,94	8,37
23	52,20	26,70	19,10	13,17	7,73	5,01
24	51,00	24,90	20,60	14,50	7,68	6,67
25	52,20	24,50	18,70	12,52	6,63	5,69
26	50,50	27,30	21,60	12,05	6,73	5,02
27	51,20	26,20	22,00	15,95	8,07	7,40
28	46,80	22,10	17,90	10,14	5,31	4,51
29	44,80	22,70	18,70	10,15	5,42	4,49
30	43,80	23,60	18,70	9,74	4,01	5,46
31	41,40	21,30	16,30	7,24	3,84	3,26
32	54,80	25,60	21,80	16,54	8,28	8,09
33	53,00	26,30	20,80	14,32	7,26	6,61
34	53,40	26,00	20,80	15,81	7,73	7,9
35	44,90	22,80	17,40	8,98	4,37	4,15
36	46,50	21,90	18,40	10,98	4,71	5,81
37	46,00	22,30	18,20	10,24	5,43	4,62
38	51,20	24,50	21,10	14,67	6,95	7,35
39	49,10	24,10	19,70	12,47	6,24	5,91
40	51,00	23,70	21,20	11,92	4,9	6,71
41	47,70	24,30	18,80	11,08	5,65	5,03
42	49,20	24,90	18,80	11,43	6,08	4,90
43	49,50	23,50	21,20	11,19	5,41	5,42
44	43,10	22,60	16,20	8,04	4,38	3,30
45	43,30	23,30	19,10	10,55	4,83	5,02
46	50,20	25,70	18,90	11,74	5,61	6,02
47	47,80	23,30	19,20	11,98	6,45	5,35
48	41,40	22,30	19,00	10,09	5,04	4,61
49	44,50	22,10	17,00	8,04	3,88	3,87
50	50,00	23,50	17,80	10,21	5,43	4,25
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	51,24	25,33	20,97	14,40	7,32	6,71
Stdev	4,96	2,30	3,14	4,89	2,66	2,34
Min	41,40	21,30	16,20	7,24	3,84	3,26
Max	60,00	30,40	29,20	32,85	17,95	14,45

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**1.9.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Mjoifjordur III, Daltangi**	Date of preparation:	Sept. 2005
Coordinates:	651612-133430	IFL#:	SN-2005-343

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	46,4	22,6	19,3	11,20	5,69	4,76
2	44,4	20,6	19,8	9,43	4,77	4,30
3	46,5	21,9	19,0	9,78	4,91	4,30
4	47,3	22,1	17,1	10,63	4,97	5,18
5	50,7	26,0	20,0	16,15	8,92	6,89
6	53,7	24,7	21,1	15,19	8,52	6,03
7	51,1	23,2	21,0	13,59	6,90	6,03
8	41,7	20,5	16,5	7,86	4,16	3,51
9	48,3	25,3	19,0	9,50	3,93	4,91
10	52,2	24,5	23,7	15,01	6,58	8,12
11	51,4	23,9	21,4	13,70	6,31	7,17
12	53,7	27,7	22,9	16,95	8,75	8,03
13	48,5	22,9	18,3	10,44	5,77	4,48
14	49,3	23,5	19,6	12,34	6,72	5,61
15	47,4	24,4	19,9	12,35	6,85	5,40
16	49,4	26,0	21,3	13,81	7,85	5,75
17	51,9	22,6	22,9	16,00	8,30	7,54
18	49,9	23,5	20,3	13,26	6,65	6,25
19	49,3	23,4	18,7	11,78	6,23	5,28
20	56,4	24,7	21,5	14,69	7,29	7,29
21	45,2	24,1	18,9	9,96	4,02	5,60
22	47,7	21,9	18,7	10,46	5,31	4,64
23	47,4	21,7	18,9	12,77	6,63	6,14
24	52,5	25,8	19,3	13,80	8,07	5,44
25	52,8	21,7	19,8	13,80	6,75	5,93
26	58,9	29,0	24,5	22,33	11,64	9,92
27	48,7	23,7	21,9	12,54	4,87	7,02
28	46,6	22,7	21,6	12,65	4,67	6,70
29	50,2	22,9	19,0	13,25	6,02	6,75
30	49,8	22,9	22,4	11,26	5,04	5,84
31	49,9	22,9	17,4	11,50	5,89	5,43
32	49,6	21,0	24,2	16,25	8,85	7,23
33	41,4	22,8	16,4	7,53	4,00	3,16
34	40,1	21,8	19,1	10,96	5,77	4,69
35	49,2	23,8	19,0	11,42	6,19	4,99
36	42,5	22,3	18,8	9,66	4,75	4,32
37	42,7	20,6	16,2	7,59	3,59	3,27
38	46,5	21,2	18,0	10,20	4,58	5,04
39	41,6	20,2	16,8	6,84	2,41	4,03
40	44,9	21,7	16,5	7,47	3,2	4,07
41	45,6	22,4	21,4	10,76	3,96	6,37
42	48,8	23,9	18,6	9,74	5,77	3,71
43	48,1	21,6	18,3	13,51	6,69	6,60
44	47,8	21,8	21,6	8,32	3,38	3,79
45	40,5	19,9	17,7	9,26	4,78	4,30
46	46,8	21,1	17,6	11,53	5,90	5,38
47	45,6	20,2	17,7	9,45	5,21	4,11
48	47,0	21,6	19,6	9,12	4,24	4,80
49	45,2	21,8	19,1	9,73	5,66	3,85
50	42,0	19,8	10,7	7,25	3,98	3,12
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	47,9	22,9	19,5	11,69	5,84	5,46
Stdev	4,0	1,9	2,4	3,00	1,78	1,44
Min	40,1	19,8	10,7	6,84	2,41	3,12
Max	58,9	29,0	24,5	22,33	11,64	9,92

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**31.8.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Hvalstod, Hvalfjordur**	Date of preparation:	Sept. 2005
Coordinates:	642375-212670	IFL#:	SN-2005-335

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	45,4	19,7	16,4	7,70	4,10	3,18
2	44,8	23,3	15,9	8,73	4,37	3,92
3	50,3	24,4	19,3	10,42	3,94	6,01
4	51,9	24,2	20,5	11,40	4,63	6,04
5	52,0	24,8	21,9	15,11	6,87	7,09
6	52,8	25,7	19,2	10,39	4,84	5,47
7	46,0	23,0	19,3	7,79	2,90	4,74
8	55,1	25,7	22,1	12,45	4,97	7,06
9	60,0	24,4	26,3	25,43	12,13	12,86
10	58,2	27,2	23,6	15,12	5,82	8,31
11	60,0	28,6	28,1	28,54	15,84	12,18
12	42,4	21,0	17,6	7,78	3,75	3,48
13	46,2	21,5	18,3	9,55	5,06	4,21
14	46,0	21,5	18,9	9,66	4,71	4,35
15	49,3	23,2	21,0	13,98	7,08	6,37
16	51,4	25,2	20,2	13,65	6,72	6,12
17	60,0	25,2	26,8	24,35	13,46	10,22
18	50,0	23,9	19,1	13,26	6,78	5,86
19	49,5	26,1	18,0	12,05	6,47	4,98
20	49,0	22,1	18,9	10,27	4,80	5,06
21	50,0	26,0	19,4	11,98	6,37	5,30
22	43,4	20,2	18,7	8,88	4,35	3,99
23	54,9	25,7	21,2	16,28	7,96	7,57
24	47,8	24,2	18,3	11,31	5,34	5,32
25	47,3	23,0	19,4	10,08	5,38	4,23
26	60,0	28,6	39,9	24,90	13,04	11,14
27	53,4	25,8	23,2	16,82	9,15	7,16
28	46,7	22,0	18,4	8,76	3,97	4,25
29	52,9	38,8	21,2	16,37	7,74	80,20
30	44,4	21,1	19,9	8,50	4,71	3,48
31	40,4	20,7	15,4	6,21	3,54	2,48
32	50,9	29,4	21,3	13,95	7,33	6,05
33	46,5	22,5	17,9	9,74	4,89	4,96
34	60,0	21,3	21,2	18,00	10,27	7,02
35	47,3	24,1	17,3	9,66	5,13	4,25
36	44,3	22,2	18,3	8,41	4,92	3,41
37	42,8	20,0	15,4	7,76	3,55	3,73
38	46,2	23,1	17,4	10,13	4,89	4,70
39	43,3	23,7	16,4	7,62	3,79	3,38
40	41,5	21,5	14,9	7,06	3,38	3,30
41	41,5	23,6	17,6	9,35	4,98	4,08
42	41,0	20,7	18,1	7,53	4,11	3,14
43	40,1	21,0	18,0	7,66	3,80	3,34
44	48,7	24,6	21,2	12,86	6,90	5,76
45	60,0	27,3	26,7	25,35	13,78	11,40
46	49,0	25,0	20,3	12,97	7,72	5,11
47	47,7	23,8	19,3	11,20	5,76	5,18
48	48,8	25,2	19,6	12,07	6,34	5,62
49	47,4	21,7	17,4	9,92	5,19	4,61
50	46,6	21,6	18,0	9,43	5,13	4,13
	Length	**Width**	**18,0**	**Total weight**	**Weight soft body**	**Weight shell**
Average	49,1	24,0	20,1	12,37	6,25	7,12
Stdev	5,7	3,2	4,1	5,30	2,94	10,81
Min	40,1	19,7	14,9	6,21	2,90	2,48
Max	60,0	38,8	39,9	28,54	15,84	80,20

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**3.8.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Dvergasteinn, Álftafjörður**	Date of preparation:	Sept 2005
Coordinates:	655989-230215	IFL#:	SN-2005-338

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	43,1	20,9	17,0	7,17	3,63	2,85
2	45,2	21,1	21,3	11,16	6,84	3,78
3	47,5	22,3	21,7	12,96	6,01	6,08
4	47,3	23,9	20,4	11,73	5,98	4,88
5	51,2	23,9	18,3	11,47	5,47	5,15
6	43,6	20,9	20,0	7,98	3,63	3,21
7	48,3	23,7	22,2	13,85	6,22	7,09
8	42,5	23,9	16,2	5,54	1,99	3,04
9	52,3	23,8	19,2	7,10	2,16	4,42
10	48,6	22,5	19,8	7,66	2,86	4,06
11	46,1	22,8	16,7	7,61	4,11	2,17
12	46,1	22,0	18,4	6,61	2,88	3,08
13	46,3	20,7	18,0	6,50	2,55	3,30
14	45,1	21,3	20,7	6,65	2,31	3,92
15	42,3	20,2	18,8	4,90	1,58	3,07
16	40,0	22,5	22,1	8,69	3,30	4,77
17	44,1	22,6	16,8	6,02	2,76	2,78
18	50,6	25,5	18,7	9,71	4,22	5,05
19	46,6	21,2	19,4	7,48	2,84	4,19
20	43,8	21,7	17,4	6,20	1,97	3,24
21	46,0	21,8	18,0	6,28	2,57	3,24
22	45,1	21,2	19,6	6,99	2,89	3,40
23	47,2	22,0	17,7	6,54	2,56	3,68
24	43,5	20,8	20,0	5,48	2,07	2,96
25	46,0	21,0	20,3	6,48	1,87	3,82
26	42,3	21,0	15,4	5,19	1,96	2,58
27	42,2	21,5	18,1	6,13	2,24	3,32
28	48,7	24,7	20,5	8,41	2,98	4,85
29	45,0	20,7	17,8	6,28	2,50	3,14
30	43,7	20,9	17,9	6,04	2,21	3,27
31	43,0	21,6	16,2	5,37	2,31	2,48
32	44,2	22,2	21,3	9,21	3,75	5,00
33	43,3	22,6	17,8	7,42	3,57	3,27
34	48,3	24,3	19,3	6,72	2,24	3,79
35	40,7	19,4	16,4	4,62	1,85	2,37
36	51,6	24,6	20,2	7,68	2,57	4,60
37	47,2	22,4	19,1	8,00	2,77	4,79
38	41,6	20,0	16,5	5,21	1,67	2,90
39	43,8	19,5	17,3	4,22	1,01	2,73
40	42,7	20,6	18,0	5,02	1,95	2,41
41	59,1	27,0	25,1	18,73	9,84	8,28
42	45,8	19,8	17,2	8,32	4,86	2,92
43	45,7	21,8	17,7	8,39	4,49	3,30
44	42,7	20,7	16,7	5,00	1,82	,2,47
45	44,3	21,0	17,1	7,28	3,60	2,77
46	47,2	22,5	21,8	8,89	2,18	5,75
47	40,9	18,7	17,4	6,40	3,38	2,53
48	48,9	21,9	20,0	10,20	5,43	3,82
49	41,0	20,2	17,7	4,54	1,26	2,80
50	40,0	18,1	16,2	4,30	1,27	2,52
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	45,4	21,8	18,7	7,53	3,18	3,74
Stdev	3,6	1,7	2,0	2,72	1,68	1,25
Min	40,0	18,1	15,4	4,22	1,01	2,17
Max	59,1	27,0	25,1	18,73	9,84	8,28

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**31.8.2004**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Grímsey**	Date of preparation:	Sept. 2005
Coordinates:	663400-180170	IFL#:	SN-2005-340

	Length (mm)	**Width (mm)**	**Height (mm)**	**Total weight (g)**	**Weight soft body (g)**	**Weight shell (g)**
1	42,7	20,2	17,9	10,30	4,08	5,65
2	44,7	20,1	19,9	11,74	4,74	6,50
3	61,6	29,5	25,0	21,13	7,73	12,57
4	58,3	28,5	24,5	23,24	11,40	11,48
5	55,1	27,0	24,0	22,21	9,75	12,09
6	47,5	23,2	20,3	14,19	6,63	6,85
7	42,5	21,3	20,7	12,75	3,19	8,41
8	45,0	26,0	18,0	10,90	4,79	5,38
9	44,5	23,1	18,1	10,20	4,11	9,90
10	50,2	24,0	20,5	16,22	6,73	9,19
11	40,5	19,5	18,0	10,51	3,54	6,54
12	42,6	21,5	19,7	12,82	5,25	7,26
13	44,4	18,3	20,9	9,39	4,77	4,29
14	45,1	19,7	20,3	12,09	5,04	6,88
15	43,8	19,3	20,8	11,50	4,21	6,97
16	54,2	22,8	24,5	16,26	8,86	6,90
17	54,0	22,7	27,6	19,26	9,99	8,76
18	58,7	24,0	26,5	20,78	9,39	10,80
19	59,3	24,5	28,7	20,58	10,57	9,30
20	53,9	25,8	24,6	19,71	7,04	11,80
21	47,2	19,2	22,5	6,79	3,26	6,79
22	44,8	19,8	20,0	12,07	4,94	6,38
23	43,8	20,6	21,7	11,09	4,61	5,97
24	45,0	19,8	20,2	10,61	3,34	6,68
25	42,8	19,4	19,8	11,51	4,18	6,85
26	62,2	25,9	29,7	23,63	12,92	10,37
27	58,8	23,8	25,8	19,43	10,85	8,10
28	55,6	21,8	25,9	19,08	7,78	10,90
29	53,8	25,0	27,1	23,70	10,34	12,94
30	52,2	25,4	25,5	19,34	9,24	9,67
31	50,7	23,7	25,7	15,49	8,02	7,28
32	55,4	20,6	25,7	15,78	8,66	6,77
33	45,8	20,5	23,7	13,82	5,88	7,54
34	54,4	23,9	26,5	21,86	9,67	12,15
35	49,9	21,1	22,1	16,43	5,76	10,05
36	49,3	21,7	24,2	16,28	6,67	9,22
37	56,2	22,2	26,6	15,71	6,70	8,66
38	53,9	23,5	25,0	18,15	9,47	8,23
39	56,5	21,2	26,7	19,44	9,19	9,98
40	61,7	22,5	27,1	20,10	10,11	8,96
41	43,5	21,1	21,6	11,94	4,39	6,81
42	47,7	19,5	22,2	12,64	4,78	7,30
43	43,7	18,5	21,6	10,86	4,44	5,92
44	40,0	19,5	20,5	11,49	4,30	6,93
45	41,4	17,5	21,0	7,95	3,00	4,53
46	59,1	25,2	30,4	22,99	12,93	9,83
47	60,0	24,9	28,2	20,86	9,10	11,10
48	56,1	23,7	26,4	21,11	9,11	11,34
49	50,2	21,2	24,6	14,69	7,51	6,62
50	48,7	20,9	20,1	14,02	5,13	7,97
	Length		**Height**		**Weight soft body**	**Weight shell**
Average	50,4	22,3	23,4	15,69	6,96	8,39
Stdev	6,5	2,7	3,3	4,66	2,74	2,20
Min	40,0	17,5	17,9	6,79	3,00	4,29
Max	62,2	29,5	30,4	23,70	12,93	12,94

Appendix II.

