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National Comments regarding the Norwegian data for 2003

Rapport 921/2004

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Norwegian Institute for Water Research

REPORT

Main Office	**Regional Office, Sørlandet**	**Regional Office, Østlandet**	**Regional Office, Vestlandet**	**Akvaplan-NIVA A/S**
P.O. Box 173, Kjelsås N-0411 Oslo Norway Phone (47) 22 18 51 00 Telefax (47) 22 18 52 00	Televeien 1 N-4890 Grimstad Norway Phone (47) 37 29 50 55 Telefax (47) 37 04 45 13	Sandvikaveien 41 N-2312 Ottestad Norway Phone (47) 62 57 64 00 Telefax (47) 62 57 66 53	Nordnesboder 5 N-5008 Bergen Norway Phone (47) 55 30 22 50 Telefax (47) 55 30 22 51	Søndre Tollbugate 3 N-9000 Tromsø Norway Phone (47) 77 68 52 80 Telefax (47) 77 68 05 09

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Abstract

This report is part of the Norwegian contribution to the SIME 2005 meeting administrated by OSPAR. JAMP 2003 included the monitoring of contaminants in blue mussels (43 stations) and cod or flatfish (18 stations) along the coast of Norway from Oslo to Bergen, Lofoten and Varangerfjord. The results indicated elevated levels of contaminants, i.e., poorer than Class I in SFT's classification system, or over provisional “high background”, in the inner Oslofjord (PCBs, mercury and lead in cod; PCBs in mussels), and Sørfjord and Hardangerfjord (cadmium, lead, mercury and DDT (ppDDE) in mussels, and PCBs and mercury in cod). Significant upward trends were found for mercury in cod from the inner Oslofjord and a downward trend was found for lead in mussels from Sørfjord/Hardangerfjord. The results from the remaining stations showed low or moderate levels of contamination. The “Pollution" and "Reference" indices for respective groups of fjords was classified as markedly (Class III and a class higher than 2002) and moderately (Class II and the same as 2002) polluted, respectively. Contamination of organotin in mussels and imposex in dogwhelks were still apparent, especially in the Haugesund area. The results from studies using biological effects methods in cod (4 stations) and imposex/intersex in dogwhelks (9 stations) are discussed.

4 keywords, Norwegian		4 keywords, English	
1.	Miljøgifter	1.	Contaminants
2.	Organismer	2.	Organisms
3.	Marin	3.	Marine
4.	Norge	4.	Norway

Kristoffer Næs

Norman W. Green
Project manager

Kristoffer Næs
Research manager

Jens Skei
Research director

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WORKING GROUP ON CONCENTRATIONS, TRENDS AND EFFECTS OF SUBSTANCES IN THE MARINE ENVIRONMENT (SIME)

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JOINT ASSESSMENT AND MONITORING PROGRAMME (JAMP)
NATIONAL COMMENTS REGARDING
THE NORWEGIAN DATA FOR 2003

Oslo, 24. December 2004

Submitted by:	NORWAY Norman W. Green Norwegian Institute for Water Research (NIVA) PB 173 Kjelsås N-0411 Oslo
Submitted to:	Oslo and Paris Commissions (OSPAR) att. Richard Emmerson New Court 48 Carey Street London WC2A 2JQ
Copy to:	Norwegian Pollution Control Authority (SFT) att. Per Erik Iversen PB 8100 Dep. N-0032 Oslo International Council for the Exploration of the Seas (ICES) att. Marilynn Sørensen Palægade 2-4 DK-1261 Copenhagen

Foreword

This report presents the Norwegian national comments on the 2003 investigations for the Joint Assessment and Monitoring Programme (JAMP). JAMP is administered by the Oslo and Paris Commissions (OSPAR) and their Environmental Assessment and Monitoring Committee (ASMO). JAMP receives guidance from the International Council for the Exploration of the Sea (ICES). ASMO has delegated implementation of part of the programme to the Working Group on Concentrations, Trends and Effects of Substances in the Marine Environment (SIME). The Norwegian 2003 investigations are directed to particular JAMP issues relating to contaminants and implemented by SIME. JAMP replaced Joint Monitoring Programme (JMP) in 1995.

The Norwegian JAMP for 2003 was carried out by the Norwegian Institute for Water Research (NIVA) by contract from the Norwegian Pollution Control Authority (SFT), (NIVA contract O-80106, O-25106).

The Norwegian contribution to the JMP/JAMP was initiated by SFT in 1981 as part of the national monitoring programme. It now comprises three areas: the Oslofjord and adjacent areas (Hvaler-Singlefjord area and Langesundsfjord, 1981-), Sørfjord/Hardangerfjord (1983-84, 1987-) and Orkdalsfjord area (1984-89, 1991-93, 1995-96).

Since the North Sea Task Force Monitoring Master Plan was implemented in 1990, additional areas have also been monitored. These include: Arendal, Lista and Bømlo-Sotra areas. On the initiative of SFT and NIVA "reference" or merely diffusely contaminated areas from Bergen to Lofoten have been monitored since 1992 and from Lofoten to the Norwegian-Russian border from 1994.

The comments are presented in accordance with the agreed standardised format (ASMO 1997, Annex 12).

Thanks are due to many colleagues at NIVA, especially: Lise Tveiten, Merete Schøyen, Åse Kristine Rogne, Sigurd Øxnevad, Åse Bakketun, Tom Tellefsen for field work, sample preparations and data entry; Alfhild Kringstad, Merete Grung, Torgunn Sætre, and their colleagues for organic analyses; Bente Hiort Lauritzen and her colleagues for metal analyses; Randi Romstad and her colleagues for biological effects measurements, Gunnar Severinsen for data programme management and operation; and to the authors Anders Ruus (biological effects methods), Mats Walday (organotin), and Eva Hagebø and her colleagues (analytical quality assurance). Thanks go also to the numerous fishermen and their boat crews for which we have had the pleasure of working with.

Oslo, 24 December 2004.

Norman W. Green
Project co-ordinator

Contents

1. General Details

1.1. Executive Summary / Sammendrag

The Norwegian JAMP 2003 included the monitoring of micropollutants (contaminants) in blue mussels (43 stations), dog whelks (9 stations) and fish (18 stations) from the border of Sweden in the south along the coast of Norway to the Bergen area, Lofoten and the Varangerfjord bordering Russia. The mussel sites include supplementary stations for the Norwegian Index programme, DDT investigations in the Sørfjorden and TBT analyses. The results showed several cases of levels of contaminants, higher than Class I in the Norwegian Pollution Control Authority's (SFT's) classification system or over provisional “high background”). The major cases were found in:

- Part of JAMP area 26: Oslofjord (up to Class III for PCBs and to a lesser extent lead and mercury), where cod liver from the inner Oslofjord was markedly polluted with PCB (Class III), even though a statistically signficant downward trend was noted, and a significant upward trend was found for mercury in cod fillet from both "large" and "small" individuals and for cadmium in cod liver from the inner Oslofjord 1984-2003;
- JAMP areas 63 and 62: Sørfjord and Hardangerfjord (for mussels, up to Class V for lead, Class IV for DDE, Class III for mercury and cadmium and for cod, Class III for mercury, Class II for ppDDE). A significant downward trend was found for lead in mussels at two stations in Hardangerfjord 1987-2003, and an upward trend was found for mercury in fillet in flounder.

Part of JAMP area 26: Langesundsfjord has been an area of concern largely due to concentrations of HCB in mussels. However, in 2003 the concentration was low (Class I), and a downward trend was found for the period 1990-2003, and there is less of a reason for concern when considering this contaminant.

Two environmental indices have been applied annually since 1995 to assess the levels of contamination in mussels from “polluted” and “reference” areas. The 2003 Pollution Index result was in the class "markedly polluted" (Class III) in the Norwegian Pollution Control Authority's (SFT's) classification system, a lower class than in 2002. The Reference Index was in the class "moderately polluted" (Class II), as in years prior to 2002.

The biological effects methods OH-pyrene (pyrene metabolite; marker for PAH exposure), δ-aminolevulinic acid dehydrase (ALA-D; marker for lead exposure), and the activity (EROD) and protein concentration of cytochrome P4501A (marker for planar hydrocarbons, such as certain PCBs/PCNs, PAHs and dioxins) were determined in cod from three to four stations along the coast from the Oslofjord to Hardanger. With respect to OH-pyrene metabolites in 2003, there was high variability in the levels at sites where fish are moderately exposed to PAH, and generally lower median levels than in the previous year (particularly in the Sørfjord). The Oslofjord showed the most elevated levels of OH-pyrene. Results for ALA-D indicated exposure to lead to cod from the inner Oslofjord and inner Sørfjord. EROD had decreased somewhat at all stations compared to 2002. EROD in the inner Oslofjord was higher than in the less contaminated Sotra-Bømlo area, while EROD in the inner Sørfjord was lower. Previous years have also shown that EROD in fish from the Oslofjord and the Sørfjord are not consistently higher than at other presumed cleaner stations. The EROD correlated significantly with the amount of cytochrome P4501A protein.

The presence of organotin (as TBT) in Norwegian waters was still a problem in 2003, most evident close to harbours. Concentrations of organotin in mussels and dogwhelks were elevated, and biological effects from TBT were found in dogwhelks from all of the investigated areas, except one northern station. However, TBT concentrations in mussels were mostly lower than in 2002 and no significant trends were found. It is a cause for concern that the ban on the use of TBT in antifouling agents on vessels <25 m of length has not lead to a clear improvement in the investigated areas.

Sammendrag

*JAMP (*Joint Assessment and Monitoring Programme*) er et internasjonalt program for miljøovervåking av kystfarvann. Norge er et av tolv land som gjennom Oslo-Pariskonvensjonen (OSPAR) har forpliktet seg til å delta i dette felles overvåkingsprogrammet. Programmet i Norge startet i 1981 og hovedmålsettingen er å overvåke miljøgifter i påvirkede områder og ellers langs hele norskekysten. Resultatene fra de minst påvirkede områdene benyttes for å angi "bakgrunnsnivåer". Resultatene rapporteres årlig.*

I 2003 omfattet JAMP undersøkelse av blåskjell (på 43 stasjoner, inkludert de til SFTs forurensningsindeks, stasjoner brukt til overvåking av TBT, og tilleggsstasjoner brukt til å kartlegge DDT i Sørfjorden), purpursnegl (9 stasjoner) og torsk eller flatfisk (18 stasjoner) fra svenskegrensen i syd til Bergen, Lofoten og Varangerfjorden mot den russiske grensen. Resultatene tydet på forhøyede konsentrasjoner av miljøgifter, dvs. mer enn Klasse I i SFTs klassifiseringssystem, eller over antatt "høyt bakgrunnsnivå". Disse tilfellene ble registrert i:

- *Oslofjorden med opp til Kl.III for PCB og i mindre grad bly og kvikksølv, hvor torskelever fra indre Oslofjord var markert forurenset med PCB (Kl.III) selv om en signifikant avtagende trend ble registrert, og det ble funnet signifikant økende trender for kvikksølv i torskefilet fra både "store" og "små" individer fra indre Oslofjord 1984-2003,*
- *Sørfjorden og Hardangerfjorden for blåskjell med opp til Kl.V for bly, Kl.IV for DDE og Kl.III når det gjaldt kvikksølv og kadmium, og for torsk med opp til Kl.III for kvikksølv og Kl.II når det gjaldt ppDDE. Det ble funnet en signifikant avtagende trend for bly i blåskjell på to stasjoner i Hardangerfjorden 1987-2003, og en økende trend for kvikksølv i skrubbefilet.*

Langesundfjorden har vært et område med bl.a. høye konsentrasjoner av HCB i blåskjell. Men konsentrasjonene i 2003 var i Kl.I og en avtagende trend ble funnet for perioden 1990-2003, slik at det er mindre grunn til bekymring når det gjelder dette stoffet.

SFTs blåskjell-forurensningsindeks og blåskjell-referanseindeks har blitt brukt årlig siden 1995 på en gruppe "forurensede-" og "referanse-" fjordområder. Forurensningsindeksen for 2003 betegnet sin gruppe som markert forurenset (Kl.III), en klasse lavere enn i 2002. Referanseindeksen har klassifisert sin gruppe som moderat forurenset (Kl.II) i hele perioden..