Biological measurements of Cod (*Gadus morhua*) 2005

Species:	**Cod (*Gadus Morhua*)**	**exped./station**			**date**	**n**
Location:	**North- Northwest off Iceland (2)**	TP1-2005-83	660079	260276	08.3.2005	6
Lenght:	30-45cm	TP1-2005-90	655880	255456	08.3.2005	3
Ship:	Páll Pálsson ÍS-102	TP1-2005-91	660089	254702	08.3.2005	6
Expd.leader:	Jón Sólmundsson	TP1-2005-93	661374	253163	10.3.2005	4
		TP1-2005-94	661959	252101	10.3.2005	6
			660236	**255260**		25

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	83	99,03	103,61	4,58	469	1	40,0	449	137	3
	90	99,14	107,95	8,81	513	0	40,0	486	151	3
	91	97,84	106,68	8,84	379	1	36,0	345	97	3
	90	97,62	107,47	9,85	495	1	37,0	420	157	
	91	97,87	108,35	10,48	480	1	37,0	406	121	3
	91	98,93	109,43	10,50	460	1	37,0	411	112	3
	83	97,84	108,68	10,84	191	0	29,0	170	52	3
	83	97,98	111,45	13,47	314	0	36,0	289	93	3
			Sum	77,37	3301,0		292,0	2976,0	920,0	21,0
			Average	9,67	412,6		36,5	372,0	115,0	3,0
			STDEV	2,52	111,4		3,4	101,6	34,6	0,0
			Min	4,58	191,0		29,0	170,0	52,0	3
			Max	13,47	513,0		40,0	486,0	157,0	3
H 2	94	98,05	114,39	16,34	250	0	30,0	213	68	3
	83	98,74	117,65	18,91	344	0	35,0	317	112	3
	93	98,85	120,25	21,40	569	1	39,0	510	128	3
	91	98,96	122,17	23,21	339	0	34,0	302	191	3
	94	97,74	124,93	27,19	636	1	42,0	527	212	4
	83	98,68	127,29	28,61	372	1	35,0	332	109	3
			Sum	135,66	2510,0		215,0	2201,0	820,0	19,0
			Average	22,61	418,3		35,8	366,8	136,7	3,2
			STDEV	4,73	149,9		4,2	124,7	54,4	0,4
			Min	16,34	250,0		30,0	213,0	68,0	3
			Max	28,61	636,0		42,0	527,0	212,0	4
H 3	83	98,44	130,05	31,61	314	0	33,0	275	99	3
	93	98,91	131,76	32,85	737	1	43,0	641	183	3
	91	98,13	131,24	33,11	769	1	45,0	667	226	4
	90	98,99	134,72	35,73	522	1	39,0	472	117	3
	94	98,12	134,25	36,13	717	1	44,0	596	161	4
	94	97,76	135,04	37,28	636	0	42,0	555	162	3
	94	98,94	138,11	39,17	664	0	43,0	595	181	3
			Sum	245,88	4359,00		289,0	3801,0	1129,0	23,0
			Average	35,13	622,71		41,3	543,0	161,3	3,3
			STDEV	2,71	158,47		4,1	133,9	42,6	0,5
			Min	31,61	314,00		33,0	275,0	99,0	3
			Max	39,17	769,00		45,0	667,0	226,0	4
H 4	93	98,65	144,21	45,56	727	0	41,0	625	167	3
	94	97,53	146,35	48,82	775	0	43,0	662	171	3
	93	99,05	148,06	49,01	674	0	41,0	568	179	3
			Sum	143,39	2176,0		125,0	1855,0	517,0	9,0
			Average	47,80	725,3		41,7	618,3	172,3	3,0
			STDEV	1,94	50,5		1,2	47,4	6,1	0,0
			Min	45,56	674,0		41,0	568,0	167,0	3
			Max	49,01	775,0		43,0	662,0	179,0	3
H 5	91	98,15	161,96	63,81	772	0	45,0	683	179	3
H1, H2, H3, H4, H5			**Sum**	666,11	13118,0		966,00	11516,00	3565,00	75,0
			Average	26,64	524,7		38,64	460,64	142,60	3,1
			STDEV	15,60	179,4		4,44	151,27	44,18	0,3
			Min	4,58	191,0		29,00	170,00	52,00	3
			Max	63,81	775,0		45,00	683,00	226,00	4

Species:	**Cod (*Gadus Morhua*)**	**exped./station**			**date**	**n**
Location:	**North-Northwest off Iceland (1)**	B3-2005-105	**663524**	**182426**	6.3.2005	25
Lenght:	30-45cm					
Ship:	Bjarni Sæmundsson					
Expd.leader:	Björn Ævar 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	98,87	104,10	5,23	338	0	35,0	402	113	3
	105	98,74	104,17	5,43	295	0	34,0	269	81	3
	105	97,75	105,60	7,85	359	1	36,0	330	96	3
	105	98,85	106,80	7,95	340	1	35,0	314	86	3
			Sum	26,46	1332,0		140,0	1315,0	376,0	12,0
			Average	6,62	333,0		35,0	328,8	94,0	3,0
			STDEV	1,49	27,0		0,8	55,2	14,1	0,0
			Min	5,23	295,0		34,0	269,0	81,0	3
			Max	7,95	359,0		36,0	402,0	113,0	3
H 2	105	98,79	109,53	10,74	320	1	35,0	288	78	3
	105	98,73	109,58	10,85	525	0	38,0	464	126	3
	105	97,88	109,13	11,25	401	0	38,0	440	116	3
	105	97,82	109,51	11,69	413	0	36,0	369	96	3
	105	98,22	110,31	12,09	338	0	35,0	517	140	3
			Sum	56,62	1997,0		182,0	2078,0	556,0	15,0
			Average	11,32	399,4		36,4	415,6	111,2	3,0
			STDEV	0,57	80,7		1,5	89,0	24,5	0,0
			Min	10,74	320,0		35,0	288,0	78,0	3
			Max	12,09	525,0		38,0	517,0	140,0	3
H 3	105	98,79	112,11	13,32	485	1	39,0	361	98	3
	105	98,82	112,25	13,43	613	0	43,0	546	135	3
	105	97,59	111,57	13,98	430	1	37,0	393	78	3
	105	97,97	111,99	14,02	495	1	38,0	443	119	3
	105	98,84	112,92	14,08	359	0	36,0	321	84	3
	105	97,77	112,00	14,23	562	1	42,0	309	83	3
	105	98,84	113,13	14,29	378	0	36,0	342	98	3
	105	98,02	112,79	14,77	540	1	41,0	479	138	4
			Sum	112,12	3862,0		312,0	3194,0	833,0	25,0
			Average	14,02	482,8		39,0	399,3	104,1	3,1
			STDEV	0,47	89,2		2,7	83,5	23,7	0,4
			Min	13,32	359,0		36,0	309,0	78,0	3
			Max	14,77	613,0		43,0	546,0	138,0	4
H 4	105	98,79	115,22	16,43	408	0	36,0	354	92	3
	105	97,86	114,31	16,45	462	1	39,0	475	132	3
	105	98,83	116,41	17,58	750	1	44,0	681	168	4
	105	98,10	115,78	17,68	504	0	38,0	452	102	3
	105	99,02	118,18	19,16	533	1	40,0	304	78	3
			Sum	87,30	2657,0		197,0	2266,0	572,0	16,0
			Average	17,46	531,4		39,4	453,2	114,4	3,2
			STDEV	1,12	130,9		3,0	145,3	35,9	0,4
			Min	16,43	408,0		36,0	304,0	78,0	3
			Max	19,16	750,0		44,0	681,0	168,0	4
H 5	105	98,80	121,31	22,51	744	1	44,0	508	127	3
	105	98,98	123,72	24,74	510	1	39,0	446	117	3
			Sum	47,25	1254,0		83,0	954,0	244,0	6,0
			Average	23,63	627,0		41,5	477,0	122,0	3,0
			STDEV	1,58	165,5		3,5	43,8	7,1	0,0
			Min	22,51	510,0		39,0	446,0	117,0	3
			Max	24,74	744,0		44,0	508,0	127,0	3
H 6	105	98,93	129,45	30,52	620	1	40,0	662	160	3
H1, H2, H3, H4, H5, H6			**Sum**	360,27	11722,0		954,0	10469,0	2741,0	77,00
			Average	14,41	468,9		38,2	418,8	109,6	3,08
			STDEV	5,72	124,5		2,9	108,7	26,1	0,28
			Min	5,23	295,0		34,0	269,0	78,0	3,00
			Max	30,52	750,0		44,0	681,0	168,0	4,00

Species:	**Cod (*Gadus Morhua*)**	**exped./station**			**date**	**n**
Location:	**Northeast off Iceland**	TBR1-2005-40	**661995**	**125255**	5.3.2005	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
H 1	40	98,87	108,75	9,88	463,0	1	40,0	431,0	86,0	3
	40	98,85	109,49	10,64	409,0	1	37,0	377,0	74,0	3
	40	98,05	109,19	11,14	323,0	0	34,0	300,0	68,0	3
	40	97,96	110,38	12,42	437,0	1	39,0	407,0	118,0	3
	40	97,68	110,40	12,72	350,0	1	36,0	324,0	85,0	3
	40	98,14	112,97	14,83	420,0	0	38,0	386,0	89,0	3
	40	97,62	113,02	15,40	425,0	1	38,0	387,0	88,0	3
			Sum	87,03	2827,0		262,0	2612,0	608,0	21,0
			Average	12,43	403,9		37,4	373,1	86,9	3,0
			STDEV	2,08	49,6		2,0	45,9	15,8	0,0
			Min	9,88	323,0		34,0	300,0	68,0	3
			Max	15,40	463,0		40,0	431,0	118,0	3
H 2	40	98,83	115,75	16,92	471,0	1	40,0	437,0	102,0	3
	40	98,54	115,50	16,96	440,0	0	37,0	398,0	102,0	4
	40	98,68	116,34	17,66	482,0	0	39,0	442,0	115,0	3
	40	97,92	115,61	17,69	552,0	1	41,0	510,0	126,0	3
	40	97,94	116,65	18,71	472,0	1	39,0	432,0	113,0	3
	40	97,63	118,99	21,36	549,0	0	42,0	499,0	131,0	3
			Sum	109,30	2966,0		238,0	2718,0	689,0	19,0
			Average	18,22	494,3		39,7	453,0	114,8	3,2
			STDEV	1,67	45,7		1,8	42,9	12,0	0,4
			Min	16,92	440,0		37,0	398,0	102,0	3
			Max	21,36	552,0		42,0	510,0	131,0	4
H 3	40	97,94	121,05	23,11	400,0	1	37,0	355,0	99,0	3
	40	98,80	122,04	23,24	598,0	0	41,0	542,0	106,0	3
	40	97,77	122,87	25,10	659,0	0	44,0	603,0	167,0	3
	40	97,85	123,03	25,18	468,0	0	39,0	414,0	97,0	3
	40	97,93	124,00	26,07	652,0	0	44,0	587,0	105,0	3
	40	97,99	124,24	26,25	454,0	1	38,0	406,0	92,0	3
	40	97,87	126,65	28,78	553,0	0	42,0	504,0	140,0	4
			Sum	177,73	3784,0		285,0	3411,0	806,0	22,0
			Average	25,39	540,6		40,7	487,3	115,1	3,1
			STDEV	1,94	102,0		2,8	96,7	27,7	0,4
			Min	23,11	400,0		37,0	355,0	92,0	3
			Max	28,78	659,0		44,0	603,0	167,0	4
H 4	40	97,86	130,90	33,04	670,0	0	44,0	602,0	127,0	4
	40	97,78	135,49	37,71	574,0	1	41,0	510,0	124,0	3
			Sum	70,75	1244,0		85,0	1112,0	251,0	7,0
			Average	35,38	622,0		42,5	556,0	125,5	3,5
			STDEV	3,30	67,9		2,1	65,1	2,1	0,7
			Min	33,04	574,0		41,0	510,0	124,0	3
			Max	37,71	670,0		44,0	602,0	127,0	4
H 5	40	98,71	138,39	39,68	591,0	1	41,0	524,0	122,0	3
	40	98,93	139,03	40,10	611,0	1	42,0	545,0	175,0	3
	40	98,95	140,54	41,59	587,0	0	42,0	522,0	142,0	4
			Sum	121,37	1789,0		125,0	1591,0	439,0	10,0
			Average	40,46	596,3		41,7	530,3	146,3	3,3
			STDEV	1,00	12,9		0,6	12,7	26,8	0,6
			Min	39,68	587,0		41,0	522,0	122,0	3,0
			Max	41,59	611,0		42,0	545,0	175,0	4,0
H1, H2, H3, H4, H5			**Sum**	566,18	12610,0		995,0	11444,0	2793,0	79,0
			Average	22,65	504,4		39,8	457,8	111,7	3,2
			STDEV	9,69	97,1		2,6	85,1	26,4	0,4
			Min	9,88	323,0		34,0	300,0	68,0	3,0
			Max	41,59	670,0		44,0	603,0	175,0	4,0

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 2004.

Analyte	QTM67BT Quasimeme R42 µg/g	I Z-score*I	Mussel Tissue BCR 278/ 918 µg/g	I Z-score*I	TORT-2 NRCC µg/g	I Z-score*I	Recovery,%	MLOD** µg/g
As							112 ± 4	2,9
Measured	4,03	0,89			24,9 ± 0,5	0,60		
Certified	3,50				21,6 ± 1,8			
Cd							107 ±10	0,23
Measured	0,171	1,79			25,6 ± 0,7	0,33		
Certified	0,125				26,7 ± 0,6			
Cu							97 ± 5	0,44
Measured	2,627	0,34			109 ± 3	0,21		
Certified	2,763				106 ± 10			
Hg							93 ± 13	0,01
Measured	0,0341	0,02	0,208 ± 0,031	0,5	0,29 ± 0,02	0,64		
Certified	0,0339		0,196 ± 0,009		0,27 ± 0,03			
Pb							98 ± 4	0,07
Measured					0,36 ± 0,03	0,76		
Certified					0,35 ± 0,13			
Se							100 ± 4	0,65
Measured					4,42 ± 0,15	1,71		
Certified					5,63 ± 0,67			
Zn							116 ± 5	12,3
Measured	25,74	0,89			196 ± 5	0,7		
Certified	22,35				180 ± 6			

* Z-score ((mesarured 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 *(Gadus morhua)* for the year 2005.

Analyte	QTM68BT Quasimeme R42 µg/g	IZI*	DORM-2 NRCC µg/g	IZI*	DOLT-3 NRCC µg/g		TORT-2 NRCC µg/g	IZI*	Recovery, % Liver	Recovery, % Flesh	MLOD** µg/g Liver	MLOD** µg/g Flesh
As									88 ± 15		1,0	
Measured							24,9 ± 0,5	0,60				
Certified							21,6 ± 1,8					
Cd									115 ± 8		0,025	
Measured					19,6 ± 0,5	0,06	25,6 ± 0,7	0,33				
Certified					19,4 ± 0,6		26,7 ± 0,6					
Cu									104 ±1		0,29	
Measured	0,169	0,1	2,13 ± 0,16	0,7	31,8 ± 0,70	0,15	109 ± 3	0,21				
Certified	0,177		2,34 ± 0,16		31,2 ± 1		106 ± 10					
Hg										87 ± 7		0,001
Measured	0,132	0,14	4,19 ± 0,10	0,78								
Certified	0,136		4,64 ± 0,26									
Pb									99 ± 4		0,08	
Measured							0,36 ± 0,03	0,76				
Certified							0,35 ± 0,13					
Se									85 ± 7		0,18	
Measured	0,273	0,24					4,42 ± 0,15	1,71				
Certified	0,264						5,63 ± 0,67					
Zn									101 ± 11		2,42	
Measured	3,79	0,29	25,6 ± 2,3	0,29	91,5 ± 2	0,46	196 ± 5	0,7				
Certified	4,24		25,6 ± 2,3		86,6 ± 2,4		180 ± 6					

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

** MLOD is on wet 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 2004.

Blue mussel 2004								assign				
chemical	**CRM**	**weight basis**	anal. 1	anal. 2	anal. 3	**mean**	**SD**	value	**time**	I Z I	**det. Lim.**	
CB28	**QOR080BT**	**wet weight**	0,13	0,10	0,13	**0,12**	**0,02**	0,19	**2 weeks**	-1,93	0,06	
CB31	**QOR080BT**	**wet weight**	0,13	0,13	0,11	**0,12**	**0,01**	0,15	**2 weeks**	-0,84	0,04	
CB52	**QOR080BT**	**wet weight**	0,58	0,60	0,58	**0,59**	**0,01**	0,56	**2 weeks**	0,32	0,01	
CB101	**QOR080BT**	**wet weight**	2,53	2,42	2,49	**2,48**	**0,06**	2,34	**2 weeks**	0,46	0,01	
CB105	**QOR080BT**	**wet weight**	0,46	0,46	0,46	**0,46**	**0,00**	0,42	**2 weeks**	0,62	0,01	
CB118	**QOR080BT**	**wet weight**	2,11	2,08	2,11	**2,10**	**0,02**	1,98	**2 weeks**	0,46	0,01	
CB138	**QOR080BT**	**wet weight**	4,61	4,34	4,62	**4,52**	**0,16**	4,24	**2 weeks**	0,52	0,01	
CB153	**QOR080BT**	**wet weight**	7,20	7,56	7,43	**7,40**	**0,18**	7,02	**2 weeks**	0,42	0,01	
CB156	**QOR080BT**	**wet weight**	0,19	0,17	0,22	**0,19**	**0,03**	0,20	**2 weeks**	-0,18	0,01	
CB180	**QOR080BT**	**wet weight**	0,42	0,48	0,46	**0,45**	**0,03**	0,48	**2 weeks**	-0,36	0,01	
HCB	**QOR080BT**	**wet weight**	0,07	0,08	0,07	**0,07**	**0,01**	0,08	**2 weeks**	-0,29	0,01	
a-HCH	**QOR080BT**	**wet weight**	0,01	0,02	0,01	**0,01**	**0,01**	0,04	**2 weeks**	-1,63	0,01	
b-HCH	**QOR080BT**	**wet weight**	0,02	0,02	0,02	**0,02**	**0,00**	0,04	**2 weeks**	-1,14	0,01	
g-HCH	**QOR080BT**	**wet weight**	0,03	0,03	0,04	**0,03**	**0,01**	0,05	**2 weeks**	-0,91	0,01	
pp'-DDE	**QOR080BT**	**wet weight**	1,21	1,22	1,17	**1,20**	**0,03**	1,22	**2 weeks**	-0,12	0,01	
pp'-DDD	**QOR080BT**	**wet weight**	0,52	0,47	0,59	**0,53**	**0,06**	0,49	**2 weeks**	0,50	0,01	
pp'-DDT	**QOR080BT**	**wet weight**	0,06	0,07	0,05	**0,06**	**0,01**	*0,21**	**2 weeks**	*	0,02	
op'-DDT	**QOR080BT**	**wet weight**	0,18	0,17	0,05	**0,13**	**0,07**	0,07	**2 weeks**	3,04	0,02	
transn-chlor	**QOR080BT**	**wet weight**	0,11	0,10	0,09	**0,10**	**0,01**	0,11	**2 weeks**	-0,38	0,01	
											0,01	a-chlor
* "assigned value" only "indicative". Quasimeme does not assign %error and thus Z-score can not be calculated.											0,01	g-chlor
a- og g-chlordane, oxychlordane and toxaphenes are not certified in this sample by quasimeme											0,01	tox 26
											0,01	tox 50
											0,01	tox 62

Table 5. Qualitative assurance. Persistent organochlorines (ng/g ww) in a certified cod liver sample from quasimeme, that were analysed with the cod liver 2005.