Følgende biologiske effekt-parametre ble undersøkt i torsk fra tre-fire stasjoner langs kysten fra indre Oslofjord til Hardanger: OH-pyren (pyren-metabolitt; markør for PAH-eksponering), δ-aminolevulinsyre dehydrase (ALA-D; markør for bly-eksponering), og aktivitet (EROD) og mengde cytokrom P4501A protein (markør for plane hydrokarboner, slik som spesifikke PCB/PCN, PAH og dioksiner). Det var høy variabilitet i konsentrasjoner av OH-pyren i fisk moderat eksponert for PAH, og generelt lavere konsentrasjoner enn foregående år (særlig i Sørfjorden). Oslofjorden viste de høyeste OH-pyren-nivåene. Resultatene for ALA-D indikerte bly-eksponering for torsk fra indre Oslofjord og indre Sørfjord. EROD aktivitetene var noe lavere enn i 2002 på alle stasjonene. EROD i indre Oslofjord var høyere enn i det mindre forurensede Sotra-Bømlo området, mens EROD i indre Sørfjorden var lavere. Tidligere år har også vist at EROD i fisk fra Oslofjorden og Sørfjorden ikke er konsistent høyere enn på andre, antatt mindre forurensede stasjoner. EROD korrelerte signifikant med mengde cytokrom P4501A-protein.

Effekter av organotin (bl.a. TBT) kunne fortsatt registreres i 2003, tydeligst i havner eller i områder med mye skipstrafikk. Konsentrasjoner av TBT i blåskjell og purpursnegl var forhøyet, og virkning av TBT (imposex) ble registrert på samtlige stasjoner. Ingen tydelig utvikling i imposex over tid ble registrert, men konsentrasjoner i blåskjell var lavere enn tidligere år. Forbud mot bruk av TBT som begroingshindrende middel på båter <25m i lengde har ikke ført til klar forbedring i de undersøkte områdene.

1.2. Introduction

The Norwegian contribution to the "Joint Assessment and Monitoring Programme (JAMP) was initiated by the Norwegian Pollution Control Authority (SFT) and is integrated with SFT's State Pollution Monitoring Programme. The procedures and practice of JAMP has also provided a basis for other investigations of interest to SFT but not necessarily requested by JAMP (e.g. SFT's Index Programme (Pollution and Reference Indices), chapter 1.3.8).

Data are submitted to ICES under three categories: for Purpose A (health assessment) on a voluntary basis, Purpose C (spatial distribution) on a voluntary basis and Purpose D (temporal trend assessment) on a mandatory basis. Where practical, data collection was in accordance to agreed procedures (OSPAR 1990, 1997). Data were screened and submitted to ICES in accordance with procedures outlined by ICES (1996).

This report focuses on issues and situations in Norway concerning contaminants and considered of interest to the implementation of JAMP (Table 1). It should be noted that these issues are being revised (cf., MON 2001). The Norwegian programme for JAMP 2003 has been outlined previously (Green 2003).

Table 1. Extract from list of JAMP issues, subjects and descriptions to which the Norwegian investigations for 2003 can be addressed (cf. ASMO 1997, Annex 30).

Issue	Subject	Description
1.2	Hg, Cd, and Pb	What are the concentrations and fluxes in sediments and biota?
1.3	TBT	To what extent do biological effects occur in the vicinity of major shipping routes, offshore installations, marinas and shipyards?
1.7	PCBs	Do high concentrations pose a risk to the marine ecosystem?
1.8	PCBs	Do high concentrations of non-ortho and mono-ortho CBs in seafood pose a risk to human health?
1.10	PAHs	What are the concentrations in the maritime area?
1.11	PAHs	Do PAHs affect fish and shellfish?
1.12	Other synthetic compounds	How widespread are synthetic organic compounds within the maritime area?
1.15	Chlorinated dioxins and dibenzofurans	What concentrations occur and have the policy goals (for the relevant parts of the maritime area) been met?
1.17	Biological effects of pollutants	Where do pollutants cause deleterious biological effects?
5.3	Chemical used [mariculture]	In which areas do pesticides and antibiotics affect marine biota?
6.1	Ecosystem health	How can ecosystem health be assessed in order to determine the extent of human impact?

The chapter structure of this report for the first and second level is according to agreed format (ASMO 1997, Annex 12) which *inter alia* presents results before methodology.

1.3. Information on measurements

An overview of JAMP stations in Norway is shown in the tables in Appendix E and maps in Appendix F. The stations and sample counts relevant to the 2003 investigations are noted in the tables in Appendix E. Data reports have been published recently for sediment 1986-1997 (Green *et al.* 2002a) and biota 1981-2002 (Green *et al.* 2002b-d).

Blue mussels were sampled at 50 stations (including supplementary stations for Index and TBT), dog whelks from 9 stations and fish from 18 stations from the border to Sweden in the south to the border to Russia in the north. Generally, mussels are not abundant on the exposed coastline from Lista (south Norway) to the North of Norway. A number of samples were collected from dock areas, buoys or anchor lines.

This chapter focuses on the principle cases where *median* concentrations exceeded provisional "high background" ("normal"). The median concentration can be derived from the tables in Appendix H or figures in Appendix I, depending on the year and concentration basis in question. Where possible, these medians are classified according to the Norwegian Pollution Control Authority's (SFT's) **environmental quality classification system** (cf. Molvær *et al.* 1997). An extract of the system that is applied in this report is shown in Table 5 and includes unofficial conversion to other bases. The system does not cover some contaminants for some species-tissues, however provisional "high background" concentrations have been determined and these are listed in Table 6. "High background" concentrations set the upper limit for Class I in SFT's system. The factor by which concentrations exceeded “high background” is termed **overconcentration**. "High background" concentration corresponds to the upper limit to Class I, or slightly (also stated in classifications system as “insignificantly”) polluted. Below the median concentrations are assessed according to the SFT system, but where this is not possible overconcentrations are used. The term "significant" refers to the results of a statistical analysis of linear trends shown in Appendix H. More details concerning these terms and methods can be found in chapter 2.1.2.

1.3.1. Oslofjord area

Mussels from the inner Oslofjord were moderately polluted with ΣPCB-7 (SFT's Class II, Figure 1A). Cod liver from the inner Oslofjord was markedly polluted with ΣPCB-7 (Class III, Figure 2A). The median concentration in cod liver was 2140 µg/kg w.w., third lowest recorded for the entire period (1990-2003). Cod liver from the outer Oslofjord was slightly polluted with regard to ΣPCB-7 (st.36B, Figure 2B).

In 1994, and renewed in 2004, the Norwegian Food Safety Authority (SNT) advised not to consume liver of cod from the inner Oslofjord (north of st.31A, see Map 1 in Appendix F) due to concerns about PCB contamination (cf. Table 3).

A significant linear *downward* trend was detected (see method description in chapter 2.1.3) for ΣPCB-7 in mussels from the inner Oslofjord (30A and 31A Figure 1A, B) for the period 1988 to 2003.

Power analyses (see chapter 2.1.3) indicated that a hypothetical trend of 10% change per year in ΣPCB-7 concentration in the blue mussel from the inner Oslofjord would take 10 to 13 years to be detected with 90% significance (Appendix H).

The fillet of "small"[1] (39-45 cm) and “large” cod (46-82 cm) from the inner Oslofjord in 2003 were moderately polluted with mercury (Class II, Figure 3A, B). A significant *upward* trend was detected for the period 1984-2003 for both size groups, even though the concentrations in 2002-2003 were lower than the three previous years. The power, indicated as number of years to detect a hypothetical 10% change per year for mercury in cod fillet from either station, was slightly better for “small” fish (10-11 years) than “large” fish (13 years) (cf. Appendix H). Concentrations of mercury when considering the entire period were significantly higher in "large" cod compared to "small" cod. Flounder fillet from mid Oslofjord was slightly polluted (Class I) (st.33B, Appendix H).

Median concentration of cadmium and lead in cod liver from the inner Oslofjord (30B) was 0.11 and 0.24 mg/kg w.w., respectively. For lead, this was less than half of the concentration found in 2002, which was the second highest found during the entire period (1990-2003). “High background” for these metals is 0.1 mg/kg w.w. A significant *upward* trend was found for cadmium in these cod.

The SFT's environmental quality classification system does not include cadmium and lead in cod liver or HCB in flounder liver.

It should be noted that the Index programme indicated severe concentrations of TBT in mussels from a station located in the inner Oslofjord (see chapter 1.3.8).

The results from reanalyses of HCB in flounder liver from mid Oslofjord (33B) in 2002 (Green *et al.* 2004) showed that the median concentration was slightly high, 1.6 µg/kg w.w. (Class I).

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[1] The size of "small" and "large" cod depends on the station-year catch, and hence may vary (see section 2.1.3. The range given is the lower and upper quartile of the median lengths of the "small" or "large" fish.

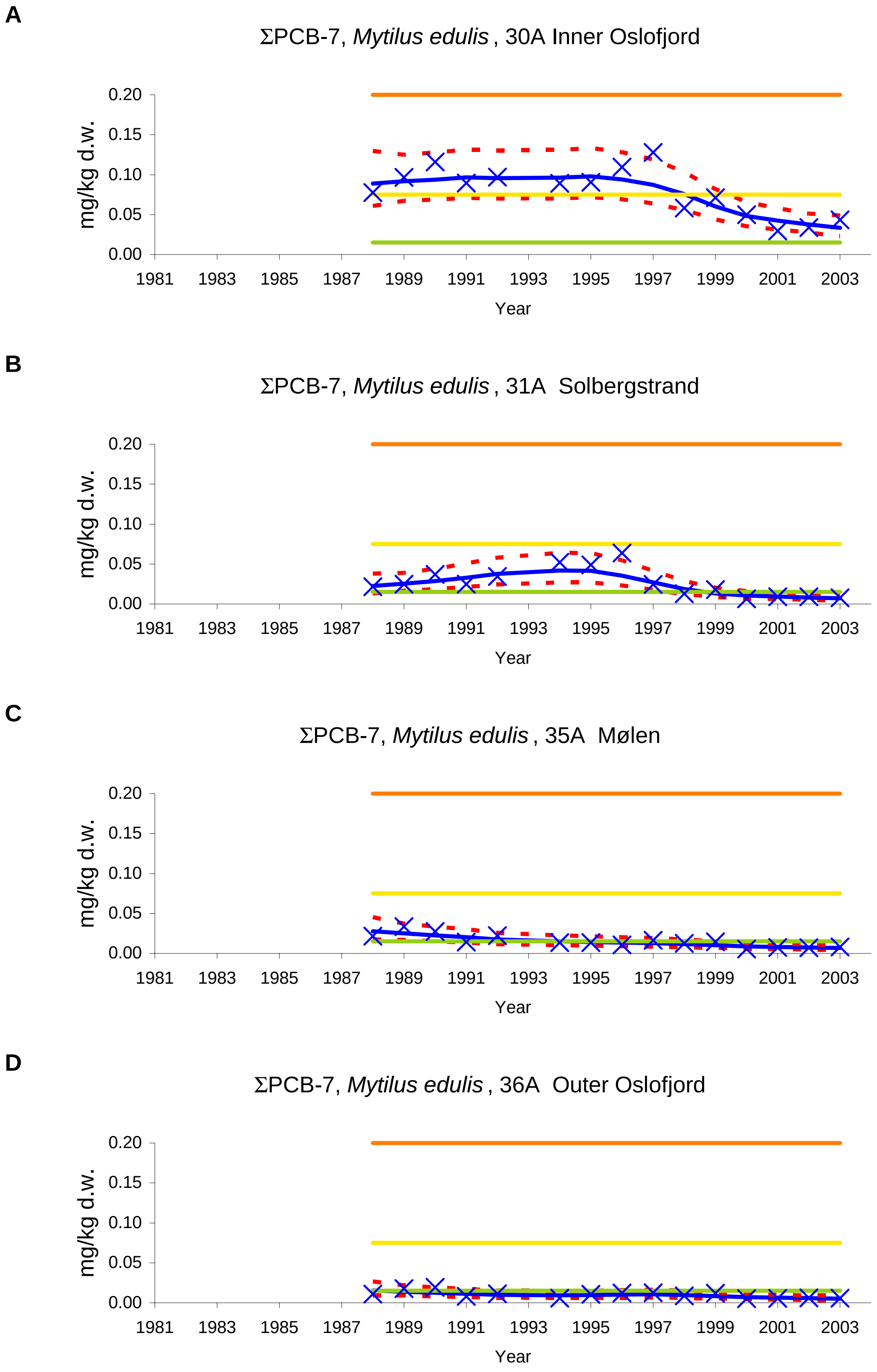
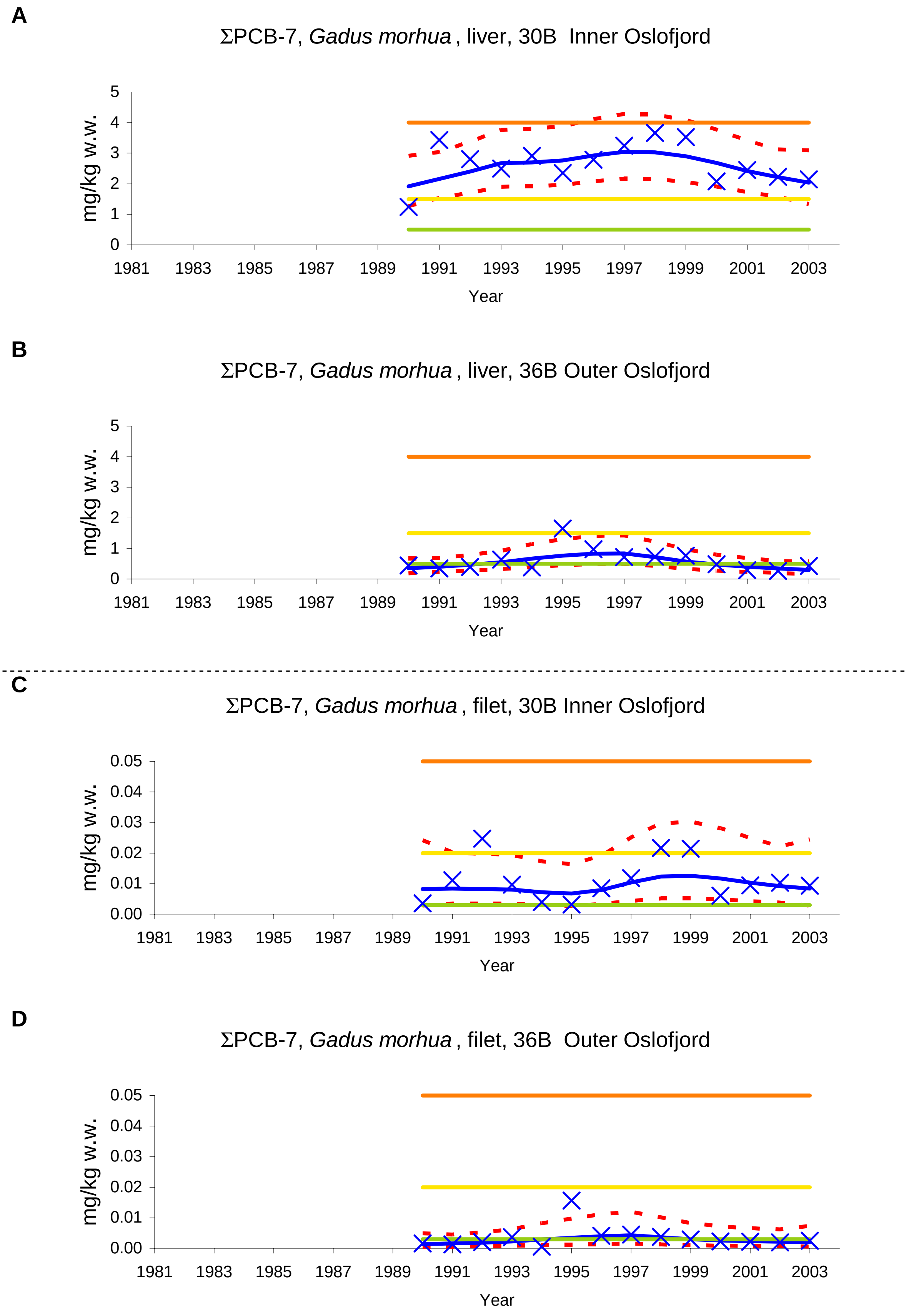


Figure 1. Median ΣPCB-7 (sum of PCB 28, 52, 101, 118, 138, 153 and 180) concentration in blue mussel (*Mytilus edulis*) from inner (st.30A) to outer (st.36A) Oslofjord. (cf. Appendix F and Appendix H, and and key in Figure 20).



A ΣPCB-7, *Gadus morhua* , liver, 30B Inner Oslofjord

B ΣPCB-7, *Gadus morhua* , liver, 36B Outer Oslofjord

C ΣPCB-7, *Gadus morhua* , filet, 30B Inner Oslofjord

D ΣPCB-7, *Gadus morhua* , filet, 36B Outer Oslofjord

Figure 2. Median ΣPCB-7 (sum of PCB 28, 52, 101, 118, 138, 153 and 180) concentration in liver and fillet of cod (*Gadus morhua*) from the inner (st.30B) to outer (st.36B) Oslofjord. (cf. Appendix F and Appendix H, and key in Figure 20).

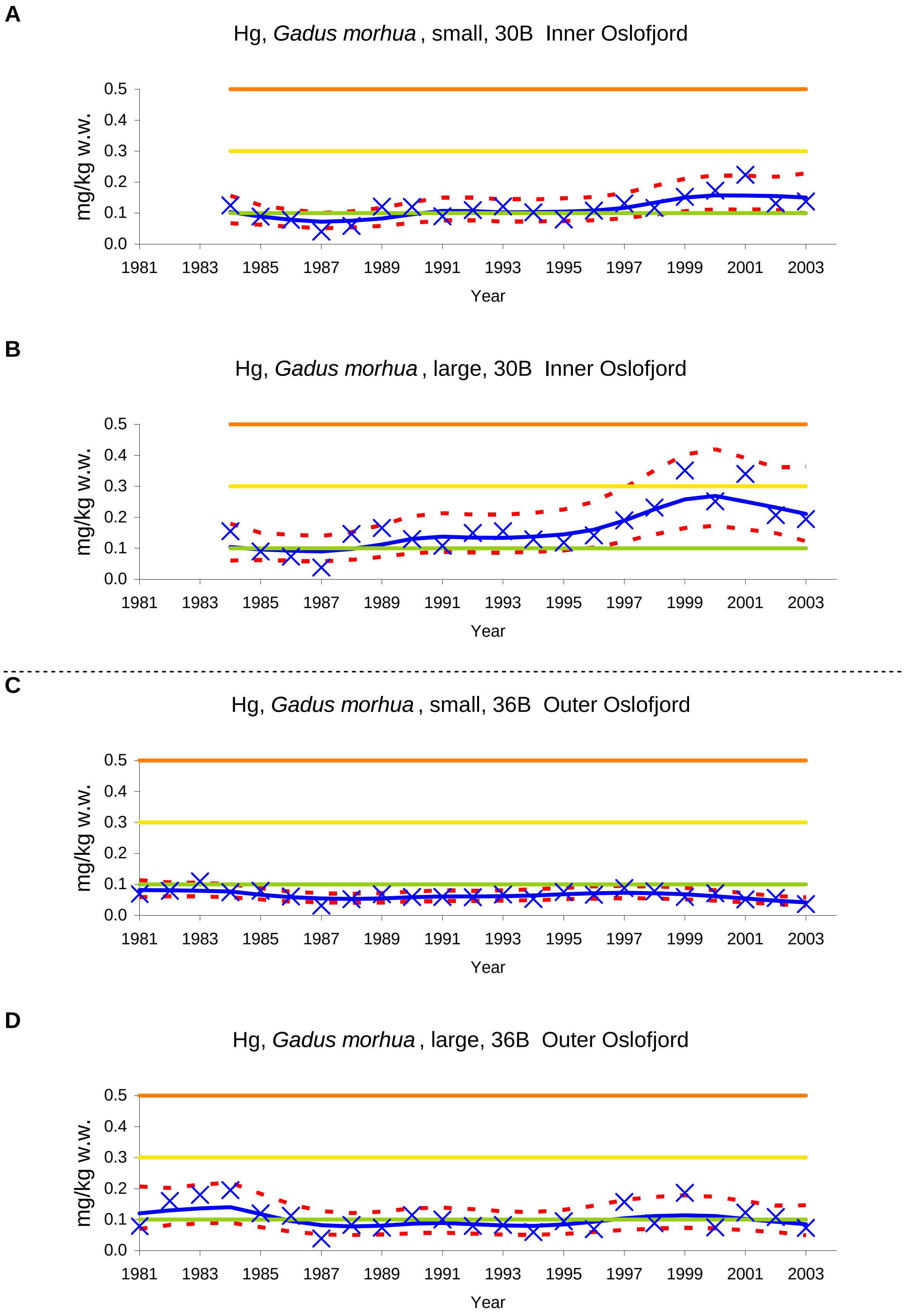


Figure 3. Median mercury (Hg) concentration in fillet of cod (*Gadus morhua*): for the inner Oslofjord (st.30B) “small” (**A**) and “large” (**B**) fish, and for the outer Oslofjord (st.36B) “small” (**C**) and “large” (**D**) fish. (cf. Appendix F and Appendix H, and key in Figure 20).

Mussels from Langesundsfjord (st.71A) in 2003 were slightly polluted with HCB (Class I, Figure 4). The median concentration in 2003 was the lowest at this station since 1983. Concentrations have varied greatly since 1983 but median value have decreased distinctly since 1989 (Figure 4) due to about 99% reduction in discharge of HCB and other organochlorines from a magnesium factory (cf. Knutzen *et al.* 2001).

The power of the monitoring programme was 15 years for the period 1990-2003 and more than 25 years for the entire period (cf. Appendix H). The 1983-2003 data series and the 1990-2003 data series had a significant *downward* trends.

Extremely high lindane concentrations (Class V) were found in blue mussels from station 71A in 2002 (cf. Green *et al.* 2004) but the concentrations were low (Class I) in 2003. The reason for high values in 2002 has not been determined.

It should be noted that dioxin is one of the contaminants monitored to establish the Pollution Index (see section 1.3.8). Dioxin toxicity equivalents based on the Nordic model (TCDDN) in mussels from 71A were severe (SFT Class IV) and extreme values were found at nearby Index stations (I711 in 2002, I712 and I713) (Figure 36).

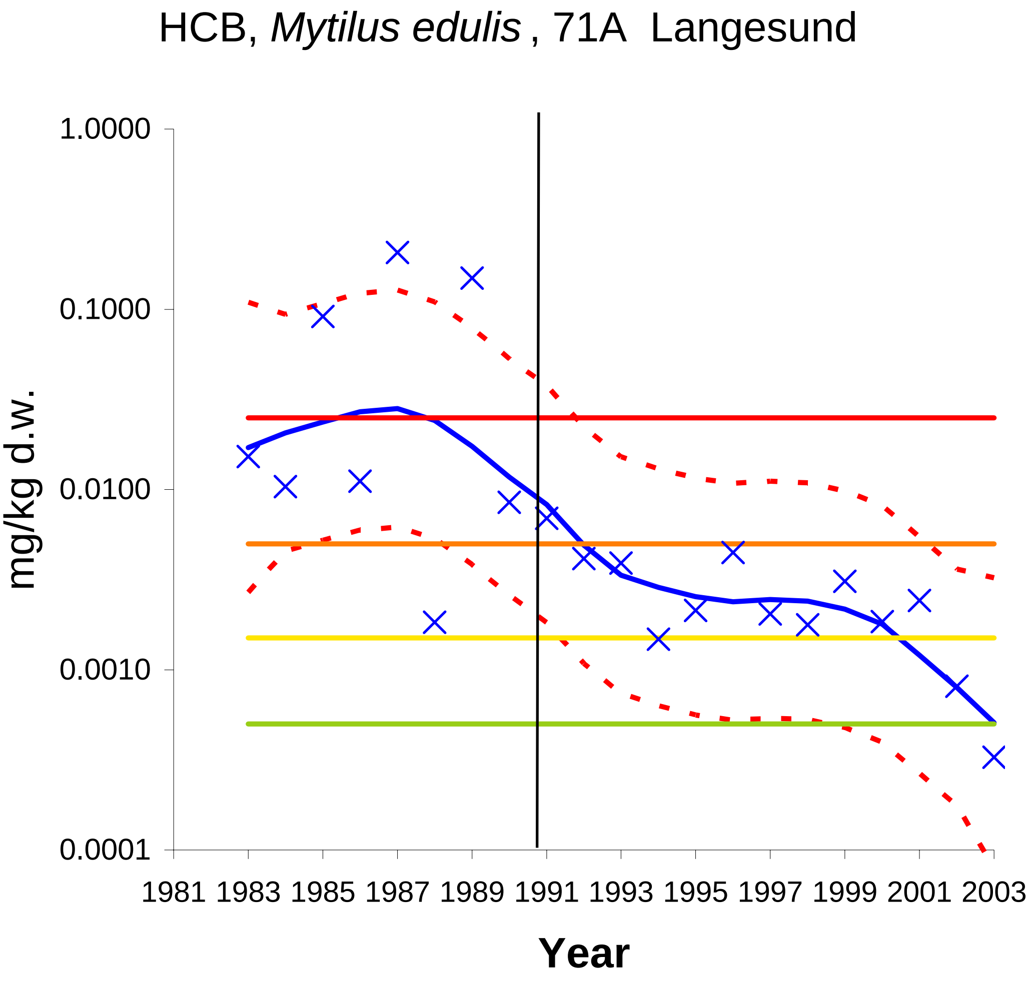


Figure 4. Median HCB concentration in blue mussel (*Mytilus edulis*) from Langesundsfjord (west of Oslofjord). (cf. Appendix F and Appendix H, and key in Figure 20). Vertical line indicates when a magnesium factory reduced it's discharge by 99%. **NB: log-scale.**