Cod liver 2005								assign				
chemical	**CRM**	**weight basis**	anal. 1	anal. 2	anal. 3	**mean**	**SD**	value	**time**	I Z I	**det. Lim.**	
CB28	**QOR066BT**	**wet weight**	13,1	12,8	13,0	**13,0**	**0,16**	11,7	**3 weeks**	0,87	0,45	
CB31	**QOR066BT**	**wet weight**	4,02	4,04	4,34	**4,13**	**0,18**	3,63	**3 weeks**	1,00	0,33	
CB52	**QOR066BT**	**wet weight**	28,9	31,3	33,9	**31,3**	**2,49**	29,4	**3 weeks**	0,52	0,11	
CB101	**QOR066BT**	**wet weight**	110	110	118	**112,4**	**4,60**	105	**3 weeks**	0,56	0,05	
CB105	**QOR066BT**	**wet weight**	43,4	45,2	46,6	**45,0**	**1,61**	43,1	**3 weeks**	0,36	0,02	
CB118	**QOR066BT**	**wet weight**	148	152	172	**157**	**13,2**	152	**3 weeks**	0,30	0,06	
CB138	**QOR066BT**	**wet weight**	281	290	306	**292**	**13,0**	292	**3 weeks**	0,00	0,02	
CB153	**QOR066BT**	**wet weight**	428	448	482	**452**	**27,6**	420	**3 weeks**	0,62	0,02	
CB156	**QOR066BT**	**wet weight**	18,0	18,1	19,5	**18,5**	**0,84**	19,3	**3 weeks**	-0,32	0,02	
CB180	**QOR066BT**	**wet weight**	88,4	93,1	94,0	**91,8**	**3,04**	86,6	**3 weeks**	0,48	0,02	
HCB	**QOR066BT**	**wet weight**	12,5	12,5	14,1	**13,0**	**0,90**	11,5	**3 weeks**	1,01	0,10	
a-HCH	**QOR066BT**	**wet weight**	1,42	1,45	1,58	**1,48**	**0,09**	1,39	**3 weeks**	0,42	0,02	
b-HCH	**QOR066BT**	**wet weight**	0,86	0,99	0,93	**0,93**	**0,07**	0,87	**3 weeks**	0,36	0,02	
g-HCH	**QOR066BT**	**wet weight**	0,89	0,88	0,91	**0,89**	**0,02**	*0,94*	**3 weeks**	-0,28	0,07	
pp'-DDE	**QOR066BT**	**wet weight**	164	162	177	**168**	**8,29**	156	**3 weeks**	0,62	0,04	
pp'-DDD	**QOR066BT**	**wet weight**	40,9	43,0	47,9	**44,0**	**3,61**	41,9	**3 weeks**	0,39	0,12	
pp'-DDT	**QOR066BT**	**wet weight**	1,58	1,18	1,15	**1,30**	**0,24**	*1**	**3 weeks**		0,40	
op'-DDT	**QOR066BT**	**wet weight**	<0,5	<0,5	<0,5			*0,8**	**3 weeks**		0,50	
transn-chlor	**QOR066BT**	**wet weight**	19,4	19,5	21,5	**20,1**	**1,18**	19,5	**3 weeks**	0,26	0,03	
											0,03	a-chlor
* "assigned value" only "indicative". Quasimeme does not assign %error and thus Z-score can not be calculated.											0,03	g-chlor
a- og g-chlordane, oxychlordane and toxaphenes are not certified in this sample by quasimeme											0,04	tox 26
											0,03	tox 50
											0,03	tox 62

Table 6. Detection limits *(ng/g)

	Detection limits	
chemical	**mussel ng/sample dw**	**Cod liver ng/sample ww**
a-HCH	0,026	0,01
HCB	0,035	0,05
b-HCH	0,010	0,03
g-HCH	0,031	0,09
PCB-31	0,398	0,38
PCB-28	0,563	0,56
PCB-52	0,096	0,09
oxychlordane	0,010	0,13
gamma-Chl.	0,010	0,01
PCB-101	0,030	0,01
alfa-Chl.	0,010	0,01
transnonachlor	0,010	0,01
4,4'-DDE	0,054	0,04
tox 26	0,010	0,01
PCB-118	0,010	0,08
4,4'-DDD	0,015	0,17
2,4'-DDT	0,031	0,66
PCB-153	0,035	0,01
PCB-105	0,023	0,01
4,4'-DDT	0,090	0,51
PCB-138	0,017	0,01
tox 50	0,010	0,01
PCB-156	0,010	0,01
PCB-180	0,009	0,01
tox 62	0,010	0,01
PCB-170	0,010	0,01

*detection limits are 3 x std of blanks, or 3 x noise level.

Appendix IV.

Results of trace metal analysis for Blue mussel (*Mytilus edulis*) 2004 and Cod (*Gadus Morhua*) 2005

Table 7. Results of trace metals in Blue mussel *(Mytilus edulis)* 2004 (dw)

Samples	Fat		Dry matter		Pb, mg/kg	Cd, mg/kg		Cu, mg/kg		Zn, mg/kg		As, mg/kg		Se, mg/kg		Hg, µg/kg	
	%	±	%	±	dw	dw	±	dw	±	dw	±	dw	±	dw	±	dw	±
Hvassahraun 04	0,37	0,01	7,31	0,05	<MLOD	2,17	0,13	8,24	0,16	196,3	11,1	20,5	0,1	3,81	0,21	44,8	1,4
Straumur,Straumsvík 04	0,35	0,06	7,8	0,11	<MLOD	2,27	0,13	6,79	0,25	164,4	14,2	12,7	0,7	4,37	0,3	45,7	1,1
Eyri, Hvalfjörður 04	0,16	0,03	8,83	0,19	<MLOD	1,56	0,13	7,63	0,14	149,3	8,1	10,30	0,2	3,69	0,16	42,2	4,3
Hvítanes, Hvalfjörður 04	0,10	0,01	8,3	0,18	<MLOD	2,70	0,08	6,57	0,17	159,4	9,3	11,2	0,2	3,39	0,13	39,0	2,1
Hvalstöð, Hvalfjörður 04	0,23	0,01	10,58	0,01	<MLOD	2,30	0,09	6,73	0,07	101,7	4,3	7,97	0,6	3,01	0,22	54,6	2,1
Dvergasteinn, Álftafjörður 04	0,54	0,02	13,96	0,01	<MLOD	4,15	0,03	6,23	0,27	112,8	2,8	28,4	0,6	3,25	0,21	58,1	4,4
Úlfsá, Skutulsfjörður 04	0,08	0,01	6,92	0,19	<MLOD	1,41	0,09	5,98	0,19	180,7	7	73,8	3,8	2,77	0,12	97,7	3,7
Mjóifjordur, head 04	0,74	0,05	12,08	0,14	<MLOD	1,86	0,05	6,57	0,18	110,5	4,8	8,2	1,2	3,64	0,19	43,1	0,3
Mjóifjordur, Hofsá 04	0,94	0,09	13,43	0,16	<MLOD	6,02	0,13	7,36	0,24	137,2	6,6	10,4	0,2	3,29	0,23	43,0	1,6
Mjóijördur, Dalatangi 04	0,23	0,03	8,17	0,03	<MLOD	2,39	0,14	5,9	0,06	124,9	2,5	17,4	0,2	2,67	0,39	61,7	6,9
Grímsey 04	0,08	0,01	6,45	0,01	<MLOD	5,92	0,53	5,3	0,19	224,4	13,2	24,4	0,7	3,46	0,10	77,4	6,0
Limit of detection for samples (MLOD)					0,07	0,23		0,44		12,3		2,9		0,65		12,6	

Table 8. Results of trace metals in liver and flesh of Cod (*Gadus morhua*) 2005 (ww)

Sample		Fat %		Dry matter %		Pb, µg/g	Cd, µg/g		Cu,µg/g		Zn, µg/g		As, µg/g		Se, µg/g		Dry matter %		Fat %		Hg, ng/g	
		Liver		Liver	±	Liver	Liver	±	Liver	±	Liver	±	Liver	±	Liver	±	Flesh*	±	Flesh*	±	Flesh*	±
COD N-NW (1) 05																	18,58	0,05	0,08	0,01	34,9	0,2
	Group 1	25,48	0,32	43,01	0,19	<MLOD	0,37	0,01	3,80	0,11	24,8	1,4	8,48	0,19	1,31	0,12						
	Group 2	42,17	0,33	55,23	0,46	<MLOD	0,17	0,01	3,50	0,09	17,0	0,6	7,88	0,15	1,44	0,18						
	Group 3	39,85	0,22	52,90	0,37	<MLOD	0,64	0,01	4,56	0,27	20,8	0,5	7,76	1,20	1,52	0,27						
	Group 4	47,35	0,07	58,47	0,01	<MLOD	0,24	0,01	3,46	0,08	16,2	0,7	6,98	0,11	0,70	0,10						
	Group 5	45,57	0,22	57,97	0,38	<MLOD	0,33	0,01	3,48	0,36	19,3	0,4	6,42	0,34	1,23	0,06						
	Group 6	48,01	0,36	60,21	0,02	<MLOD	0,48	0,01	2,51	0,15	13,2	0,7	6,00	0,25	0,73	0,33						
COD N-NW (2) 05																	19,13	0,13	0,06	0,03	31,69	3,2
	Group 1	32,00	1,21	48,31	0,47	<MLOD	0,36	0,01	4,58	0,16	24,3	0,7	8,29	0,20	1,05	0,16						
	Group 2	54,34	0,71	65,07	0,16	<MLOD	0,28	0,01	3,18	0,11	12,6	0,4	6,15	0,09	0,87	0,15						
	Group 3	57,79	0,26	67,68	0,14	<MLOD	0,25	0,01	2,97	0,03	13,4	0,6	5,23	0,04	0,62	0,02						
	Group 4	53,93	0,59	64,67	0,19	<MLOD	0,29	0,01	2,60	0,18	12,1	0,6	5,03	0,12	0,79	0,03						
	Group 5	74,98	0,33	81,31	0,39	<MLOD	0,54	0,01	4,30	0,25	10,3	0,6	5,17	0,64	0,50	0,03						
COD NE 05																	19,23	0,06	0,17	0,04	24,05	0,7
	Group 1	49,05	0,08	62,68	0,44	<MLOD	0,22	0,01	3,33	0,09	14,7	0,8	6,60	0,13	0,94	0,04						
	Group 2	49,69	0,66	66,50	0,42	<MLOD	0,18	0,01	2,98	0,15	17,4	1,4	5,48	0,51	0,76	0,04						
	Group 3	57,82	0,68	67,69	0,91	<MLOD	0,18	0,01	3,07	0,19	12,1	2,7	6,05	0,04	0,71	0,13						
	Group 4	63,81	0,23	77,41	0,77	<MLOD	0,12	0,01	2,62	0,21	8,84	0,3	4,73	0,17	0,52	0,04						
	Group 5	62,58	0,64	71,38	0,67	<MLOD	0,13	0,01	2,30	0,14	10,7	0,4	4,21	0,35	0,49	0,06						
Average of all measurements							0,30	0,15	3,33	0,70	15,5	4,8	6,3	0,3	0,89	0,33					27,87	1,95
Limit of detection for samples (MLOD)						0,08	0,025		0,29		2,41		0,99		0,18						0,92	

*flesh was pooled into one sample

Appendix V.

Results of organochlorine analysis for Blue mussel (*Mytilus edulis*) 2004 and Cod (*Gadus morhua*) 2005

Table 9. Persistent organochlorines in Blue mussel (Mytulis edulis, ng/g dw) 2004.

	Hvassahraun 04			Straumur 04			Grímsey 04	Úlfsá 04	Dvergasteinn 04
	A	B	mean*	A	B	mean*			
PCB28	<0,56	0,60	**<0,60**	<0,56	0,76	**<0,76**	**0,68**	**<0,56**	**<0,56**
PCB31	<0,39	0,48	**<0,48**	<0,39	0,62	**<0,62**	**0,51**	**<0,39**	**<0,39**
PCB52	0,26	0,58	**0,42**	0,58	0,87	**0,73**	**0,60**	**0,20**	**0,33**
PCB101	0,57	0,65	**0,61**	1,05	1,16	**1,11**	**0,17**	**0,51**	**1,01**
PCB105	0,29	0,21	**0,25**	0,50	0,36	**0,43**	**0,10**	**0,20**	**0,40**
PCB118	0,77	0,62	**0,70**	1,12	1,17	**1,15**	**0,26**	**0,47**	**1,09**
PCB138	1,29	1,21	**1,25**	2,16	1,91	**2,04**	**0,30**	**0,75**	**1,13**
PCB153	1,55	1,47	**1,51**	2,82	2,69	**2,76**	**0,49**	**0,90**	**1,36**
PCB156	<0,08	<0,08	**<0,08**	0,11	0,07	**0,09**	**<0,08**	**<0,08**	**0,11**
PCB170	<0,07	<0,07	**<0,07**	<0,07	<0,07	**<0,07**	**<0,07**	**<0,07**	**<0,07**
PCB180	0,08	0,15	**0,12**	0,12	0,20	**0,16**	**0,05**	**0,10**	**0,08**
Σ3PCB**	3,61	3,30	**3,46**	6,10	5,77	**5,94**	**1,05**	**2,12**	**3,58**
HCB	0,19	0,26	**0,23**	0,27	0,30	**0,28**	**0,19**	**0,21**	**0,16**
a-HCH	0,16	0,20	**0,18**	0,21	0,20	**0,20**	**0,17**	**0,10**	**0,17**
b-HCH	<0,10	<0,10	**<0,10**	0,11	<0,10	**<0,11**	**<0,10**	**0,11**	**0,16**
g-HCH	0,20	0,19	**0,20**	0,19	0,16	**0,17**	**0,20**	**<0,10**	**0,14**
p,p'-DDE	0,72	0,93	**0,83**	0,98	1,11	**1,05**	**0,56**	**0,50**	**0,40**
p,p'-DDD	0,25	0,23	**0,24**	0,46	0,50	**0,48**	**<0,10**	**0,15**	**0,15**
p,p'-DDT	0,34	0,30	**0,32**	0,56	0,56	**0,56**	**<0,10**	**0,17**	**<0,10**
o,p'-DDT	0,28	0,34	**0,31**	0,46	0,45	**0,46**	**<0,10**	**0,26**	**<0,10**
transnonachlor	0,29	0,36	**0,33**	0,29	0,32	**0,30**	**0,25**	**0,35**	**0,54**
a-chlordan	0,20	0,16	**0,18**	0,23	0,16	**0,20**	**0,13**	**0,12**	**0,20**
g-chlordan	<0,10	<0,10	**<0,10**	<0,10	<0,10	**<0,10**	**<0,10**	**<0,10**	**<0,10**
oxychlordan	<0,10	<0,10	**<0,10**	<0,10	<0,10	**<0,10**	**<0,10**	**<0,10**	**<0,10**
Tox-26	0,33	0,29	**0,31**	0,38	0,37	**0,38**	**0,24**	**0,23**	**0,38**
Tox-50	0,56	0,50	**0,53**	0,65	0,76	**0,71**	**0,24**	**0,40**	**0,78**
Tox-62	0,07	0,22	**0,15**	0,22	0,20	**0,21**	**0,13**	**0,10**	**0,25**
PBDE-47	0,44	0,48	**0,46**	0,99	0,95	**0,97**	**0,71**	**0,67**	**0,18**
PBDE-99	0,18	0,16	**0,17**	0,53	0,44	**0,49**	**0,18**	**0,49**	**<0,08**
% extracted fat	0,43	0,41	**0,42**	0,44	0,48	**0,46**	**0,21**	**0,21**	**0,80**
% fat (IFL)			***0,37***				***0,075***	***0,075***	***0,54***
% dw (IFL)			***7,30***				***6,46***	***6,92***	***14,0***

*Mean of two analysis A and B. Preformed one week apart
**PCB #118, 138 and 153

Table 9 cont. Persistent organochlorines in Blue mussel (Mytulis edulis, ng/g dw) 2004.

	Mjóifj. Dalat.04	Mjóifj. Hofsá 04			Mjóifj. Head 04	Hvalfj. Hvalstod 04	Hvalfj. Hvítanes 04	Hvalfj. Eyri 04
		A	B	mean*				
PCB28	**<0,56**	<0,56	<0,56	**<0,56**	**<0,56**	**<0,56**	**<0,56**	**<0,56**
PCB31	**<0,39**	<0,39	<0,39	**<0,39**	**<0,39**	**<0,39**	**0,41**	**<0,39**
PCB52	**0,22**	0,42	0,42	**0,42**	**0,28**	**0,45**	**0,45**	**0,22**
PCB101	**0,49**	0,48	0,49	**0,49**	**0,16**	**0,86**	**0,60**	**0,60**
PCB105	**0,39**	0,16	0,22	**0,19**	**0,07**	**0,34**	**0,21**	**0,25**
PCB118	**0,70**	0,81	0,68	**0,75**	**0,25**	**0,95**	**0,59**	**0,64**
PCB138	**0,70**	1,80	1,61	**1,70**	**0,27**	**1,73**	**1,27**	**1,08**
PCB153	**0,84**	2,16	2,21	**2,18**	**0,45**	**2,08**	**1,52**	**1,30**
PCB156	**<0,08**	0,11	0,13	**0,12**	**<0,08**	**0,08**	**<0,08**	**<0,08**
PCB170	**<0,07**	<0,07	<0,07	**<0,07**	**<0,07**	**<0,07**	**<0,07**	**<0,07**
PCB180	**<0,07**	0,28	0,49	**0,38**	**0,14**	**0,16**	**0,20**	**0,08**
Σ3PCB**	**2,24**	4,77	4,50	**4,63**	**0,97**	**4,76**	**3,38**	**3,02**
HCB	**0,13**	0,18	0,19	**0,19**	**0,14**	**0,12**	**0,14**	**0,14**
a-HCH	**0,19**	0,29	0,31	**0,30**	**0,28**	**0,19**	**0,18**	**0,14**
b-HCH	**<0,10**	<0,10	<0,10	**<0,10**	**<0,10**	**<0,10**	**<0,10**	**<0,10**
g-HCH	**0,27**	0,24	0,18	**0,21**	**0,28**	**0,32**	**0,25**	**0,41**
p,p'-DDE	**0,47**	4,20	4,26	**4,23**	**0,58**	**1,02**	**0,49**	**0,47**
p,p'-DDD	**0,09**	0,71	0,67	**0,69**	**0,16**	**0,27**	**0,16**	**0,17**
p,p'-DDT	**0,26**	(0,72)	0,34	**0,34**	**0,27**	**0,20**	**0,12**	**0,21**
o,p'-DDT	**0,26**	0,59	0,63	**0,61**	**0,17**	**0,18**	**<0,10**	**0,21**
transnonachlor	**0,19**	1,71	1,57	**1,64**	**0,34**	**0,35**	**0,18**	**0,19**
a-chlordan	**0,11**	0,68	0,61	**0,65**	**0,23**	**0,21**	**0,14**	**0,12**
g-chlordan	**<0,10**	0,17	0,20	**0,19**	**<0,10**	**<0,10**	**<0,10**	**<0,10**
oxychlordan	**<0,10**	0,30	0,43	**0,37**	**<0,10**	**<0,10**	**<0,10**	**<0,10**
Tox-26	**0,22**	1,14	0,99	**1,06**	**0,40**	**0,21**	**0,17**	**0,18**
Tox-50	**0,40**	1,99	2,29	**2,14**	**0,75**	**0,30**	**0,31**	**0,36**
Tox-62	**0,17**	(1,13)	0,51	**0,51**	**0,19**	**0,15**	**<0,08**	**<0,08**
PBDE-47	**0,09**	0,56		**0,56**	**0,16**	**0,30**	**0,29**	**0,47**
PBDE-99	**<0,08**	0,20		**0,20**	**0,09**	**0,15**	**0,10**	**0,19**
% extracted fat	**0,28**	0,89		**0,89**	**0,71**	**0,53**	**0,29**	**0,29**
% fat (IFL)	***0,23***			***0,94***	***0,74***	***0,23***	***0,10***	***0,16***
% dw (IFL)	***8,17***			***13,4***	***12,1***	***10,6***	***8,31***	***8,83***

*Mean of two analysis A and B. Preformed one week apart
**PCB #118, 138 and 153

Table 10. Persistent organochlorines in cod liver from 2005 (ng/g ww).

	COD N-NW(2) H1	COD N-NW(2) H2 A	COD N-NW(2) H2 B	COD N-NW(2) H2*	COD N-NW(2) H3	COD N-NW(2) H4	COD N-NW(2) H5
PCB28	1,8	1,7	2,1	1,9	2,2	2,0	2,1
PCB31	0,70	0,83	1,0	0,94	1,0	1,0	1,0
PCB52	5,9	5,5	6,1	5,8	7,0	5,6	5,8
PCB101	8,4	7,2	7,9	7,6	8,1	5,8	10,2
PCB105	3,7	2,2	2,6	2,4	2,8	1,9	3,1
PCB118	11,8	7,5	8,3	7,9	8,9	6,3	9,9
PCB138	17,9	12,7	14,0	13,4	15,3	10,3	18,3
PCB153	32,9	19,8	21,7	20,7	24,0	15,9	25,5
PCB156	1,2	0,41	0,74	0,58	0,70	0,5	0,80
PCB170	2,2	1,7	1,8	1,7	1,9	1,1	2,2
PCB180	7,8	4,0	5,0	4,5	5,4	3,2	6,1
Σ7PCB**	86,4	58,4	65,0	61,7	70,8	49,1	78,1
HCB	13,9	18,4	20,9	19,6	21,2	19,5	21,4
a-HCH	1,2	2,7	2,7	2,7	2,6	2,4	4,2
b-HCH	0,41	0,63	0,66	0,65	0,61	0,57	0,93
g-HCH	0,39	0,79	0,84	0,82	0,87	0,73	1,35
p,p'-DDE	55,5	42,2	51,7	46,9	50,1	30,3	70,0
p,p'-DDD	19,0	15,7	16,9	16,3	18,2	14,5	24,4
p,p'-DDT	5,2	8,9	7,9	8,4	7,4	6,8	14,6
o,p'-DDT	10,0	15,0	14,0	14,5	14,7	12,4	22,9
ΣDDT	89,6	81,8	90,5	86,2	90,3	63,9	132
transnonachlor	30,2	22,5	25,6	24,0	26,8	20,2	33,4
a-chlordan	19,1	20,2	21,5	20,8	23,1	19,7	28,9
g-chlordan	5,5	6,6	6,7	6,6	7,1	6,0	8,3
oxychlordan	5,4	4,4	5,1	4,8	5,5	4,2	5,2
ΣCHL	60,1	53,7	58,8	56,3	62,5	50,1	75,8
Tox-26	22,6	23,4	25,2	24,3	25,5	22,2	31,0
Tox-50	34,9	43,3	44,7	44,0	45,4	41,0	64,1
Tox-62	11,3	22,0	17,8	19,9	16,4	17,2	31,6
% extracted fat	29,3	50,7	56,3	53,5	56,2	53,5	73,7

* Mean of two different analysis performed on week apart.
**PCB #28,52,101,118,138,153,180

Table 10 cont. Persistent organochlorines in cod liver from 2005 (ng/g ww).

	COD N-NW(1) H1	COD N-NW(1) H2	COD N-NW(1) H3 A	COD N-NW(1) H3 B	COD N-NW(1) H3*	COD N-NW(1) H4	COD N-NW(1) H5	COD N-NW(1) H6
PCB28	1,5	1,4	1,4	1,5	1,4	1,8	1,5	1,8
PCB31	0,47	0,53	0,53	0,67	0,60	0,76	0,55	0,91
PCB52	4,8	4,2	3,9	4,2	4,1	5,6	4,6	6,0
PCB101	7,8	6,5	6,8	7,6	7,2	7,9	6,8	6,4
PCB105	3,6	3,0	3,3	3,3	3,3	3,5	3,5	2,1
PCB118	10,5	8,4	8,9	10,0	9,5	9,2	9,8	7,2
PCB138	14,9	11,5	12,9	15,8	14,3	14,3	14,4	12,6
PCB153	25,7	20,6	24,3	27,1	25,7	23,6	25,8	19,6
PCB156	0,92	0,67	0,73	0,96	0,85	0,92	1,1	0,42
PCB170	2,1	1,6	2,0	2,3	2,1	2,1	2,5	1,5
PCB180	5,8	4,8	5,3	6,6	5,9	5,7	6,3	3,8
Σ7PCB**	71,0	57,3	63,4	72,9	68,1	68,2	69,2	57,4
HCB	9,9	13,2	12,8	13,6	13,2	17,2	14,6	19,4
a-HCH	1,2	2,1	1,9	2,0	2,0	2,3	2,2	2,3
b-HCH	0,38	0,56	0,54	0,50	0,52	0,59	0,55	0,61
g-HCH	0,45	0,71	0,65	0,67	0,66	0,74	0,83	0,69
p,p'-DDE	45,3	33,6	32,1	36,5	34,3	41,5	39,4	33,2
p,p'-DDD	15,2	12,0	9,9	11,5	10,7	14,4	13,1	16,2
p,p'-DDT	7,2	7,0	3,9	5,7	4,8	6,5	6,4	8,6
o,p'-DDT	11,2	11,9	6,7	8,0	7,4	12,2	9,7	16,4
ΣDDT	78,8	64,5	52,6	61,7	57,2	74,6	68,5	74,4
transnonachlor	25,9	20,5	20,2	21,8	21,0	25,0	24,1	20,8
a-chlordan	16,8	15,5	13,5	14,4	13,9	18,6	16,0	19,7
g-chlordan	4,6	4,6	3,9	4,1	4,0	5,6	4,6	7,3
oxychlordan	4,1	3,7	3,7	4,1	3,9	4,8	4,8	4,4
ΣCHL	51,4	44,3	41,3	44,4	42,9	53,9	49,4	52,2
Tox-26	20,3	18,1	15,8	18,3	17,0	22,4	19,2	24,2
Tox-50	30,3	28,6	25,6	31,8	28,7	37,5	31,4	42,9
Tox-62	8,1	9,4	8,4	13,3	10,9	13,5	9,2	19,8
% extracted fat	26,5	40,8	38,3	40,3	39,3	45,9	44,8	47,6

* Mean of two different analysis performed on week apart.
**PCB #28,52,101,118,138,153,180

Table 10 cont. Persistent organochlorines in cod liver from 2005 (ng/g ww).

	COD NE H1	COD NE H2	COD NE H3 A	COD NE H3 B	COD NE H3*	COD NE H4	COD NE H5
PCB28	2,0	2,2	2,1	2,1	2,1	2,2	1,9
PCB31	0,65	0,62	0,78	0,80	0,79	0,74	0,68
PCB52	7,8	8,6	6,9	7,5	7,2	7,6	6,7
PCB101	12,5	12,1	8,8	9,6	9,2	9,4	8,5
PCB105	3,6	3,4	3,2	2,9	3,1	2,5	2,1
PCB118	13,4	12,1	7,7	10,1	8,9	8,7	7,6
PCB138	26,8	20,9	13,6	15,5	14,5	14,3	11,9
PCB153	44,7	31,0	20,6	23,7	22,1	20,7	17,6
PCB156	0,80	0,65	0,84	0,54	0,69	0,40	0,29
PCB170	4,8	2,8	2,0	2,1	2,0	1,7	1,5
PCB180	14,1	8,1	4,9	4,6	4,7	3,9	2,8
Σ7PCB**	122	95,0	64,5	73,0	68,7	66,8	56,9
HCB	17,9	21,1	20,1	21,1	20,6	21,8	21,4
a-HCH	3,0	3,4	3,9	3,9	3,9	4,4	4,2
b-HCH	0,70	0,82	0,86	0,90	0,88	0,97	0,92
g-HCH	0,99	1,2	1,3	1,3	1,3	1,5	1,4
p,p'-DDE	85,6	58,3	40,9	43,9	42,4	41,8	34,8
p,p'-DDD	20,4	22,3	17,2	19,7	18,5	19,7	17,5
p,p'-DDT	6,9	11,4	7,0	8,8	7,9	9,3	7,8
o,p'-DDT	12,5	24,2	18,9	18,6	18,7	22,3	20,0
ΣDDT	125	116	84,0	90,9	87,5	93,0	80,0
transnonachlor	32,3	33,5	25,1	27,6	26,4	26,4	22,8
a-chlordan	23,2	27,6	22,3	24,5	23,4	25,9	23,5
g-chlordan	7,4	8,6	7,0	8,1	7,6	8,6	8,1
oxychlordan	5,6	5,7	4,7	5,0	4,8	4,4	4,2
ΣCHL	68,4	75,5	59,2	65,2	62,2	65,3	58,6
Tox-26	28,7	31,7	25,0	28,6	26,8	28,1	25,0
Tox-50	46,9	55,8	45,2	51,0	48,1	48,5	46,5
Tox-62	15,6	23,2	19,3	23,8	21,6	21,7	21,3
% extracted fat	47,7	52,4	57,1	57,9	57,5	62,9	62,2

* Mean of two different analysis performed on week apart.
**PCB #28,52,101,118,138,153,180

Appendix VI.

Graphs of biological variation in Cod (*Gadus morhua*) 1990-2005

Biological variation in 30-45 cm Cod (Gadus morhua) from Icelandic waters in March 1990-2005

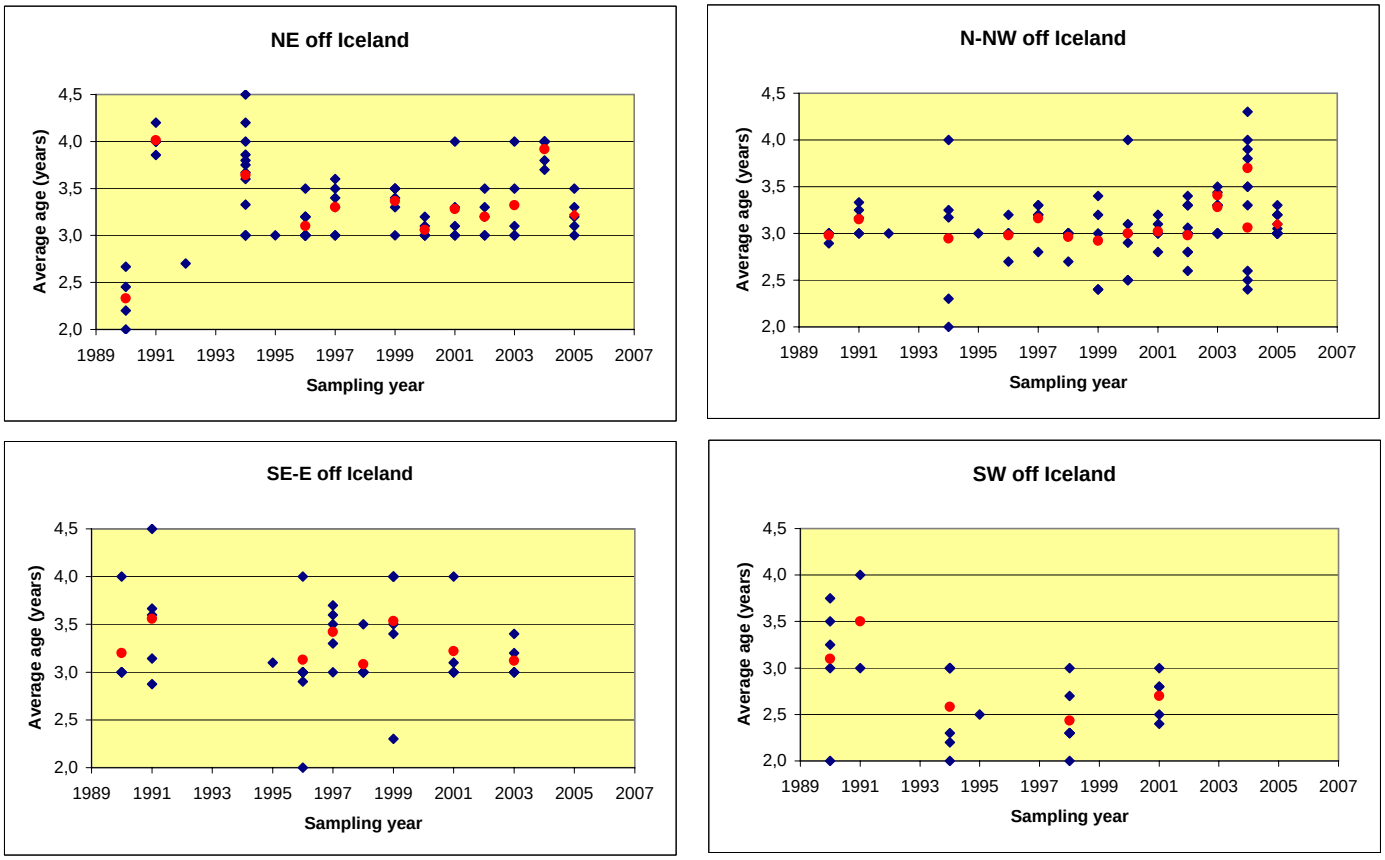


Figure 2a. Average age in 30-45 cm Cod (Gadus morhua) from Icelandic waters in March 1990-2005.The red dots represent the average values.

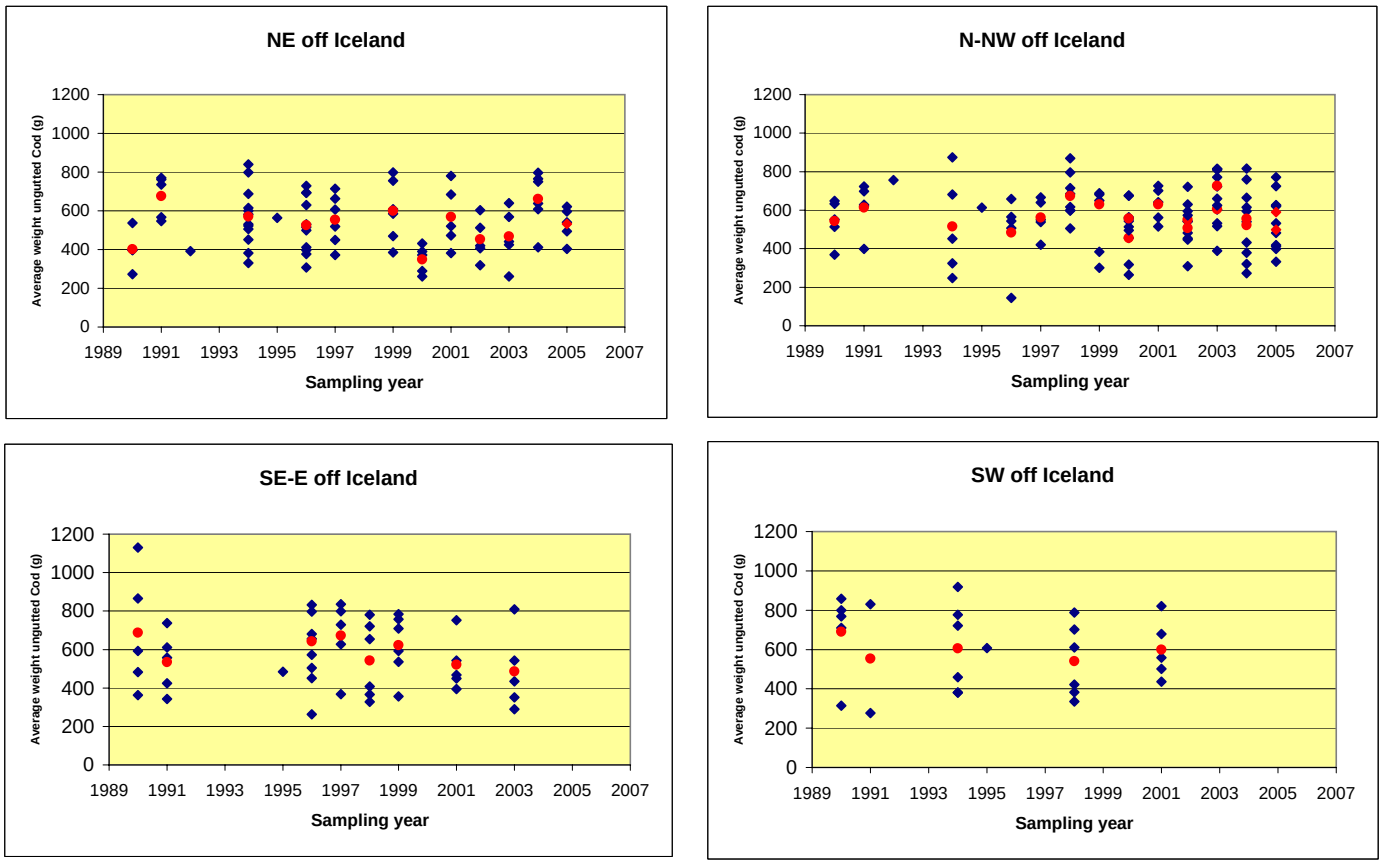


Figure 2b. Average weight ungutted Cod (Gadus morhua), 30-45 cm, from Icelandic waters in March 1990-2005.The red dots represent the average values.

Biological variation in 30-45 cm Cod (Gadus morhua) from Icelandic waters in March 1990-2005

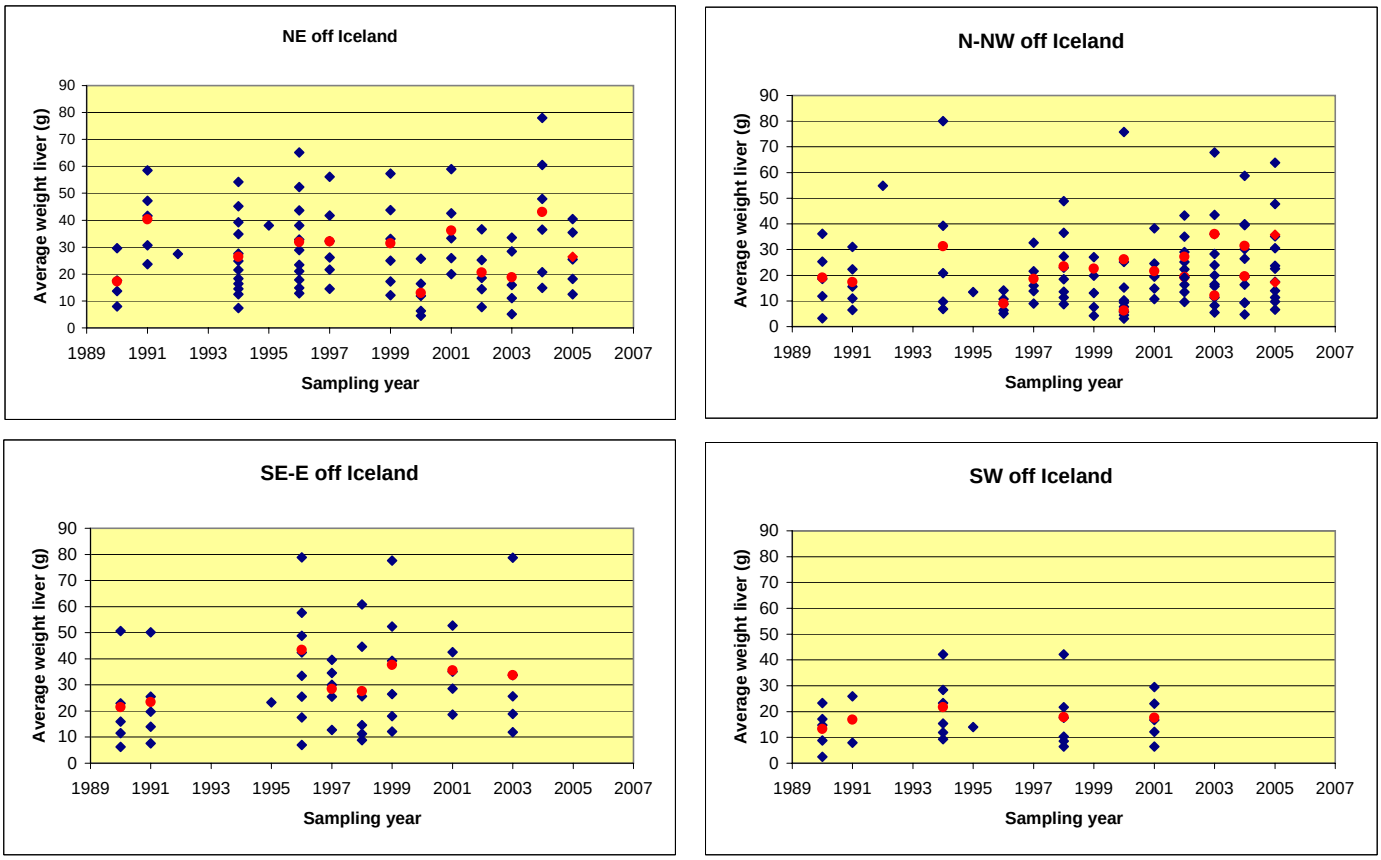


Figure 2c. Average weight liver of Cod (Gadus morhua), 30-45 cm, from Icelandic waters in March 1990-2005.The red dots represent the average values.