1.3.2. Sørfjord and Hardangerfjord

The development of the contaminant conditions in these connected fjords and the main remedial actions that have been taken, have been outlined in the JAMP National comments for 1989 (Green 1991)) and in recent reports concerning Sørfjord in particular (Skei 2000, 2001, Skei & Knutzen 2000, Skei *et al.* 1998). The results from JAMP 2003 are coupled to other studies in this area (cf. Knutzen & Green 2001a, Ruus & Green 2002, 2003, 2004) and confirm that the Sørfjord, and in some cases also Hardangerfjord, continue to be contaminated especially with cadmium (Figure 5 and Figure 6), lead (Figure 7), mercury (Figure 8 and Figure 9), ppDDE (Figure 10, Figure 11 and Figure 12) and to a lesser extent PCB (Figure 12).

In 2002 the Norwegian Food Safety Authority (*Mattilsynet*, earlier referred to as SNT) extended their advice against the consumption of mussels to include all seafood in the Sørfjord including deep-water fish due to concerns about metal and PCB contamination (Table 3).

Results for mussels collected from the Sørfjord indicated that these were moderately (Class II) or markedly polluted (Class III) with cadmium in respect to SFT's classification system (Figure 5, Appendix H). Mussels as far as Lille Teløy in Hardangerfjorden (st.69A), over 100 km from the head of Sørfjorden, were moderately polluted with cadmium (Figure 6). A significant *downward* trend was found for cadmium at two stations in Sørfjord (st.56A and 57A) and two in Hardangerfjord (st.63A and 65A) (Appendix H). Also, the median lead concentration at one station (st.51A) was extreme (Class V). A *downward* trend was found for lead at st. 63A and 65A, 1990-2003. Mercury was marked (Class III) at one station (st.51A).

Cod fillet from "large" individuals (38-60 cm) from the inner Sørfjord (st.53B) was moderately polluted with mercury (Class II). Overconcentrations for mercury were found in fillet in flounder (4-5 times "background") and an *upward* trend was also found. Overconcentrations were found for cadmium in cod liver and flounder liver from inner Sørfjord (2 and 15 times, respectively). Overcentrations of lead in flounder liver was also observed (2 times).

The power of the sampling strategies for mussels was relatively poor for samples collected from Odda; the innermost part of Sørfjord (st.51A or 52A). For example for lead in mussels, it is estimated that it would take 19-24 years to detect a hypothetical trend of 10% per year with 90% significance (Appendix H). This reflects the large variability found in the data series from this area. The variability is mostly due to the irregular/accidental input of contaminated discharges. The power improved with distance from Odda, and at Ranaskjær (st.63A, ca.50 km from Odda) it was only 10 years.

Mussels at one station (st.56A) near the outer Sørfjord were severely polluted with ppDDE (Class IV) but not elsewhere in the Sørfjord-Hardanger region (Figure 10 and Figure 11). Cod fillet from the Sørfjord was only moderately polluted with ppDDE (Class II). The median concentration in cod liver was low (Class I) in contrast to many previous years (Figure 12A, Appendix H).

Median concentrations of ΣPCB-7 in liver of cod from Hardangerfjord for 2003 were only slightly polluted (Class I). Since JAMP monitoring started in the Sørfjord and Hardangerfjord the median values have varied between 100 and 2400 µg/kg w.w. (Appendix H). This indicated that cod is subject to a variable exposure from PCB, but the cause of this variation is not clear.

No trends were evident for ppDDE and ΣPCB-7 in mussels and cod. A *downward* trend was found for these substances in flounder fillet from inner Sørfjord.

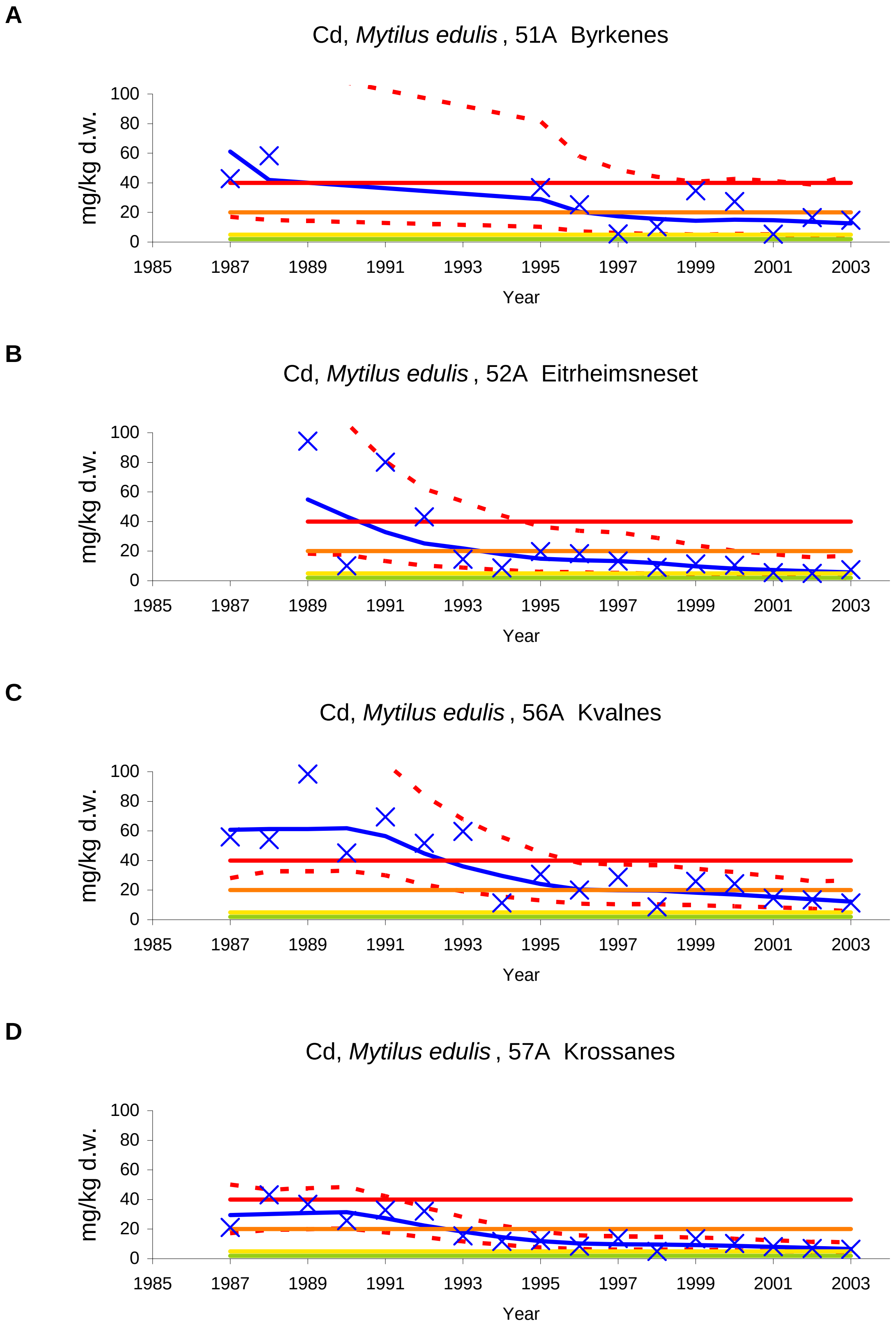


Figure 5. Median cadmium (Cd) concentration in blue mussel (*Mytilus edulis*) from inner (st.51A) to outer (st.57A) Sørfjord. NB: (cf. Appendix F and Appendix H, and key in Figure 20). **Note: for some years the upper confidence interval line is off-scale in figures A-C. Note: horizontal lines for Classes I and II are near x-axis.**

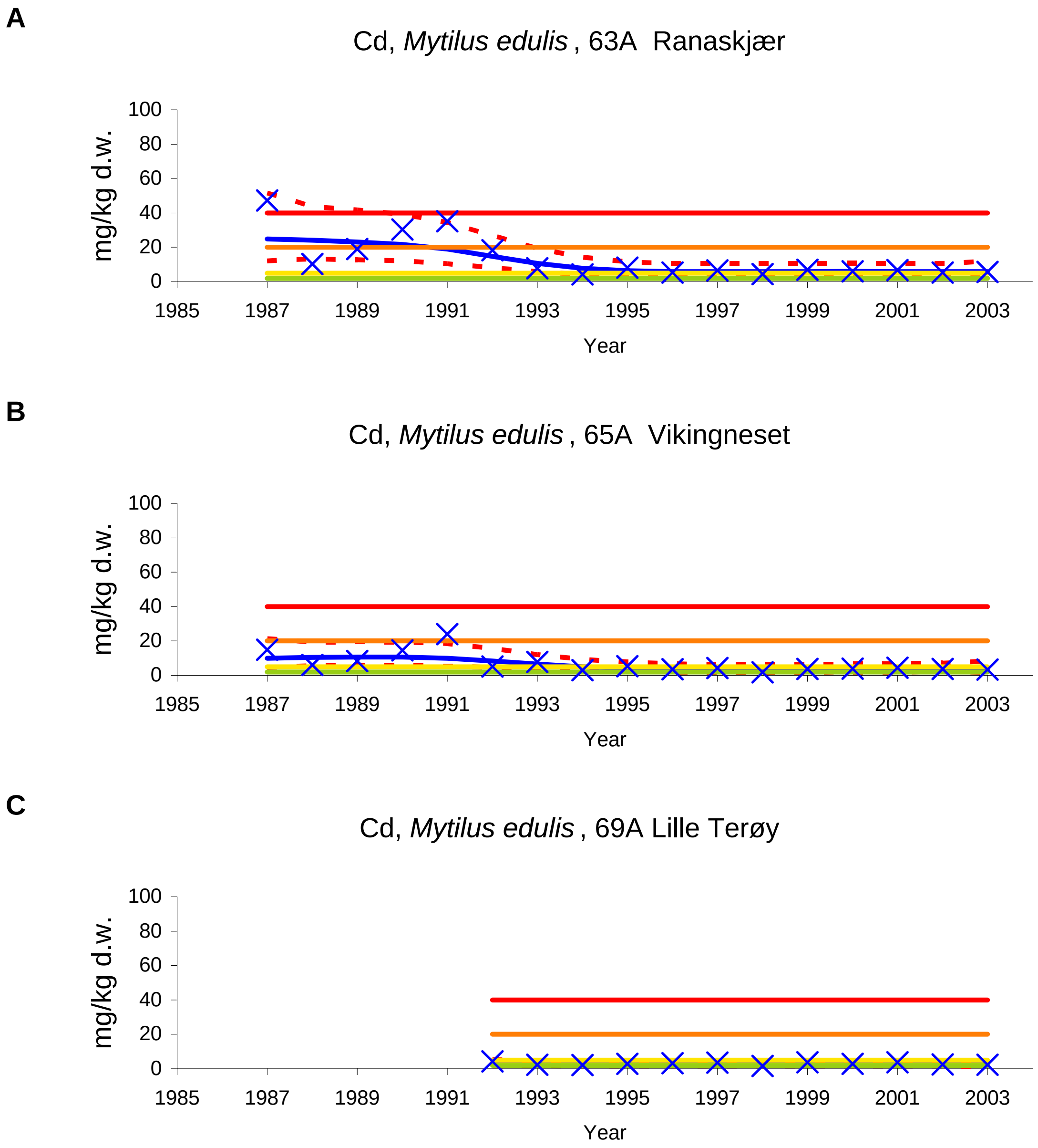


Figure 6. Median cadmium (Cd) concentration in blue mussel (*Mytilus edulis*) from Hardangerfjord (st. 63A, 65A and 69A). (cf. Appendix F and Appendix H, and key in Figure 20). **Note: horizontal lines for Classes I and II are near x-axis.**