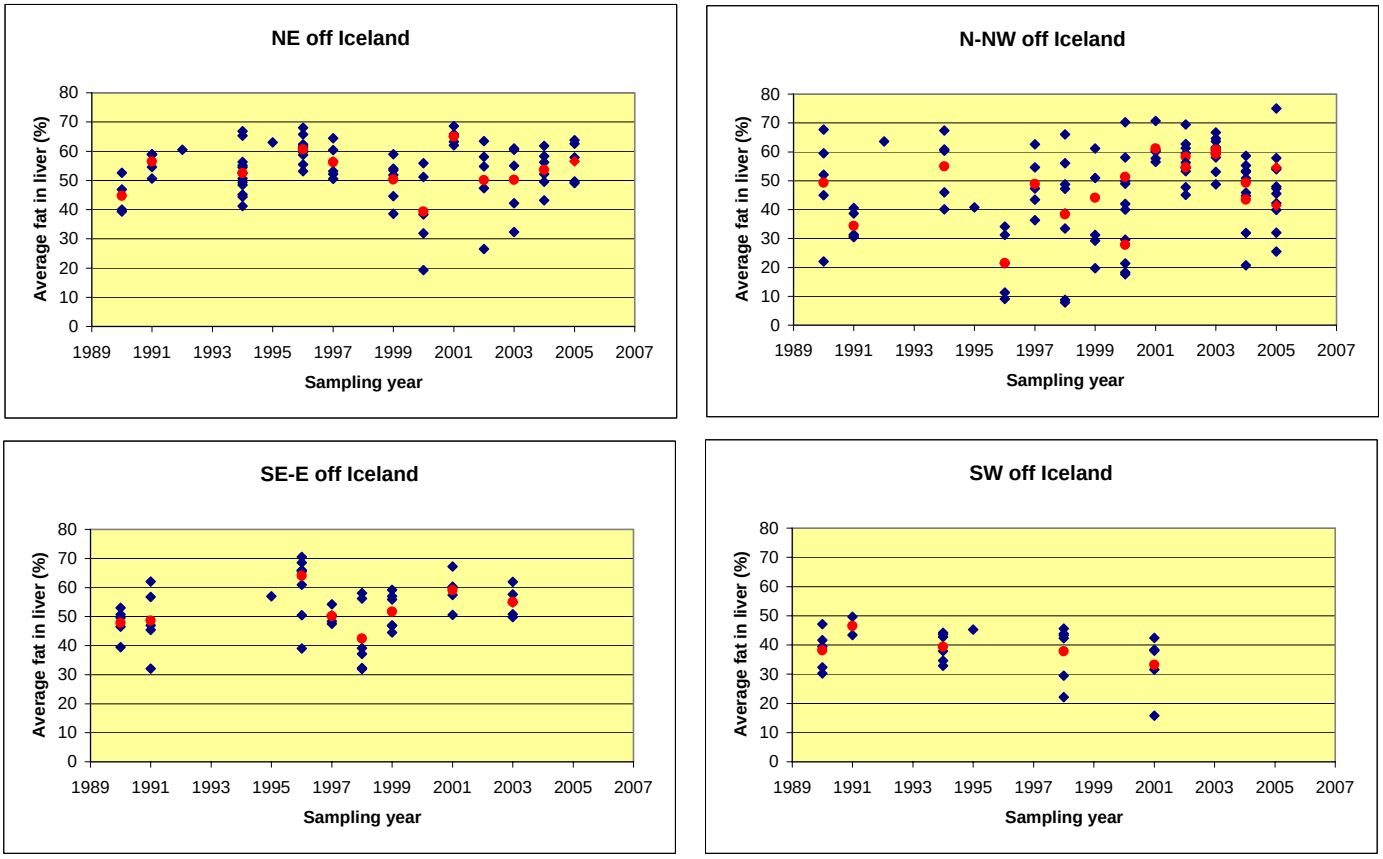


Figure 2d. Average fat (%) in liver of Cod (Gadus morhua), 30-45 cm, from Icelandic waters in March 1990-2005.The red dots represent the average values.

Appendix VII.

Graphs of metals and organic compounds in Blue mussel (*Mytilus edulis*) 1990-2004

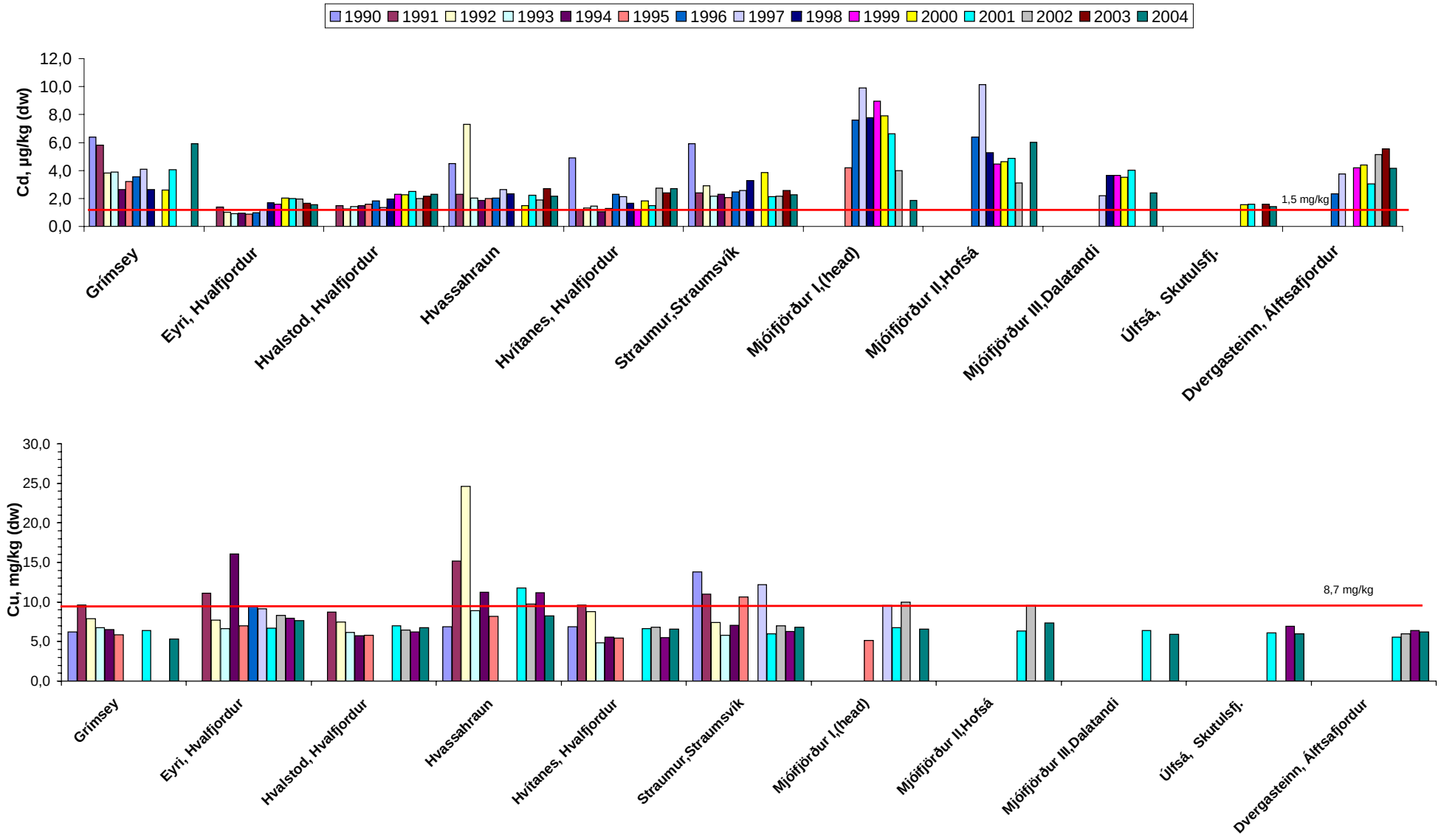
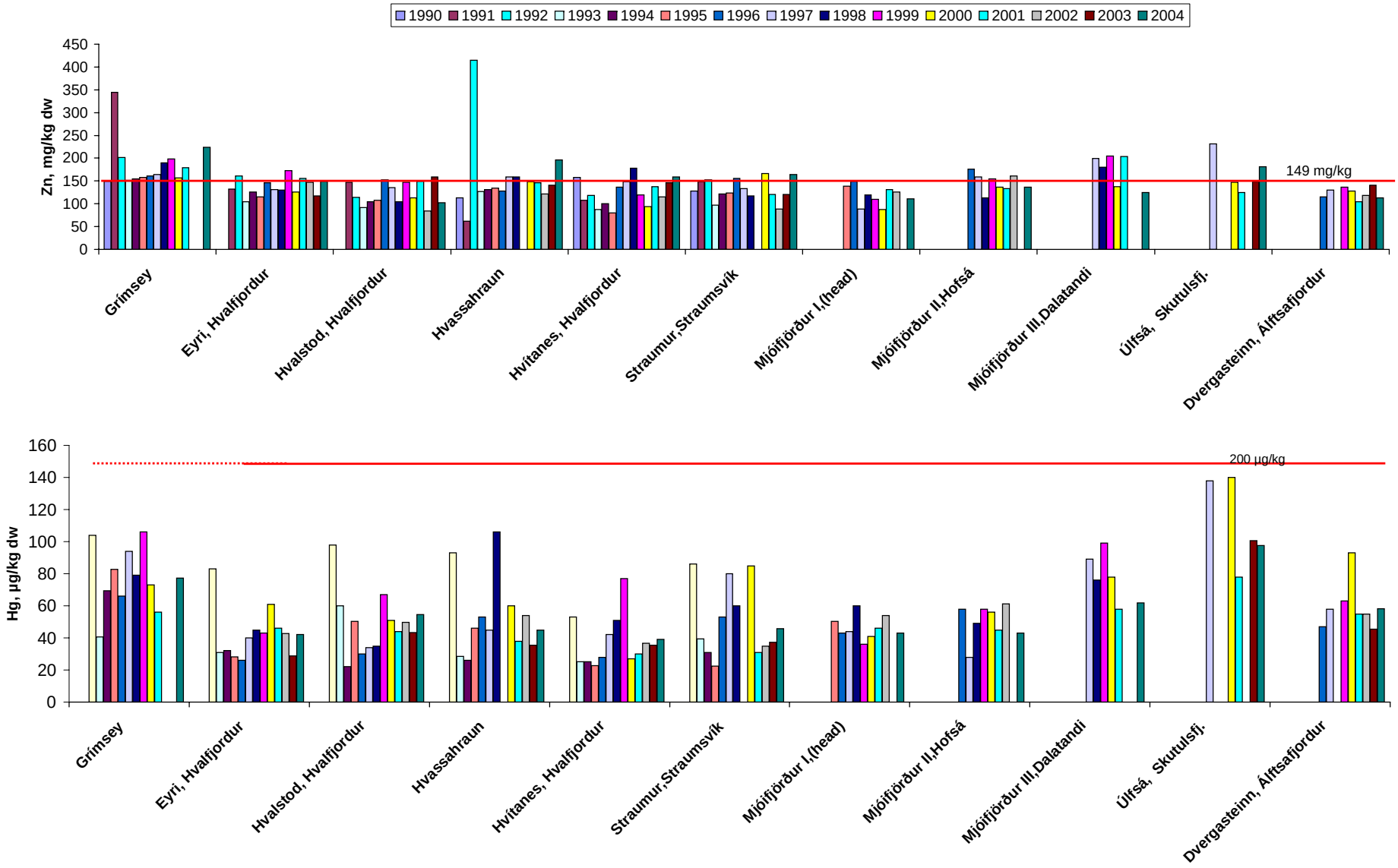


Figure 3a. Cadmium and copper concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1990-2004. Red line indicates ICES 90 75% baseline (11).



). *Zinc and mercury concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1990-2004. Red line indicates ICES 90 75% baseline (11)*

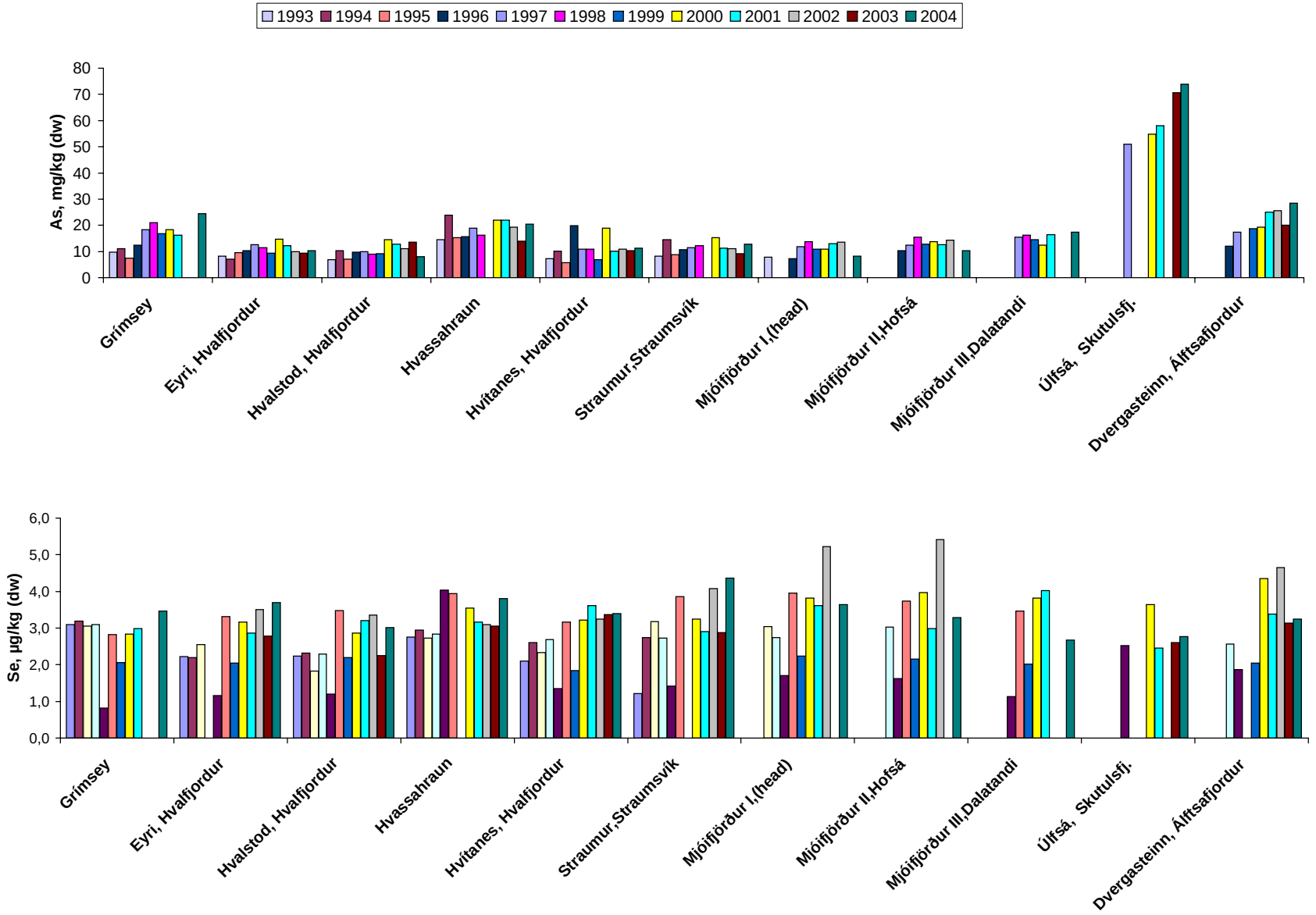


Figure 3c. Arsen and selenium concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1990-2004.

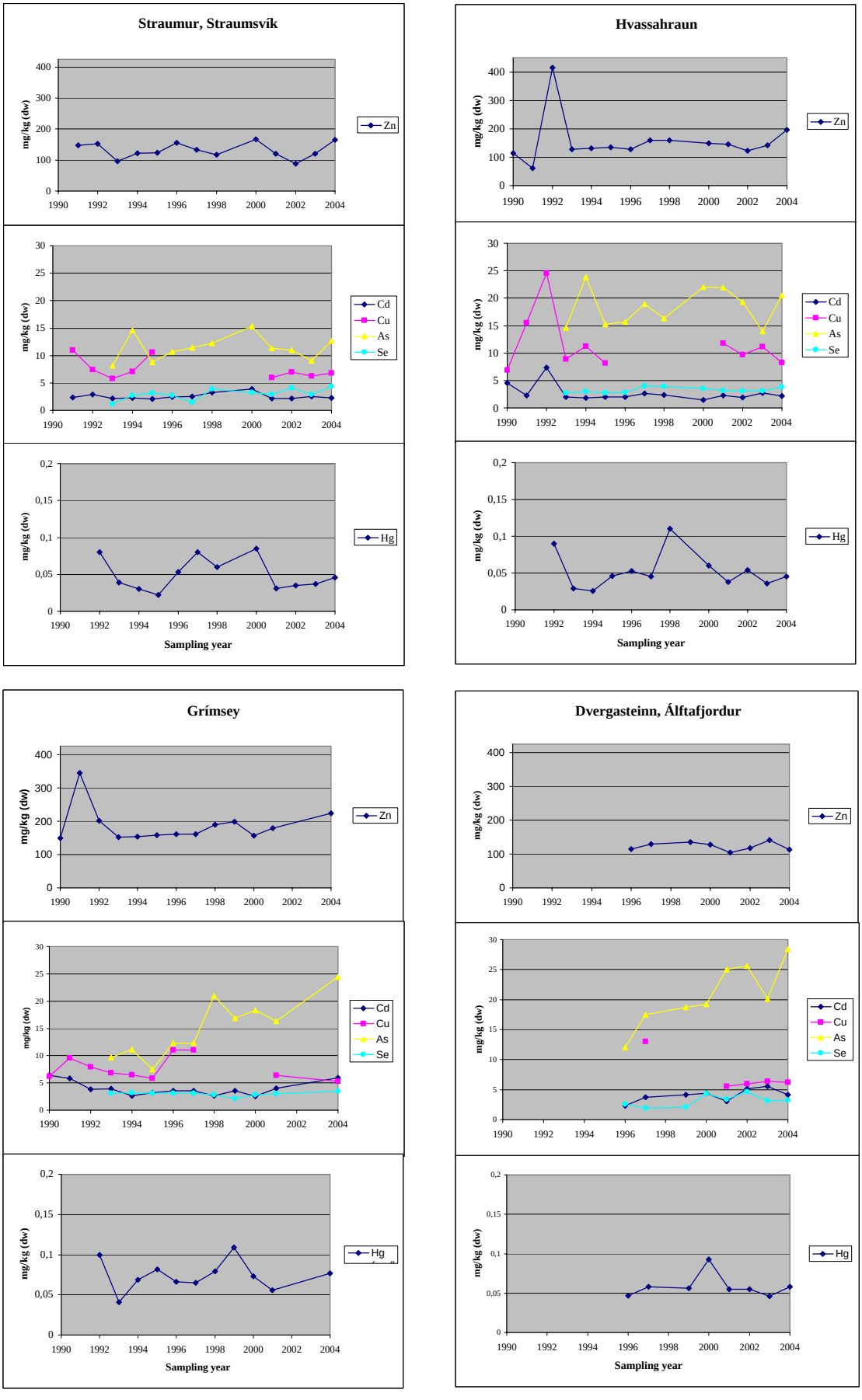


Figure 4a. Concentration of heavy metals (dry weight) in Blue mussel from different sampling sites around Iceland, 1991-2004.

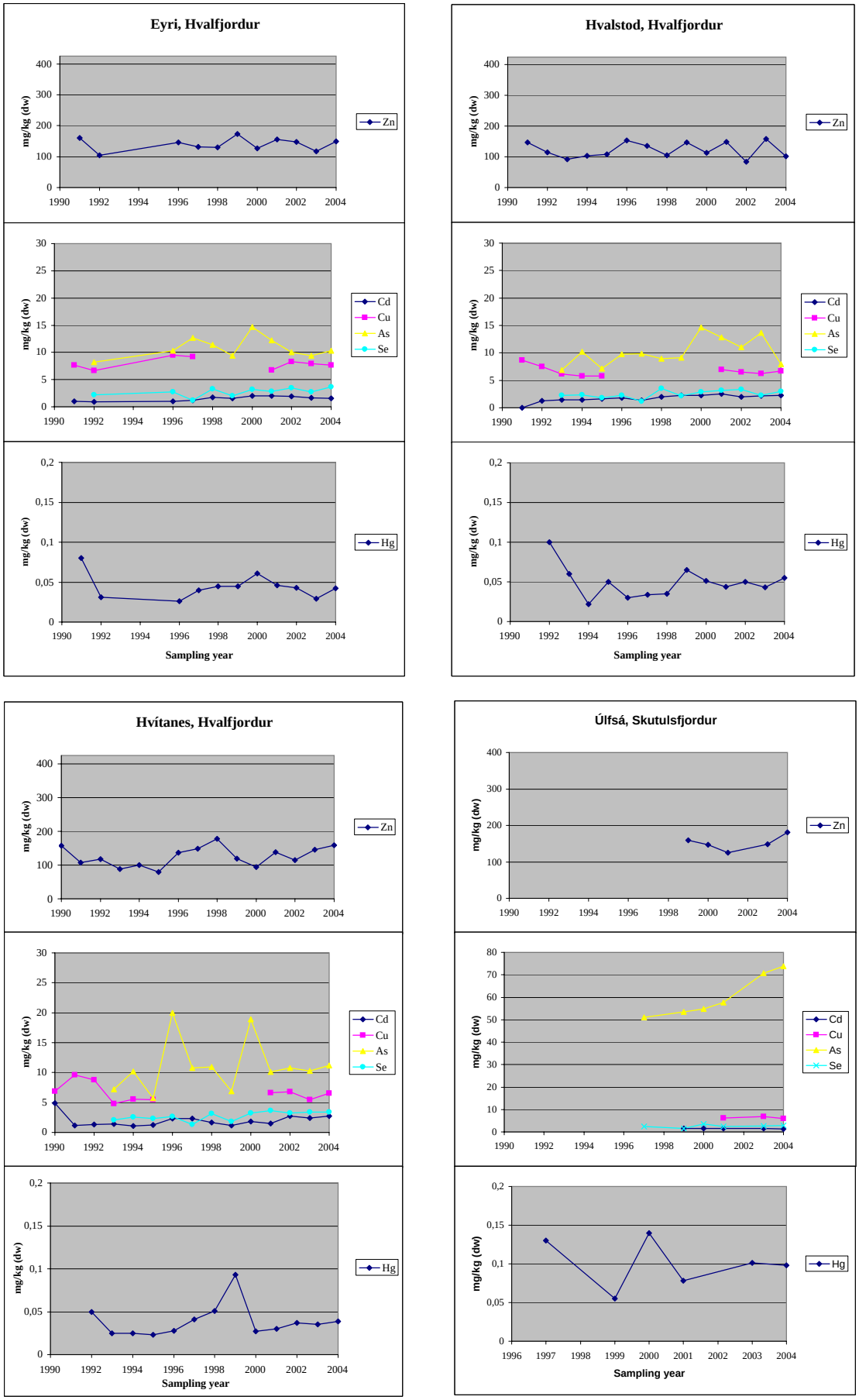


Figure 4b. Concentration of heavy metals (dry weight) in blue mussel from different sampling sites around Iceland, 1991-2004.

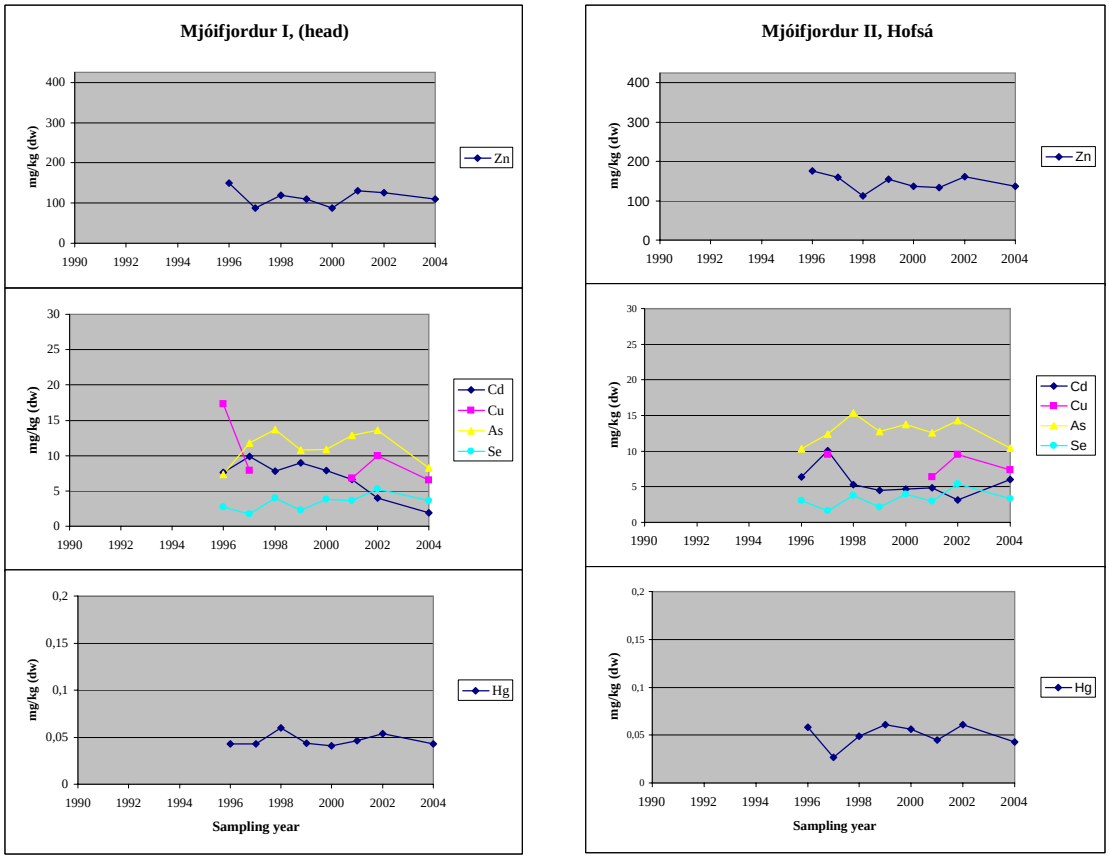


Figure 4c. Concentration of heavy metals (dry weight) in blue mussel from different sampling sites around Iceland, 1991-2004.

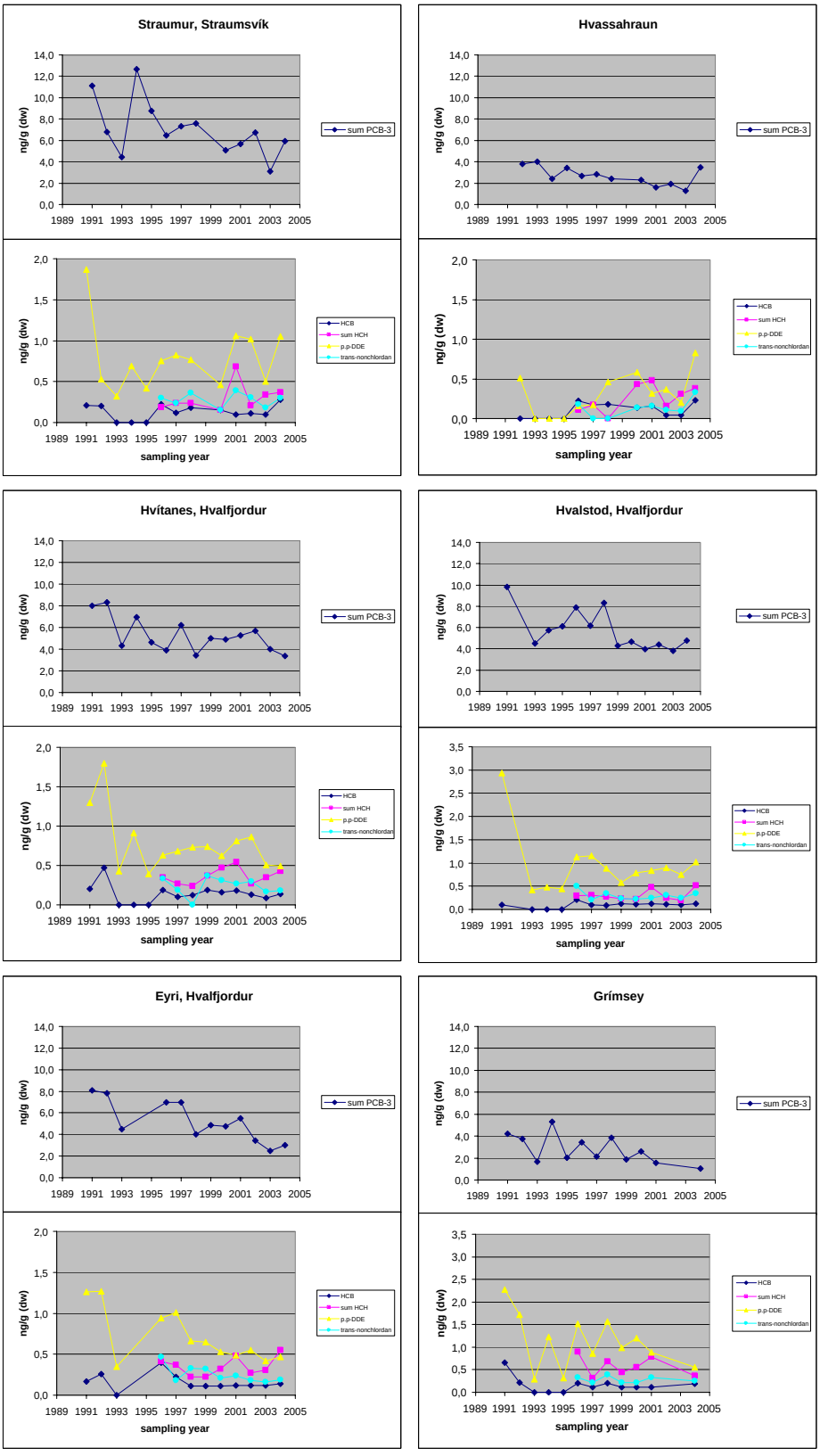


Figure 5a. Concentration of organochlorine compounds (dw) in Blue mussel (Mytilus edulis) at different locations 1991-2004.

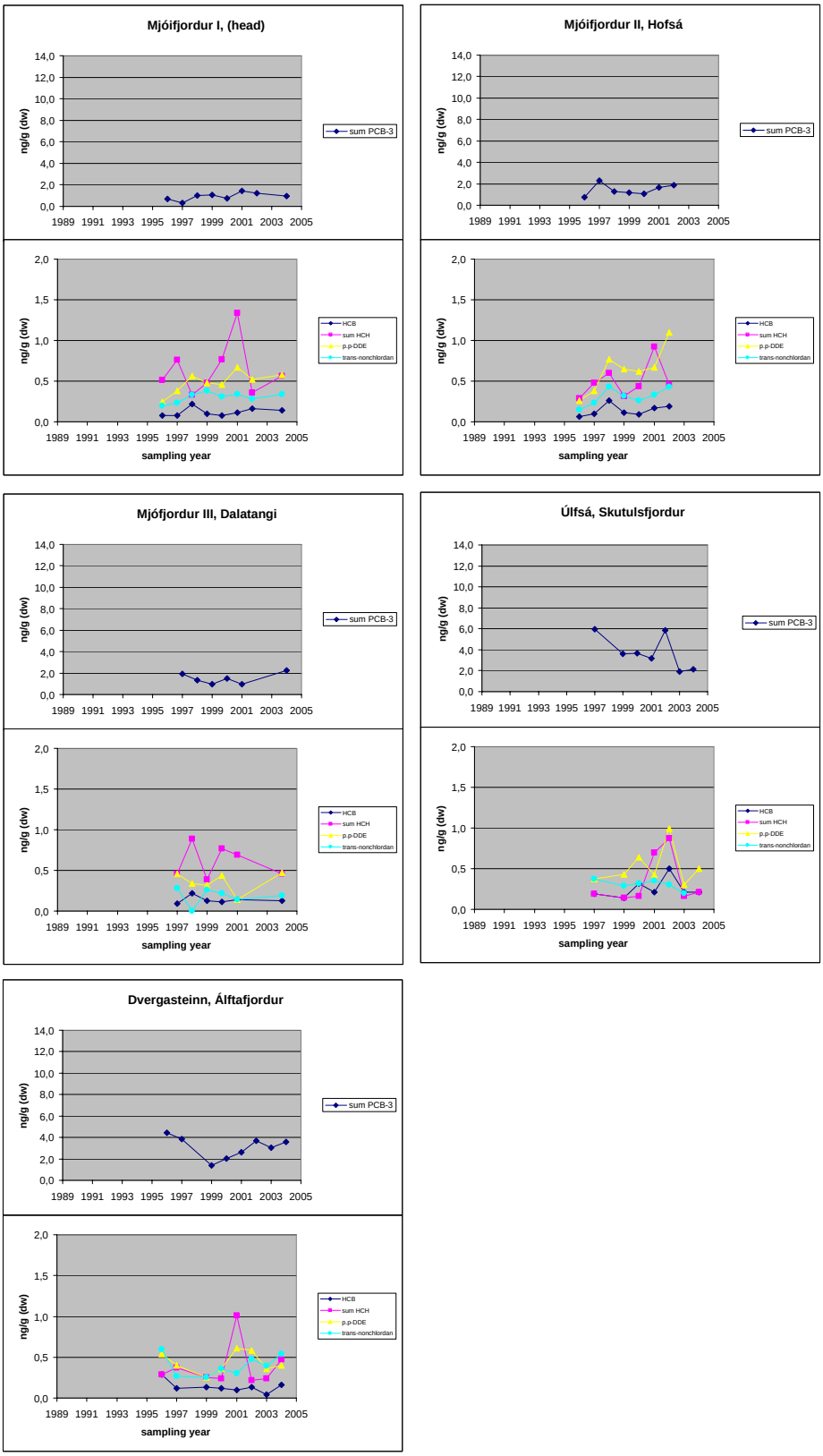


Figure 5b. Concentration of organochlorine compounds (dw) in Blue mussel (Mytilus edulis) at different locations 1991-2004.

Appendix VIII.

Graphs of metals and organic compounds in Cod (*Gadus morhua*) 1990-2005

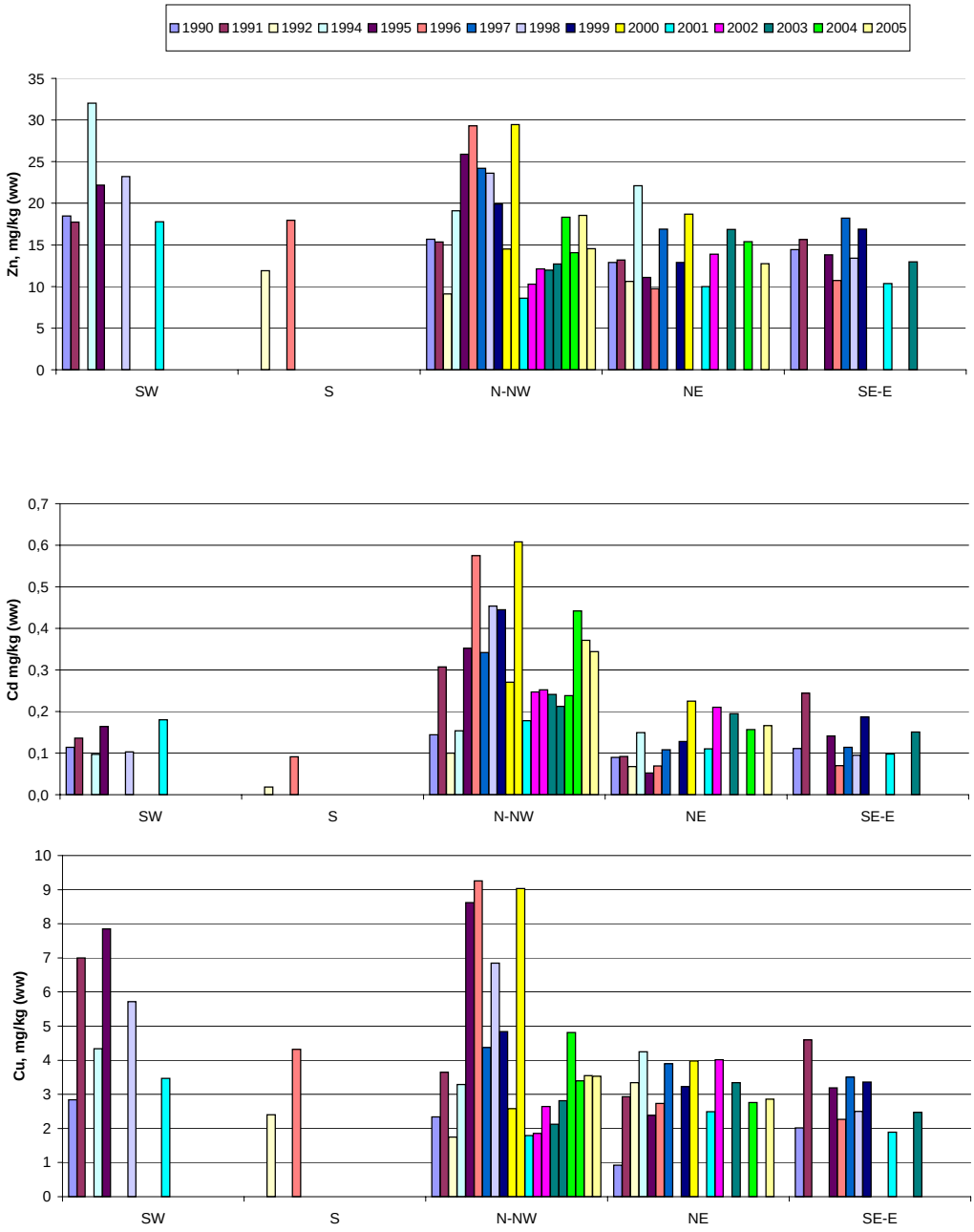


Figure 6a. Heavy metal consentration (ww) in livers of 30-45cm cod (Gadus morhua) from Icelandic waters in March 1990-2005.