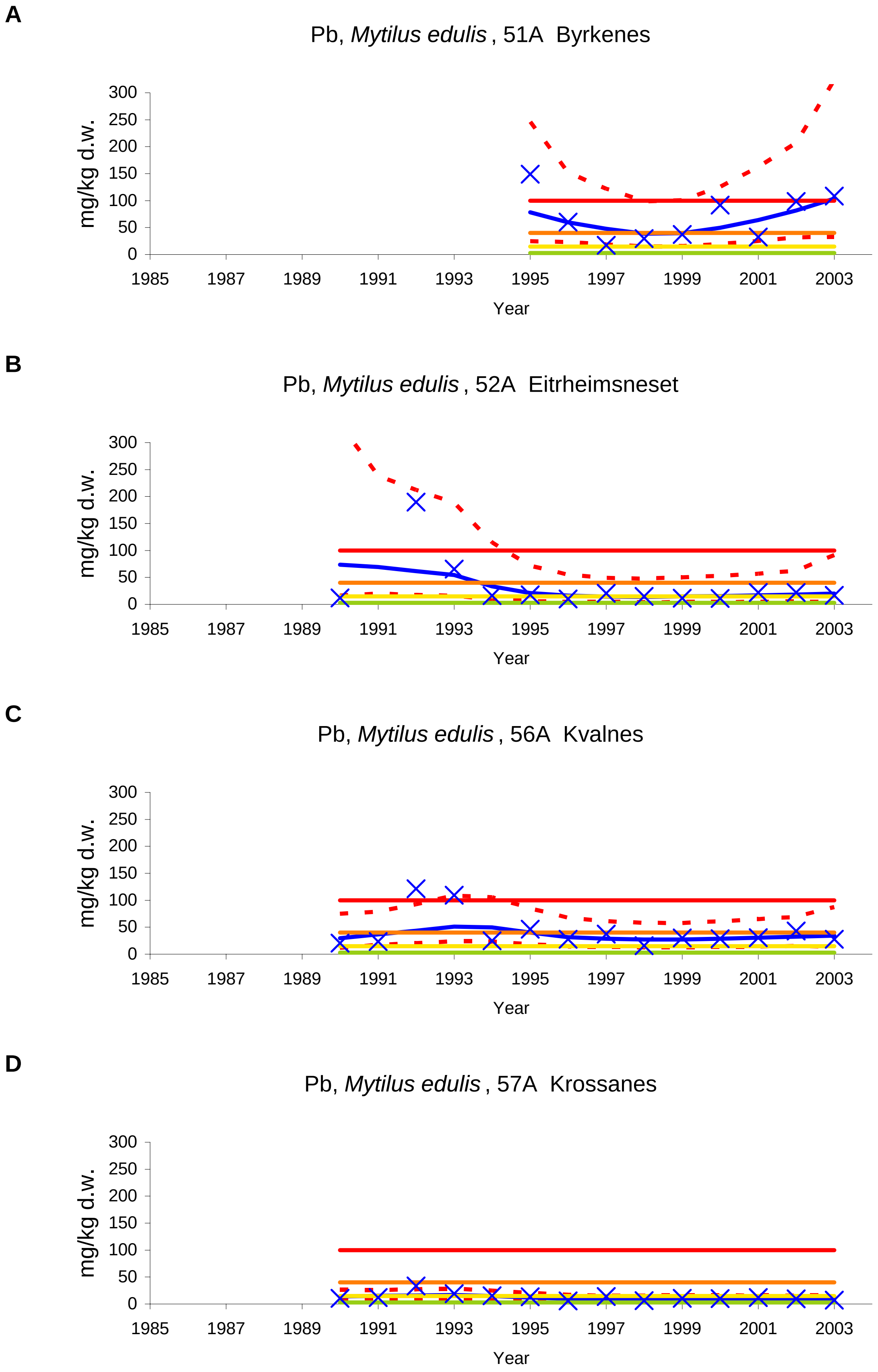


Figure 7. Median lead (Pb) concentration in blue mussel (*Mytilus edulis*) from inner (st.51A) to outer (st.57A) Sørfjord. (cf. Appendix F and Appendix H, and key in Figure 20). **Note: horizontal lines for Classes I and II are near x-axis.**

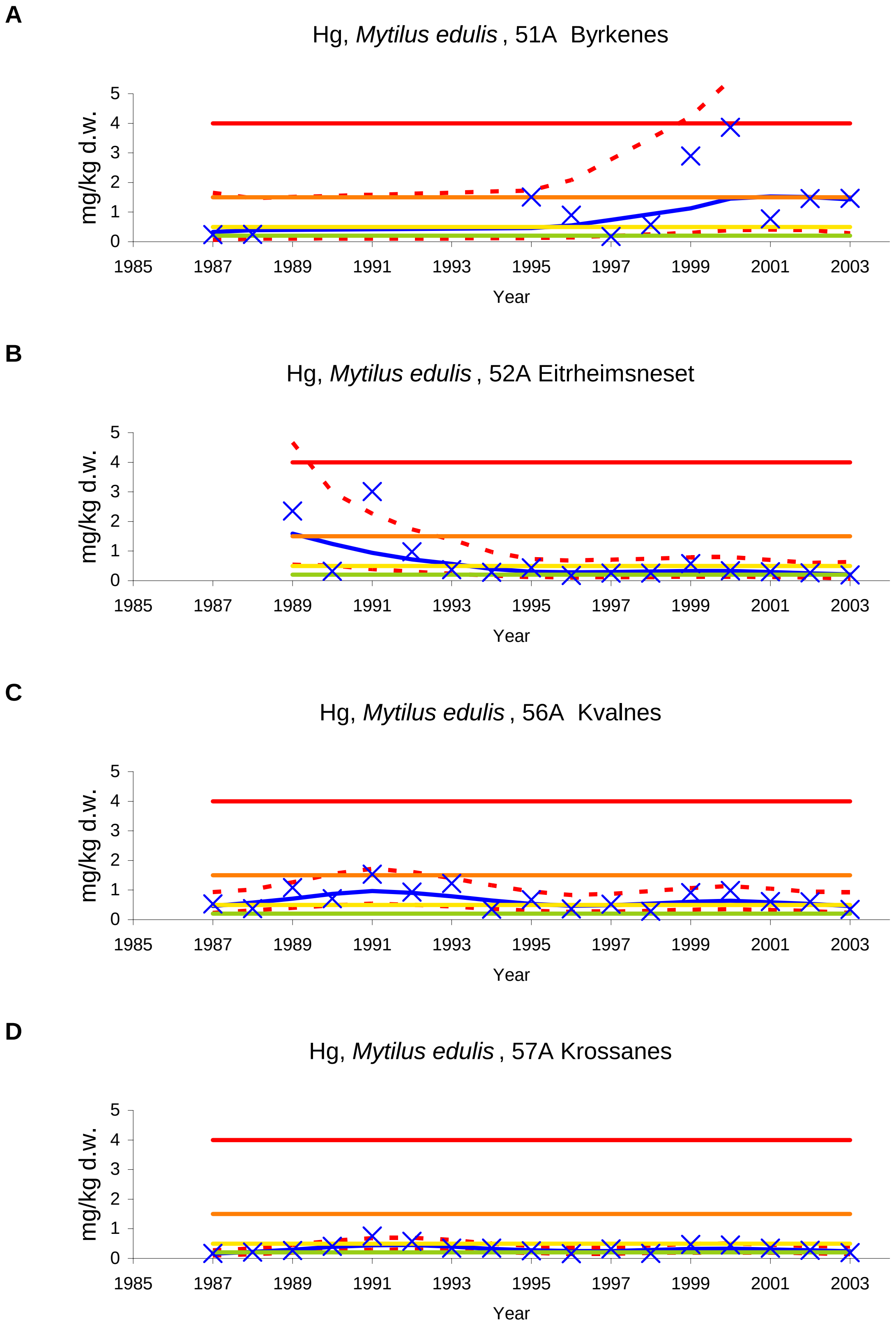


Figure 8. Median mercury (Hg) concentration in blue mussel (*Mytilus edulis*) from inner (st.51A) to outer (st.57A) Sørfjord. (cf. Appendix F and Appendix H, and key in Figure 20). **Note: for some years the upper confidence interval line is off-scale in figure A. Note: horizontal lines for Classes I and II are near x-axis.**

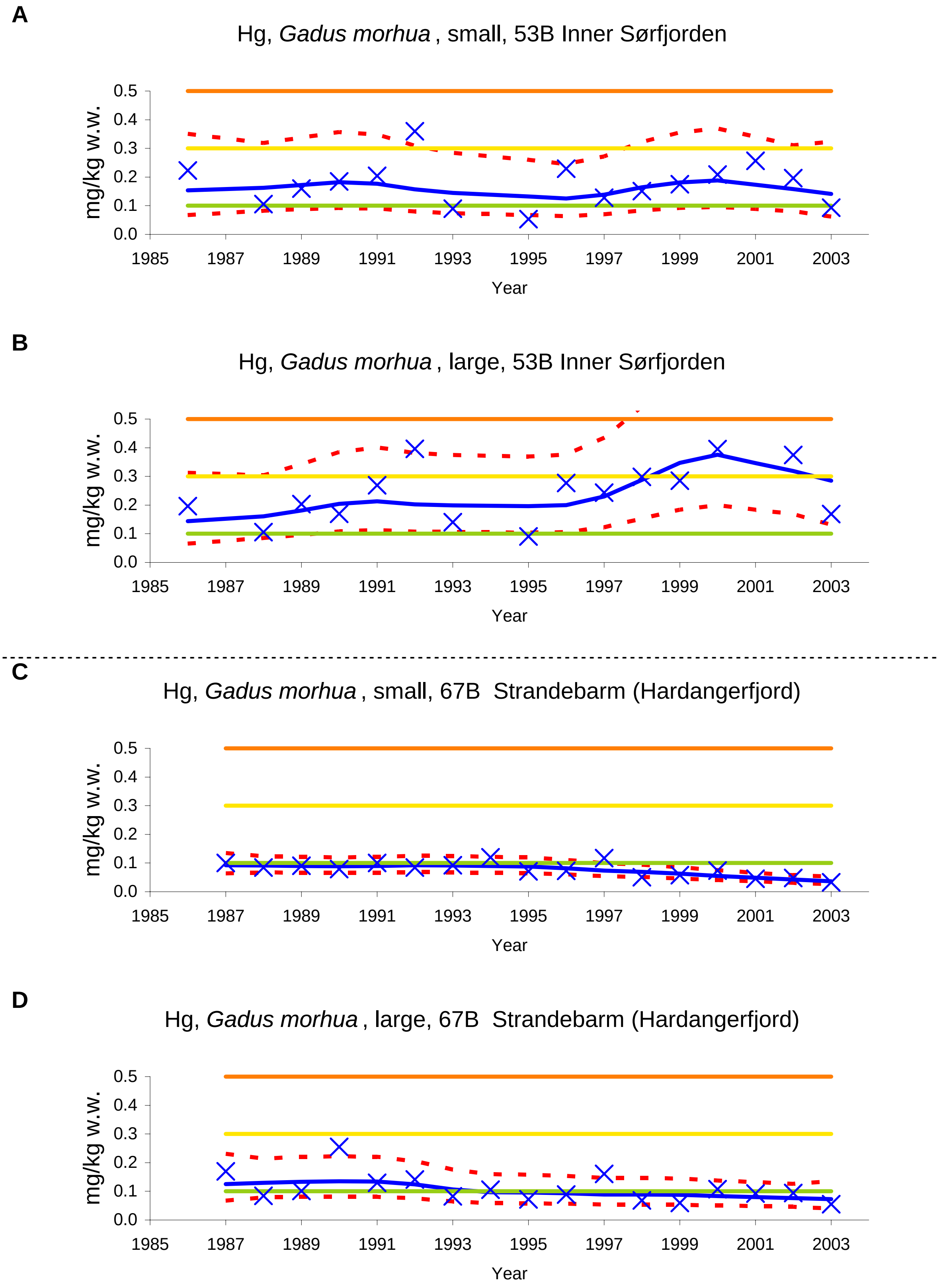


Figure 9. Median mercury (Hg) concentration in fillet of cod (*Gadus morhua*): from Sørfjord (st.53B) for "small" (**A**) and "large" (**B**) fish and Hardangerfjord (st.67B) for "small" (**C**) and "large" (**D**) fish (cf. Appendix F and Appendix H, and key in Figure 20). **Note: for some years the upper confidence interval line is off-scale in Figure B.**