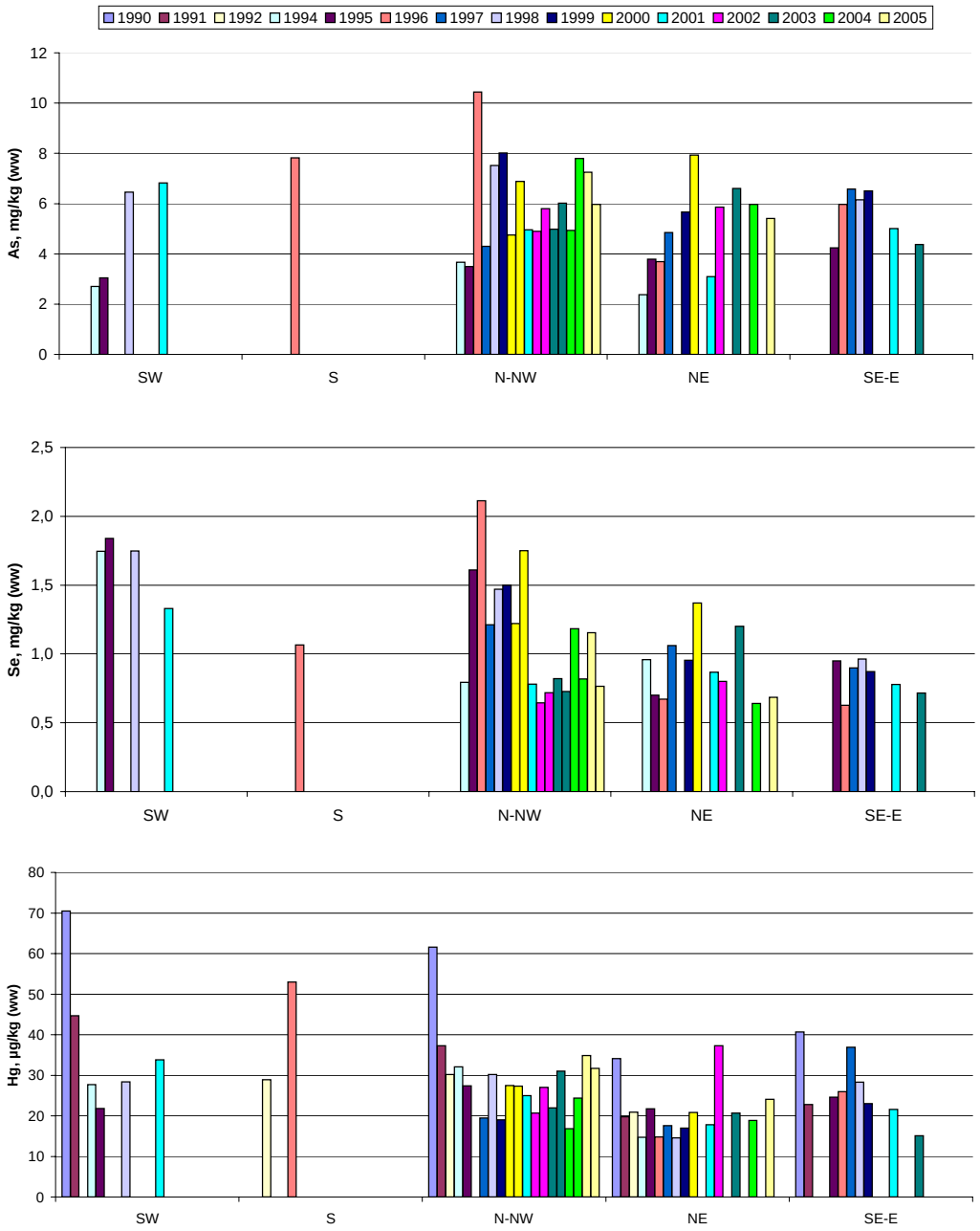


Figure 6b. Heavy metal consentration (ww) in livers of 30-45cm cod (Gadus morhua) from Icelandic waters in March 1990-2005. Mercury (Hg) was analysed in the flesh

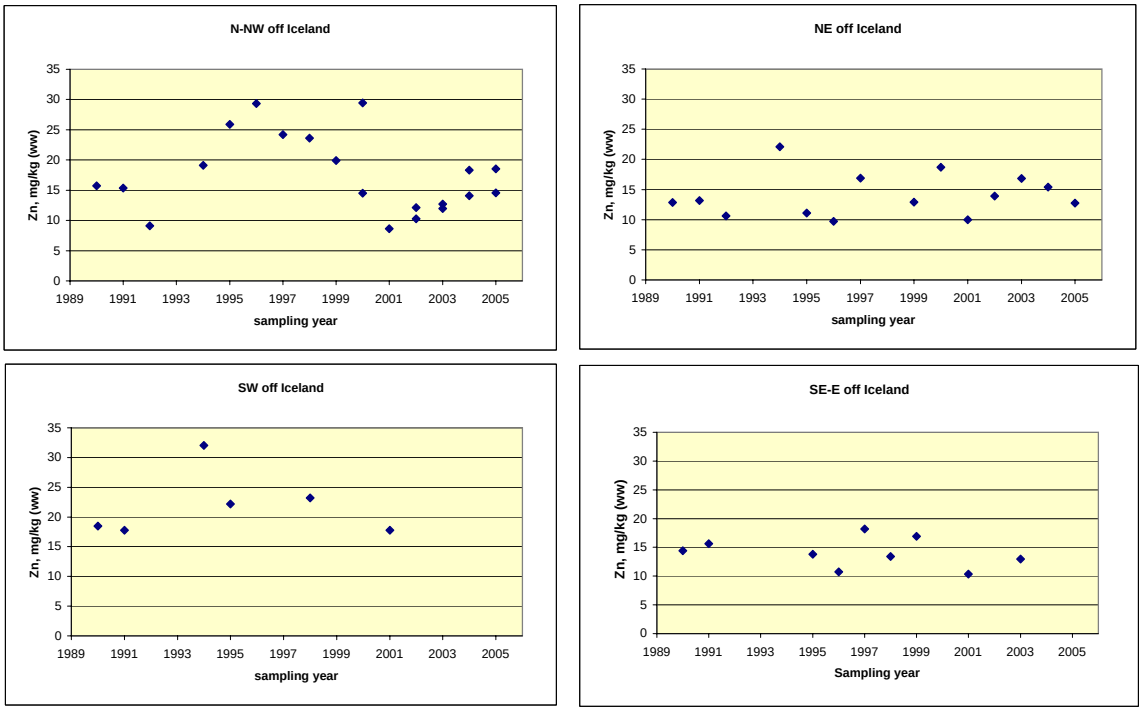


Figure 7a. Average concentration of Zinc (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2005.

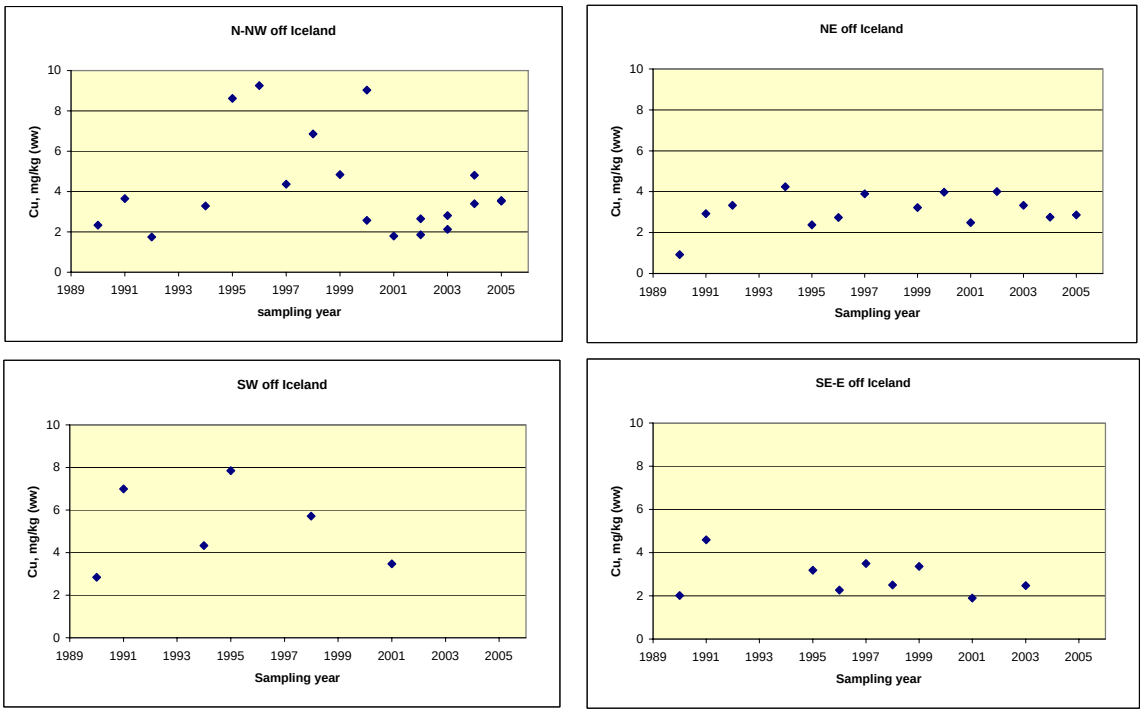


Figure 7b. Average concentration of Copper (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2005.

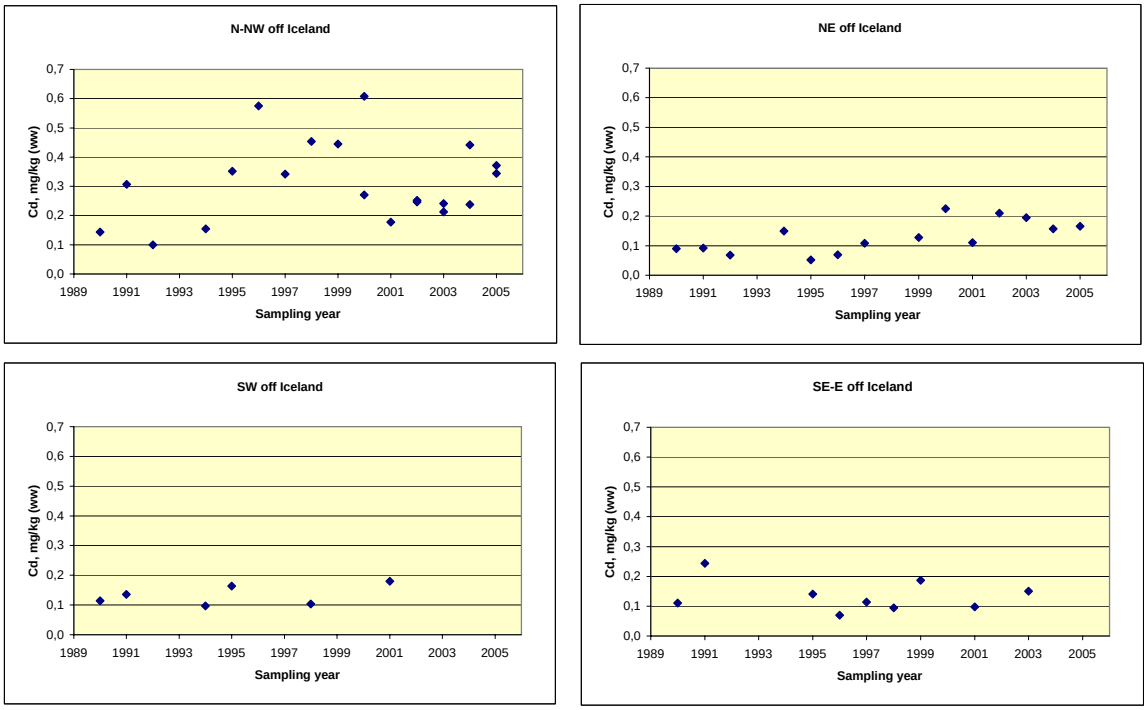


Figure 7c. Average concentration of Cadmium (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2005.

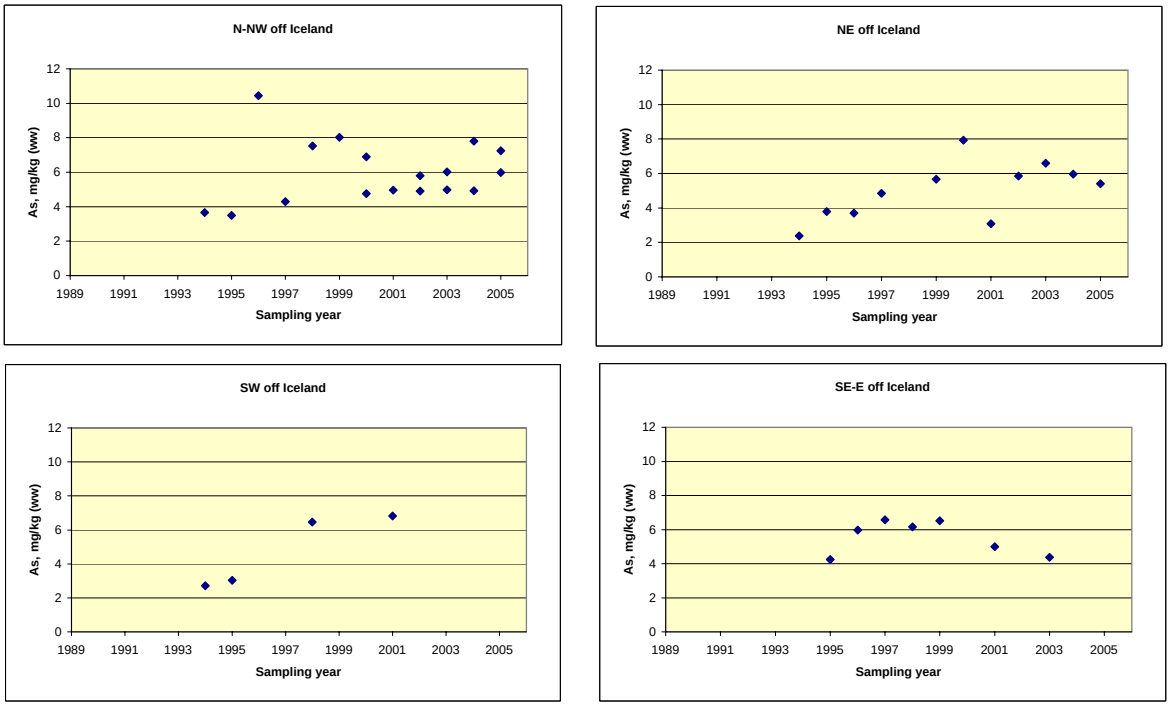


Figure 7d. Average concentration of Arsenic (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2005.

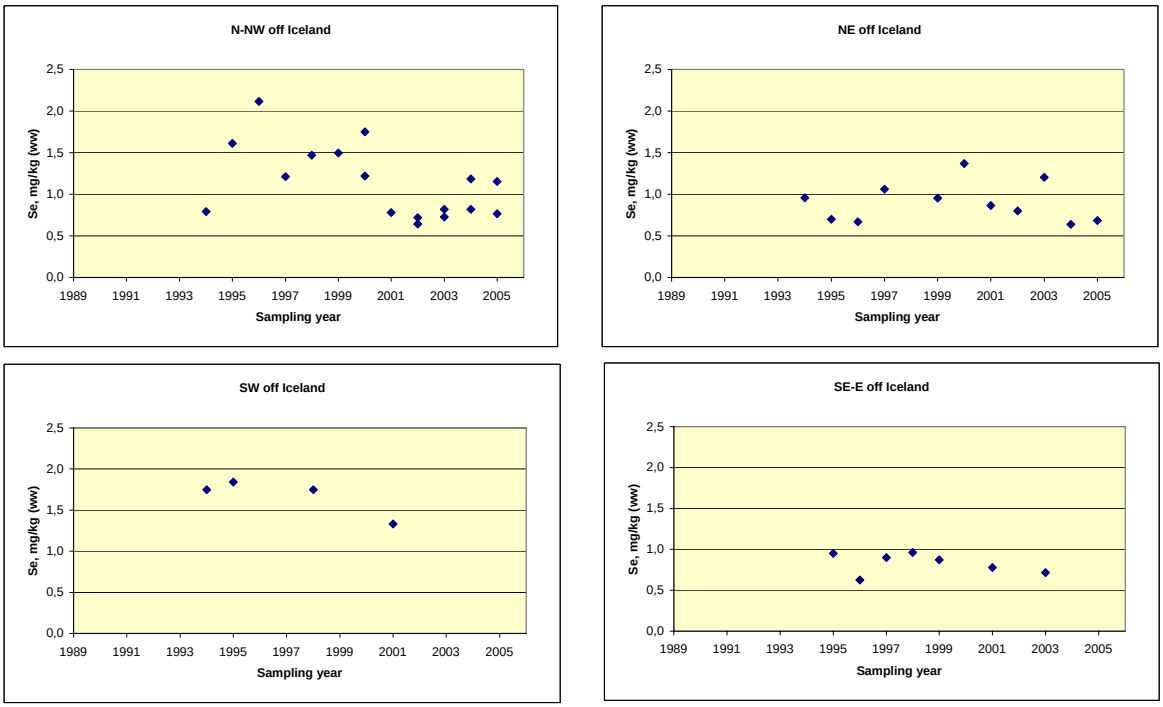


Figure 7e. Average concentration of Selenium (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2005.