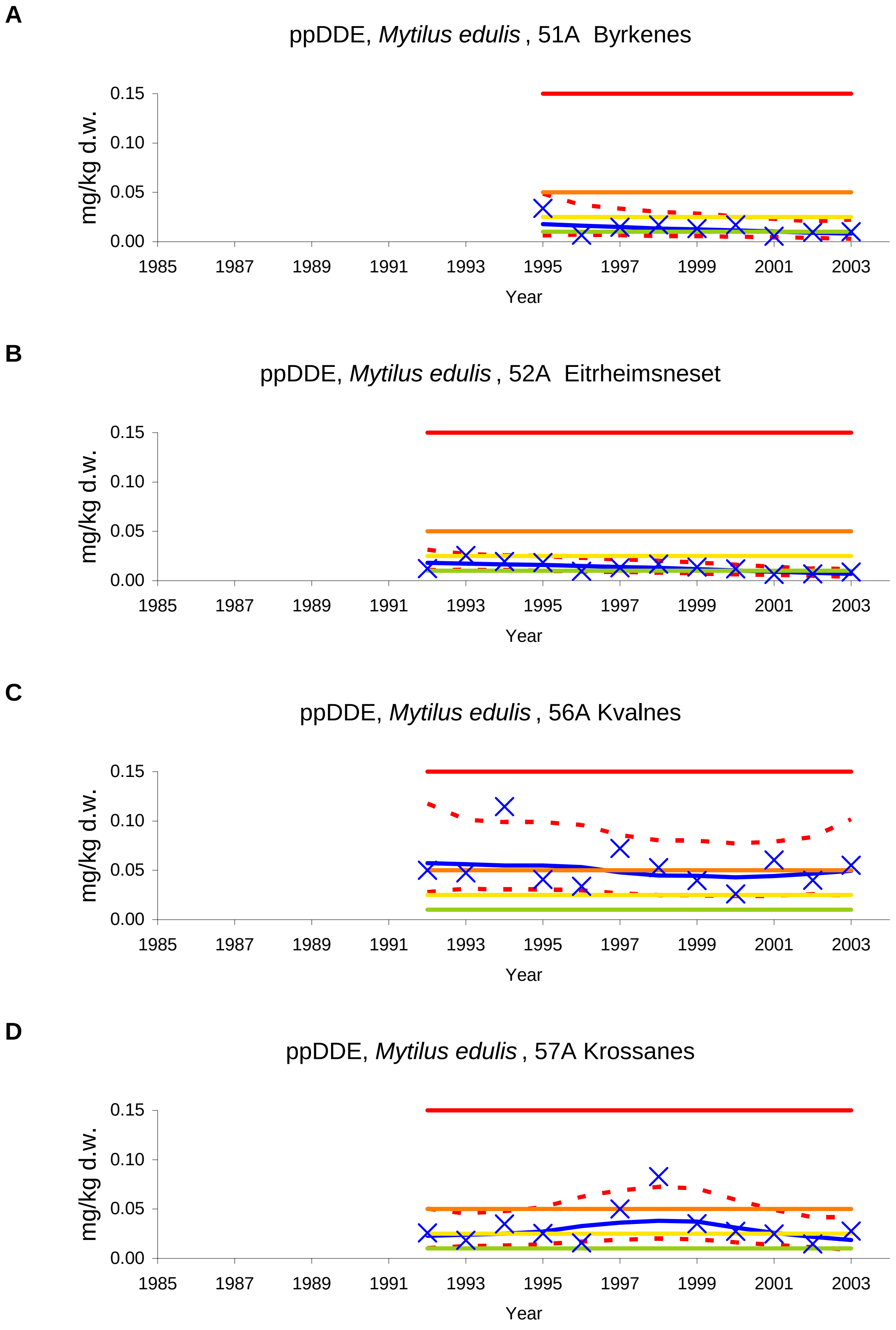


Figure 10. Median ppDDE concentration in blue mussel (*Mytilus edulis*) from inner (st.51A) to outer (st.57A) Sørfjord. (cf. Appendix F and Appendix H, and key in Figure 20). **Note: horizontal line for Class I is near x-axis.**

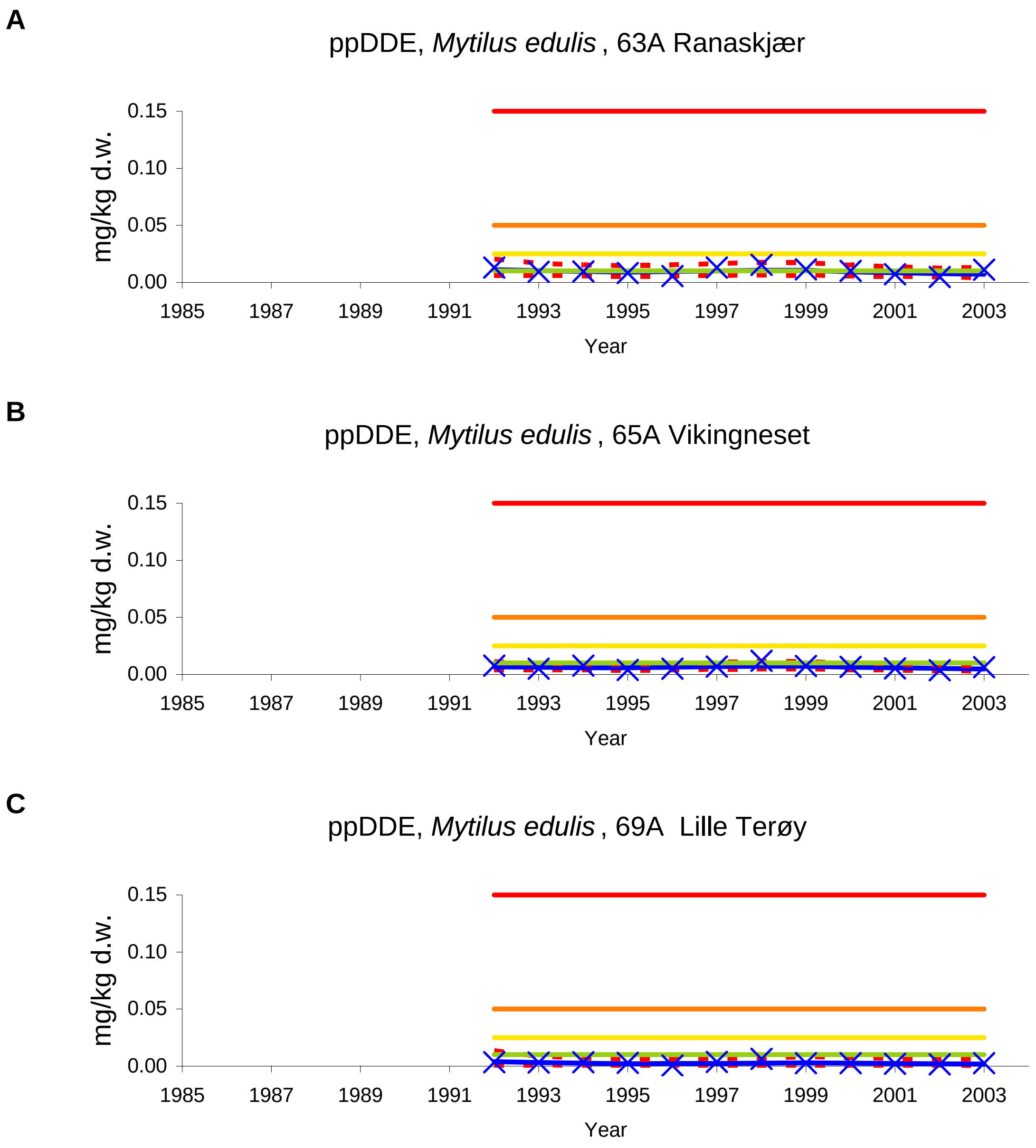


Figure 11. Median ppDDE concentrations in blue mussel (*Mytilus edulis*) from Hardangerfjord (st. 63A, 65A and 69A). (cf. Appendix F and Appendix H, and key in Figure 20). **Note: horizontal line for Class I is near x-axis.**

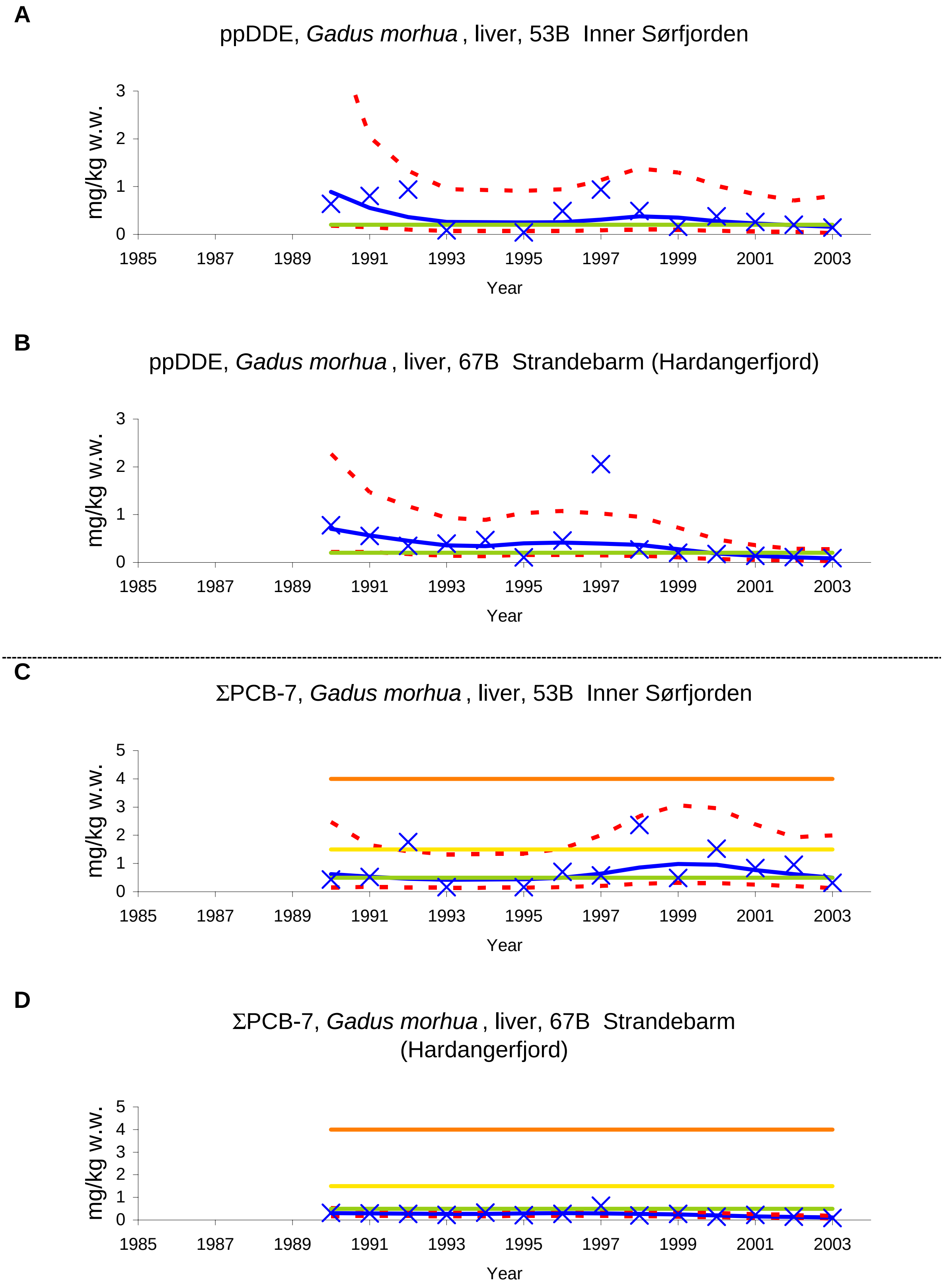


Figure 12. Median ppDDE and ΣPCB-7 concentrations in liver of cod (*Gadus morhua*) from Sørfjord (st.53B) and Hardangerfjord (st.67B) (cf. Appendix F and Appendix H, and key in Figure 20). **Note that for 1989 the upper confidence interval line is off-scale in Figure A.**

1.3.3. Lista area

Median concentrations of contaminants in mussels, cod and dab were slight and no upward trends were found (st.15, Appendix H and Appendix I).

1.3.4. Bømlo-Sotra area

It was impractical to continue sampling for flatfish at st.22F Borøyfjorden. Thus, a new station in Åkrafjorden, 21F Kyrping, was initiated in 2000. This station is located about 82km south-east of 22F, but like 22F, 21F is located in a reference area.

Mussels, cod and flounder from this area (22A, 23B, 21F) were slightly polluted or showed no overcentrations with respect to metals or organochlorines (Appendix H and Appendix I).

1.3.5. Orkdalsfjord area

Investigations in the area have been discontinued. Data for mussels is available for the period 1984-1996.

1.3.6. Open coast areas from Bergen to Lofoten

This stretch of coastline covers 7° of latitude to 68°N (Appendix F). Only one mussel station (st.98A) was investigated. Mussels were collected from 98A in 1992-1993. However, during the period 1994-1996 mussels were not found at this station but were collected from nearby Skrova harbour (98X). Since 1997 a "new" 98A location was found roughly 18 km north in a small fjord remote from any apparent point source of contamination.

In 2003, moderate overconcentrations (SFT's Class II) of cadmium were found in mussels and liver of plaice (st.98A/F) (Appendix H and Appendix I). An *upward* trend for cadmium in mussels was observed.

1.3.7. Exposed area of Varangerfjord near the Russian border

The remaining and northern area of JAMP in Norway stretches north of 68°N and east from a longitude of 17 to 29°E (Appendix F). In 2003 only two mussel stations, one for cod and one for plaice were investigated in the Varangerfjord (at approximately 70°N).

Slight overconcentrations (less than 2 times “high background”) of cadmium were found in liver of plaice (st.10F) (Appendix H and Appendix I).

1.3.8. Norwegian Pollution and Reference Indices (The Index Programme)

The Norwegian Pollution Control Authority (SFT) has requested a specific and small group of indices to assess the quality of the environment with respect to contaminants - The Index Programme. One index is based on the levels and trends of contaminant concentrations in blue mussels collected annually from a selection of the more contaminated fjords in Norway (Appendix J). SFT has also requested the testing of this index against “reference” stations from selected areas and fjords.

The Index scale varies from 1, when all areas or fjords are slightly polluted (Class I in SFT's environmental quality classification system (Molvær *et al.* 1997)), to 5, in which at least one sample from each area or fjord could be classified as extremely polluted or Class V in SFT's system.

Nine fjord areas were used to calculate the Pollution Index. On a comparable basis, the Index for 2003 was 2.9 compared to 3.2 in 2002. A value between 3 and 4 would be termed by the SFT system as “Severely” polluted and between 2 and 3 as "Markedly" polluted. One reason for the higher value in 2002 were the exceptionally high values of Lindane found at one station in the Grenlandsfjord area (st.71A), which were not found in 2003 (st.71A, cf. Green *et al.* 2004). Taking the supplementary stations (Strømtangen, Flåøya, Moholmen, and Toraneskaien) and analyses (TBT and dioxin) into consideration the Index was 3.6 (cf. Appendix J). This was due to the dioxin results for the Frierfjord area (Steinholmen) that were in Class V or “Extremely” polluted and TBT results for the Inner Oslofjord (Akershuskaia) in Class IV or “Severe”.

Only five fjord areas were included in Reference Index for 1998-2003 compared to seven-eight fjords used in previous years. But only four of these provided a common basis because the Lofoten area must be excluded. The Index for 2003 is 1.2 and lower than 1.3 for 2002. A value between 1 and 2 would be classified as moderately polluted, or Class II in SFT's system. With the new calculation where supplementary analyses of TBT are included, the Reference Index was 1.8, and 1.6 if Lofoten is included, compared to 1.2 using the older method. All five fjords/areas included TBT analyses. The inclusion of TBT analyses caused an increase from Class I to Class II in the mid and outer Oslofjord area and an increase from Class I to Class III in the Bømlo-Sotra area.

The use of the indices to assess the general level of pollution in contaminated or reference areas of coastal water for the period 1995 to 1999 has been reviewed (Green & Knutzen, 2001). The conclusions were mainly that the sample and analytical strategies lacked adequate coverage of the relevant contaminants and geographical areas. Furthermore, the report suggested supplementing the assessment of this type with relevant analyses of sediment. In 2002 the programme was improved by including more stations and parameters relevant to the blue mussel Pollution Index.

It is not the intent of the application of the indices to give a station by station account, however, time trend analyses for the entire period (1995-2003) showed some significant trends in mussels (cf. Appendix H). Seven cases with significant trends are worth noting:

- St.I307, Ramtonholmen in inner Oslofjord (Map 1, Appendix F) where the medians of cadmium and benzo[*a*]pyrene (BAP) were in Class I (in 2003) and *upward* trends were detected,
- St.I712, Gjemmesholmen in the Grenlandsfjord area (Map 3, Appendix F) where the median ΣPCB-7 was in Class II and a *downward* trend was detected,
- St.I132, Fiskåtangen in the Kristiansand harbour (Map 4, Appendix F) where the median ΣPCB-7 was in Class I and the median HCB was in Class II and *downward* trends were detected,
- St.I133, Odderø, west in the Kristiansand harbour (Map 4, Appendix F) where the medians of ΣPAH and ΣPCB-7 were in Class I and *downward* trends were detected,

1.4. Biological effects methods for cod

The JAMP-programme for 2003 included five biological effects methods (BEM): OH-pyrene, ALA-D, EROD, CYP1A and TBT (Table 2). The first four are discussed in this chapter (Figure 13 to Figure 15) and TBT is discussed separately (cf., section 1.5). Results for OH-pyrene, ALA-D, EROD and metallothionein (MT) in cod and flatfish, 1997-2001, have been published earlier (Ruus *et al.* 2003). For the 2003 investigations OH-pyrene, ALA-D, EROD and CYP1A were measured in Atlantic cod in the inner Oslofjord (30B), Sørfjord (st.53B), and Sotra-Bømlo area (23B). OH-pyrene was also measured in cod outside Lista (15B). It has become clear that cod caught in the open coastal area outside Lista are more strongly affected by PAHs than cod at the other stations, despite the large water exchange in that area (Ruus *et al.* 2003). Furthermore, stations from the inner Oslofjord and Sørfjord are considered to be more contaminated with metals and organochlorines than the other stations.

Table 2. Summary of biological methods employed by the JAMP-2003.

Code	Name	tissue sampled	Specificity
OH-pyrene	Pyrene metabolite	fish bile	PAH
ALA-D	δ-amino levulinic acid dehydrase inhibition	fish red blood cells	Pb
EROD	Cytochrome P4501A-activity (CYP1A/P4501A1, EROD)	fish liver	planar PCB/PCNs, PAHs, dioxins
CYP1A	Relative amount of cytochrome P450 1A-protein	fish liver	Supporting parameter for EROD
TBT	Imposex/Intersex	snail soft tissue	organotin

The reason to use biological effects methods within monitoring programmes is to evaluate whether marine organisms are affected by contaminant inputs. Such knowledge can not be derived from tissue levels of contaminants only. In addition to enable conclusions on the health of marine organisms, some biomarkers assist in the interpretation of contaminant bioaccumulation. The biological effects component of the Norwegian JAMP is possibly the most extensive of its type in Europe and includes imposex in gastropods as well as biomarkers in fish. The four chosen methods for fish were selected for specificity, for robustness and because they are among a limited set of methods proposed by international organisations, including OSPAR and ICES.

Under controlled conditions the measures derived from OH-pyrene, EROD and CYP1A increase with increased exposure to their respective inducing contaminants. The activity of ALA-D on the other hand is inhibited by contamination (i.e., lead), thus lower activity means higher exposure.

As in most previous years, 25 individual cod were sampled for biological effects measurements at each station. However, in 2003 (as in 2002) only three stations (four for OH-pyrene) were sampled, instead of eight stations as in previous years. Furthermore, no samples for BEM were taken from flatfish. All fish were collected by local fishermen and kept alive until sampling by NIVA staff within 5 days. There is a continuous process to train and inform the fishermen that collect fish for JAMP to ensure the quality of the material.

1.4.1. OH-pyrene metabolites in bile

Detection methods for OH-pyrene have been changed (improved) two times since the initiation of these analyses in the JAMP programme. In 1998 the support/normalisation parameter biliverdin was changed to measurement of light absorbance at 380 nm. Furthermore, in 2000, the use of single-wavelength fluorescence for quantification of OH-pyrene was discontinued and the use of HPLC separation with fluorescence detection was implemented. Although there is a good correlation between results from the two methods they can not be compared directly. The single wavelength fluorescence method is naturally more unspecific and will include fluorescence from more components than the HPLC method, which has extremely high specificity towards individual metabolites. The interpretation of OH-pyrene data is therefore primarily focused on the differences between the stations within each year.

In 2003 the median concentration of OH-pyrene metabolites in cod from the inner Oslofjord (30B), was higher than in cod from Lista (15B), Inner Sørfjorden (53B) and the “reference” station on the west coast (23B) (Figure 13, Appendix H). However, the variability (expressed as standard deviation) was higher than the respective medians at stations 15B and 53B (Figure 37, Appendix I). This indicated that some individuals at these two stations had been exposed to PAHs.

For 1998, 1999, 2001 the median concentrations of OH-pyrene in cod from Lista (15B) were higher than at stations 30B, 53B and 23B (no samples from 15B in 2000). In 2002 and 2003 concentrations were below those at stations 30B and 53B but above station 23B. The variability at Lista was relatively high indicating large differences among the 25 cod sampled. Lista is located in an area with a large discharge of PAH to water from an aluminium-smelter. The fish were collected on the open coast and the discharge from the smelter occurred in a small bay about 2-3 km away. No significant temporal trends were found at these three stations.

Bile metabolites of PAH can be detected within a short period (hours) following exposure, and holding conditions prior to sampling may affect results. However, measures were taken in 1998 and 1999 to minimise or remove the problem. Given the precautions taken, it is unlikely that the observed levels have been caused by storage of fish prior to sampling.

In 2003, the median concentration of OH-pyrene in cod from station 30B (inner Oslofjord) was higher than the other three stations. When considering the whole period (1998-2003), the yearly median concentration at 30B were the highest or next highest compared to the other 2-3 stations Appendix H). Furthermore concentrations at 53B Sørfjorden were usually higher than 23B. This presumably reflect the general contamination of the two areas (inner Sørfjord and inner Oslofjord).