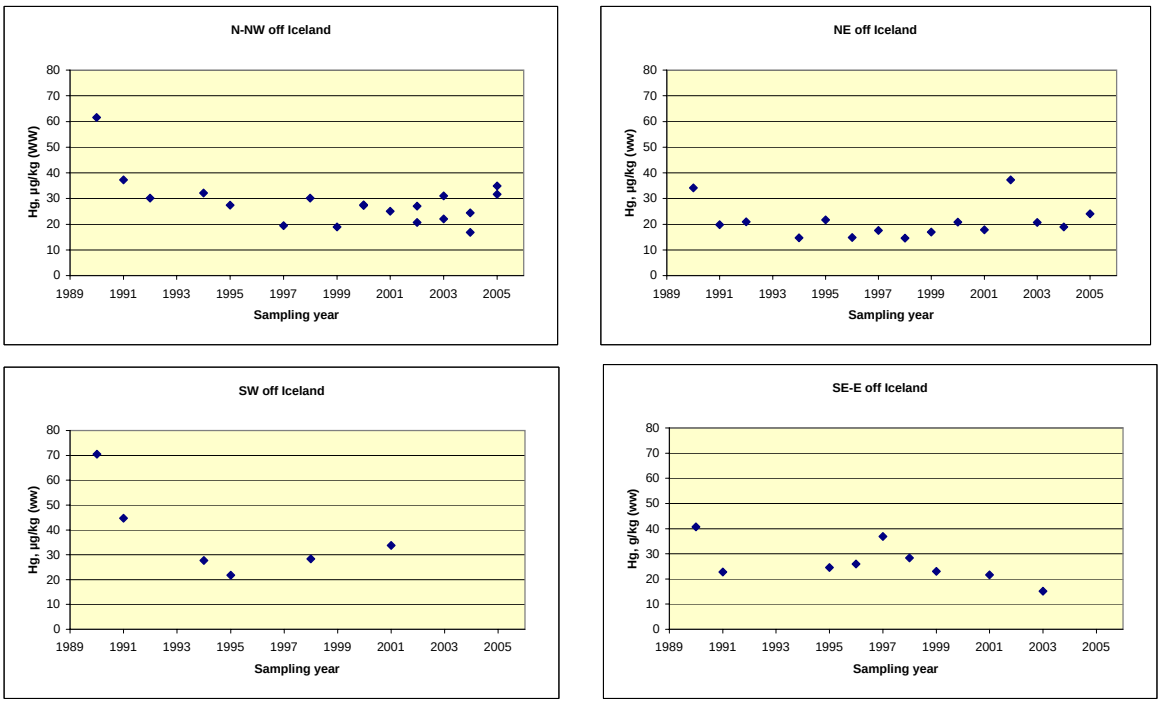
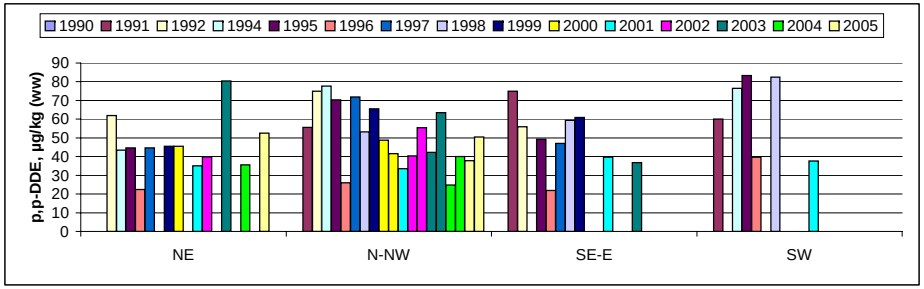
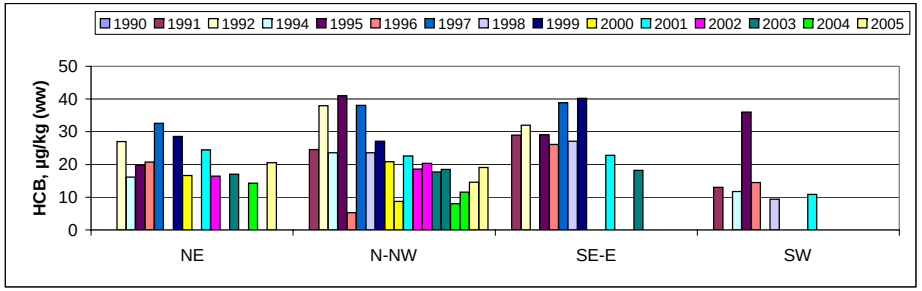
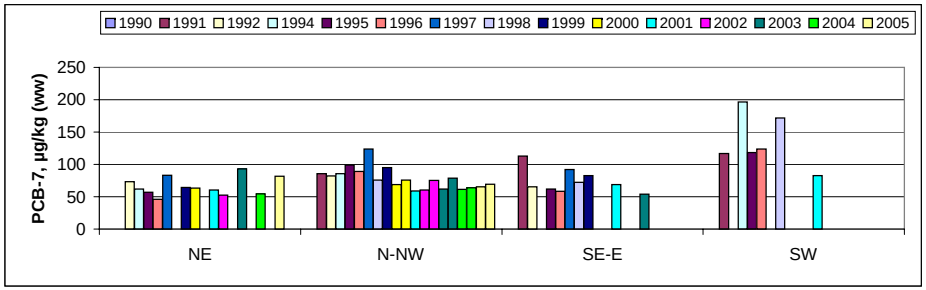
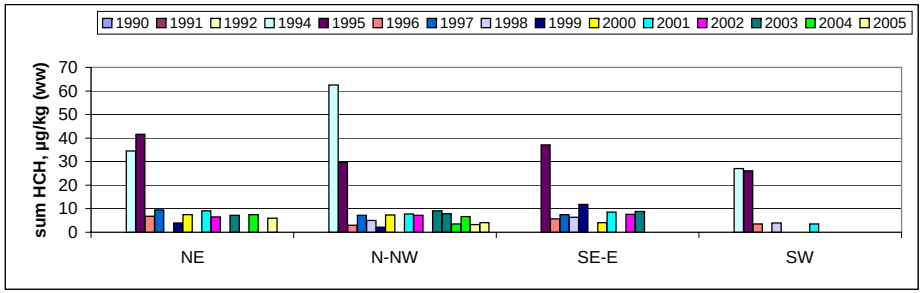


Figure 7f. Average concentration of Mercury (ww) in flesh of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2005.









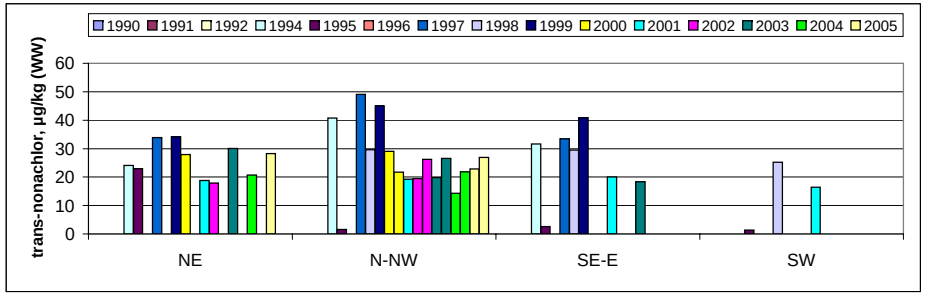


Figure 8. Average concentration of organochlorine compounds (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2005.

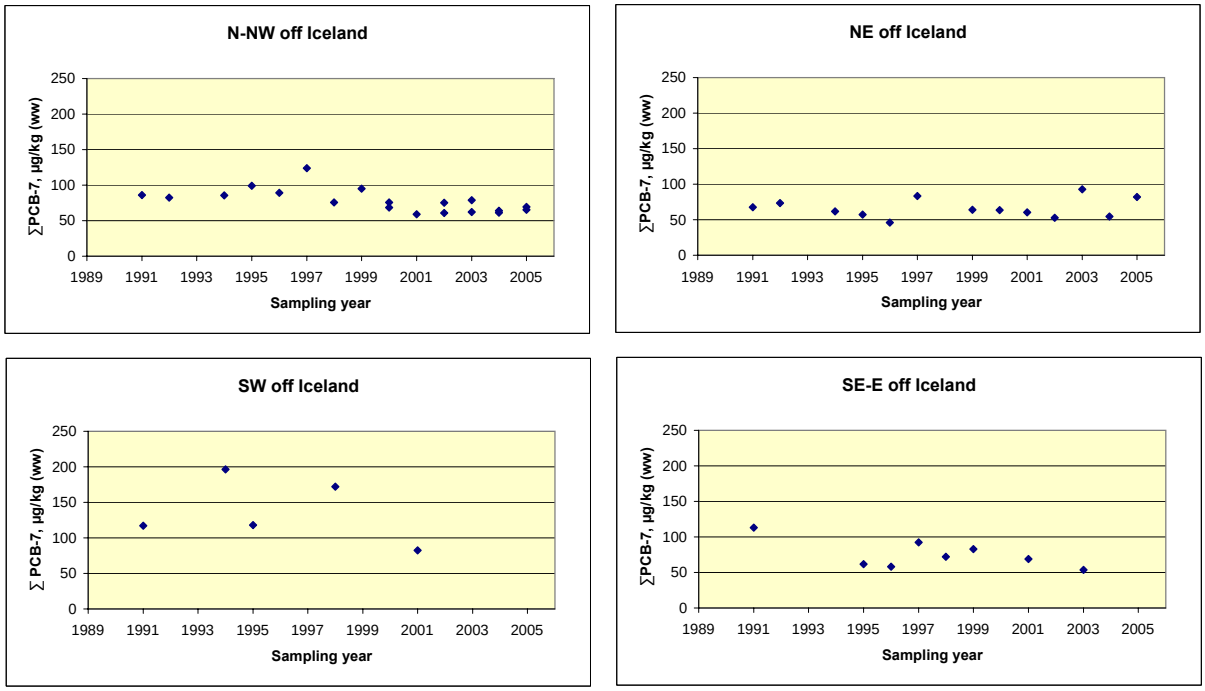


Figure 9a. Average concentration of ∑PCB-7 (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2005.

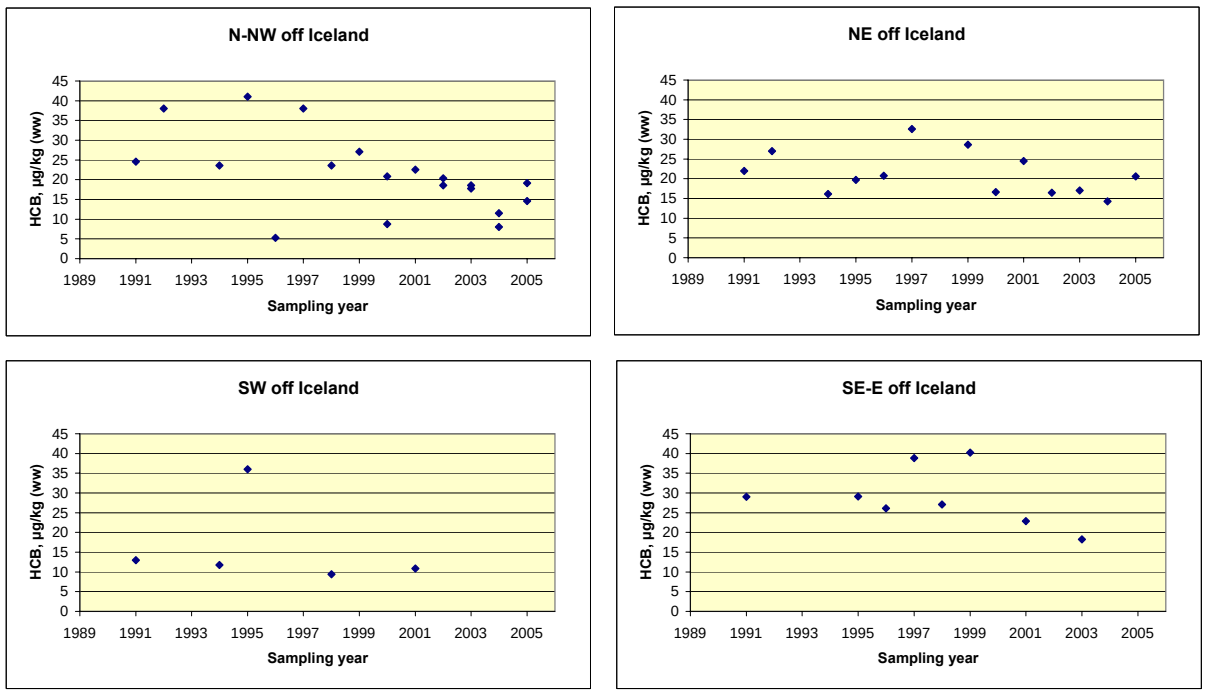


Figure 9b. Average concentration of HCB (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2005.

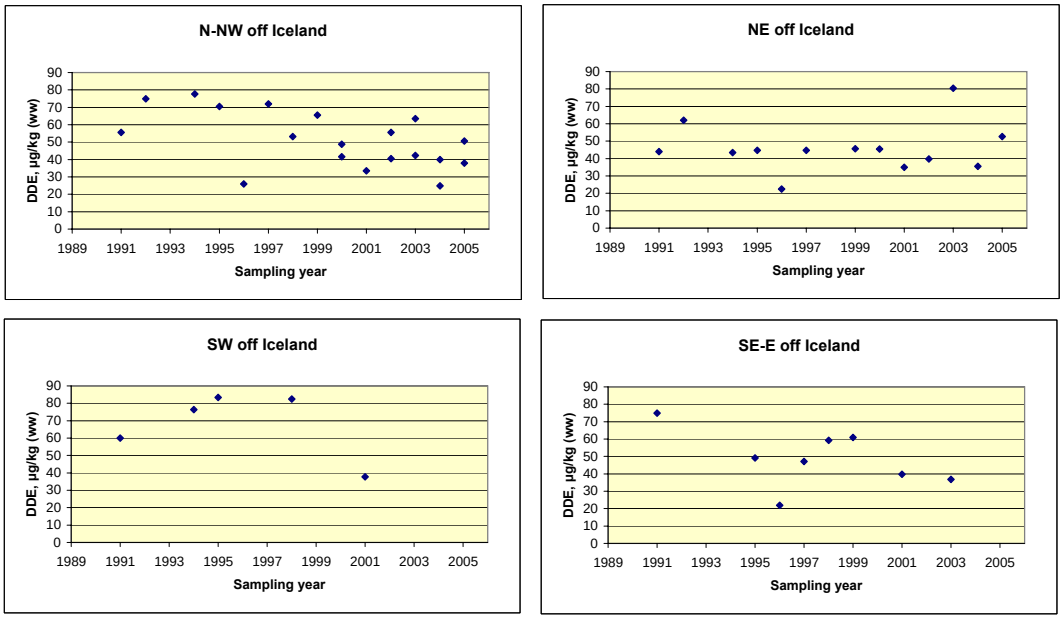


Figure 9c. Average concentration of DDE (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2005.

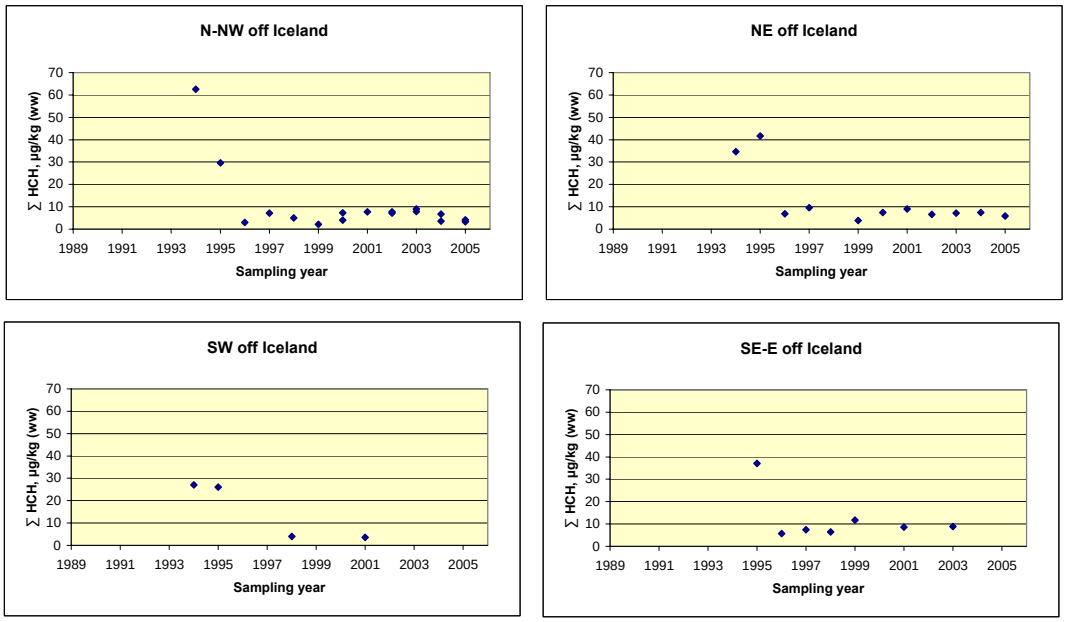


Figure 9d. Average concentration of ∑HCH (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2005.

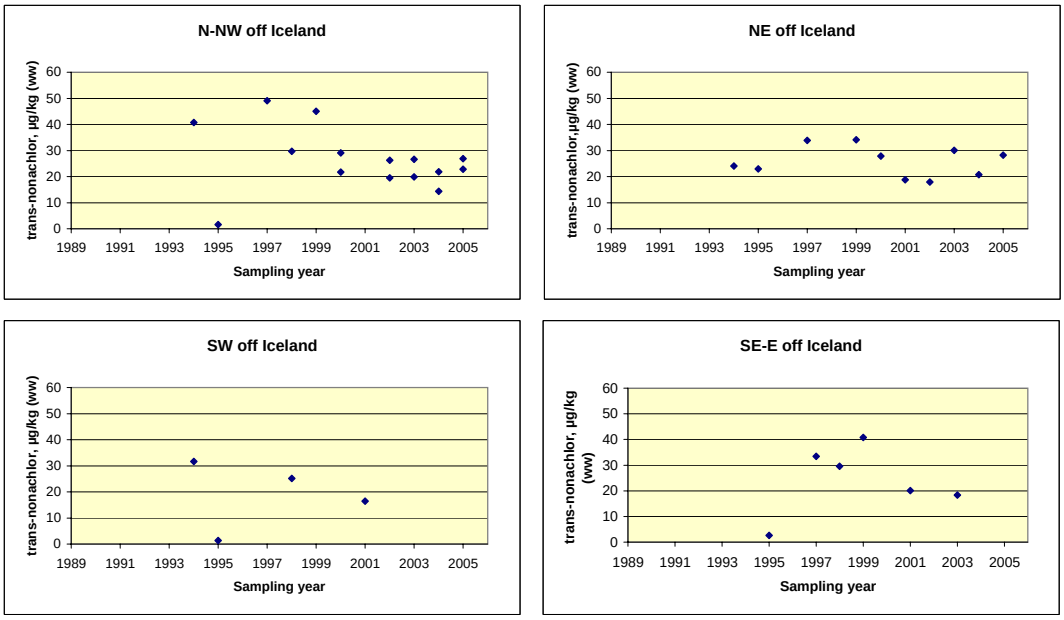


Figure 9e. Average concentration of transnonachlor (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2005.