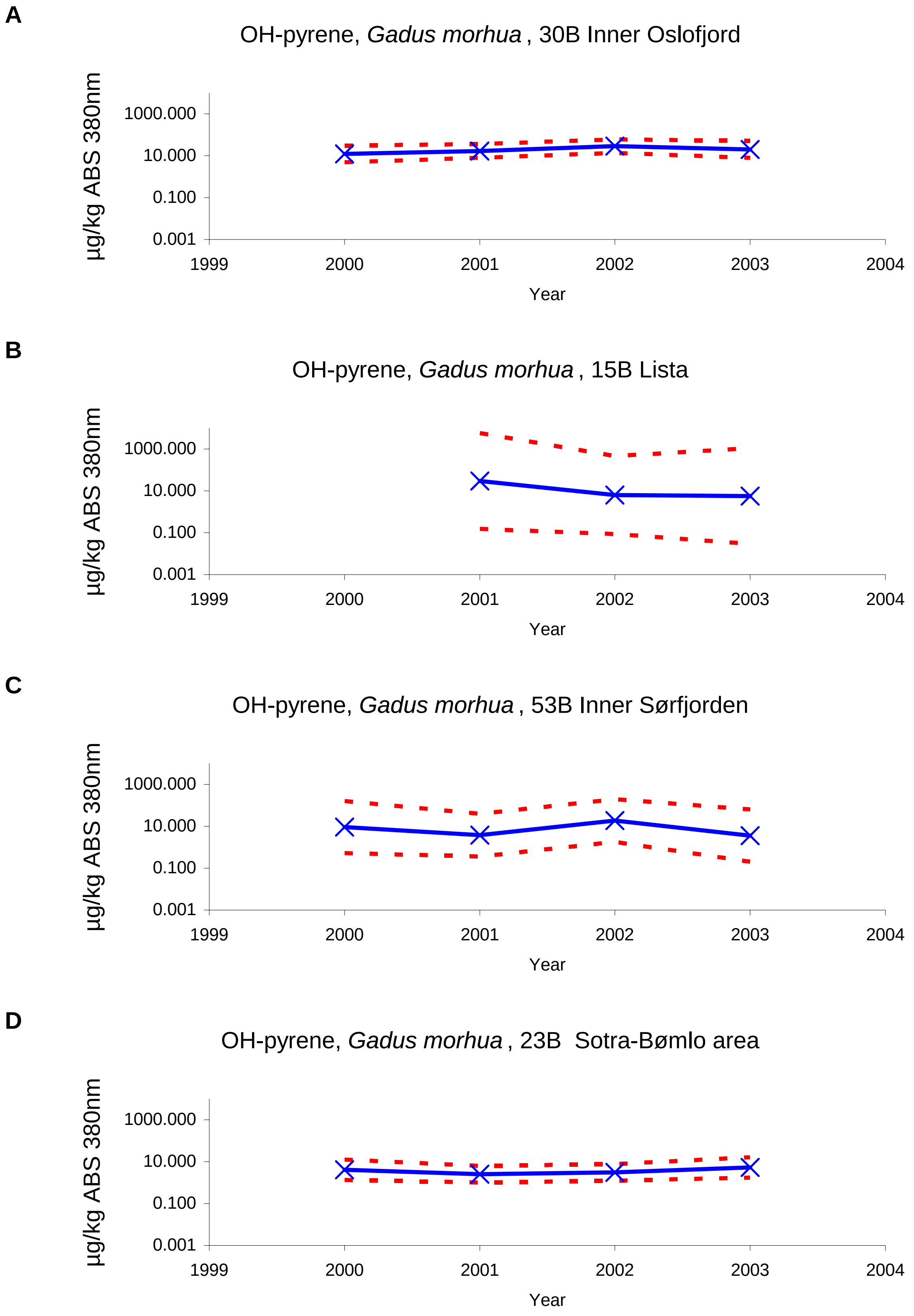


Figure 13. Concentration of OH-pyrene (µg/kg ABS 380nm) in bile from Atlantic cod collected at the indicated stations 2003. There was insufficient data to present a time series from st. 15B. (cf. Appendix F and Appendix H, and key in Figure 20). **NB: log-scale.**

1.4.2. ALA-D in blood cells

Most years the activity of ALA-D in cod was generally inhibited (indicating the influence of lead contamination) at the two stations, i.e. 30B and 53B, compared to stations (i.e. 36B, 23B, and 10B). This was the case for 1997, 1998, and 2000-2003 (cf. Appendix H, results for stations 30B, 53B, and 23B in Figure 14). For all years 1997-2003 the activity of the enzyme at st.53B in Sørfjord was generally lower than station 23B on the open coast, about 130 km away.

In 2003 (as in 2002), ALA-D was measured only in cod at stations 23B, 30B and 53B. At these three stations the activity was more inhibited in 2002 compared to 2000-2001. As in previous years, the inibition was largest in the Sørfjord (53B) and the inner Oslofjord (30B) in 2003. (Figure 14, Appendix H). This indicates pollution of metals at 53B and 30B. The median ALA-D activity 1997-2002 was lowest at station 53B, but the variability has been generally high at this station (Appendix H, cf. Green *et al.*2004). A slight increase in median ALA-D activity could be seen from 2002 to 2003 indicating less exposure. This was supported by measurements of lead concentrations in cod liver, where the median decreased about a third from 2002 to 2003 (Appendix H). Furthermore, the total discharge of lead into the inner Sørfjorden in 2003 was about 2.4 tonnes, or 60% of the 2002 discharge (Ruus & Green 2004). No significant temporal trends in ALA-D activity were found at any of the three stations.

Although ALA-D inhibition is lead-specific, it is not possible to rule out interference by other metals or organic contaminants. Previous studies indicate that only zinc may ameliorate the effect of lead to some extent, but the effect is variable and weak. Other studies have also shown ALA-D to be a remarkably robust biomarker and factors such as sex, age or season do not appear to affect the response.

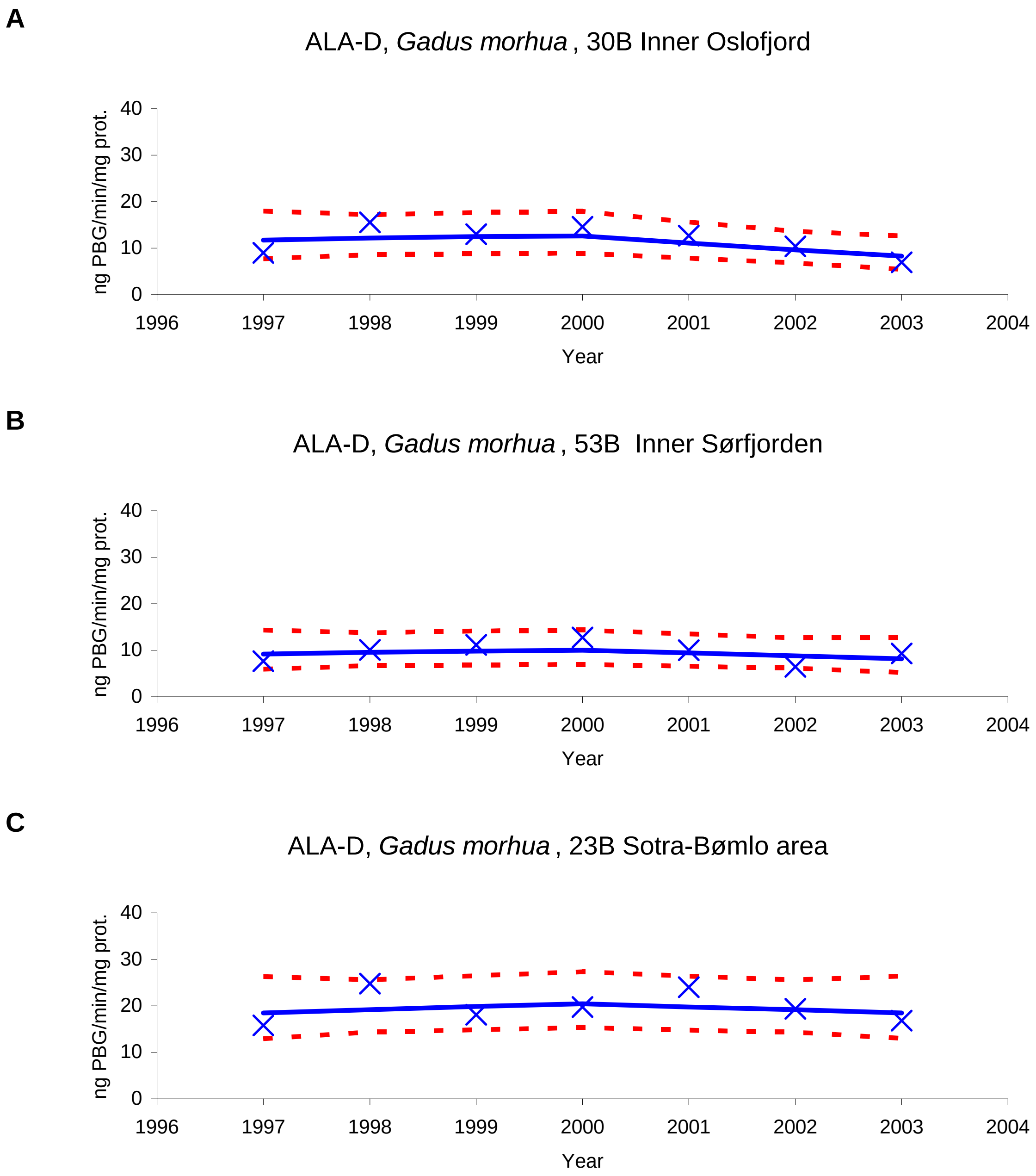


Figure 14. Activity of δ-aminolevulinic acid dehydrase (ALA-D, ng PBG/min/mg protein) in red blood cells from Atlantic cod collected at the indicated stations 2003. (cf. Appendix F and Appendix H, and key in Figure 20).

1.4.3. EROD activity and CYP1A protein in liver

EROD activity

High activity of hepatic cytochrome P4501A activity (EROD) normally occurs as a response to the contaminants indicated in Table 2. It was expected that higher activity would be found at the stations that were presumed to be most perturbated by planar PCBs, PCNs, PAHs or dioxins, which were st.30B (inner Oslofjord) and 53B/F (inner Sørfjord). However, median EROD activity at 53B was lower than at 23B (Figure 15, Appendix H). Previous years have also shown that EROD in fish at stations 30B and 53B are not consistently higher than at other stations. At all three stations, median EROD activities were lower in 2003 than in 2002. No significant temporal trends were found at these three stations.

Extreme concentrations of PCBs were found in four individuals of cod from the inner Sørfjord in 2002 (Green *et al.* 2004), which should induce a subfamily of cytochrome P450A1 proteins (CYP 1A) and thus increase EROD activity in these individuals. Two of these fish were those with the highest EROD-activities (although not much higher than some individuals with moderate PCB-concentrations). However, the other two extreme-PCB-concentration-fish had moderate hepatic EROD activities. It was concluded from the finding that undetermined confounding factors, which affects EROD activity, were likely present, and that moderate EROD activities do not disprove an environmental problem, at least with respect to the PCB congeners in question (Green *et al.* 2004). There were no individuals with correspondingly high PCB-concentrations in 2003 (unpublished data).

No adjustment for water temperature has been made. Fish are sampled at the same time of year (September-November) when differences between the sexes should be at a minimum. Statistical analyses indicate no clear difference in activity between the sexes (Ruus *et al.* 2003). It has been shown that generally higher activity has been found at more contaminated stations (Ruus *et al.* 2003). However, the response is inconsistent (cf. Appendix H), perhaps due to sampling of populations with variable exposure history. Besides, there is evidence from other fish species that continuous exposure to e.g. PCBs may cause adaptation, i.e. decreased EROD response.

CYP1A protein

The cytochrome P450 system is a large superfamily of enzymes with several hundred forms comprising 265 different families (of which animals have 69), further divided into subfamilies (see Nelson *et al.* (1996) and http://drnelson.utmem.edu/CytochromeP450.html for overview). The system is a highly diversified set of proteins and is found in bacteria, plants and lower eukaryotes, as well as in animals. Members of the P450 subfamiliy of cytochrome proteins (CYP1A) are particularly important in the metabolism of many pollutants. In the case of PCBs and related compounds, iso-enzymes of CYP1A are responsible for the insertion of oxygen into the molecular structure of the congeners. In addition to being substrates for biotransformation, PCBs and other chemicals can also interact with cytochrome P450 as inducers. Several studies have indicated that P450 induction is the first step in a series of toxic symptoms, such as immunosuppression, vitamin and hormonal imbalance, and reproductive failure. While the EROD assay measures this induction as an increase in enzyme activity, the CYP1A ELISA assay measures the amount of enzyme (protein) in the microsomal fraction. It is therfore common to observe a correlation between these two measures, as found in the 2003-data (Figure 16).

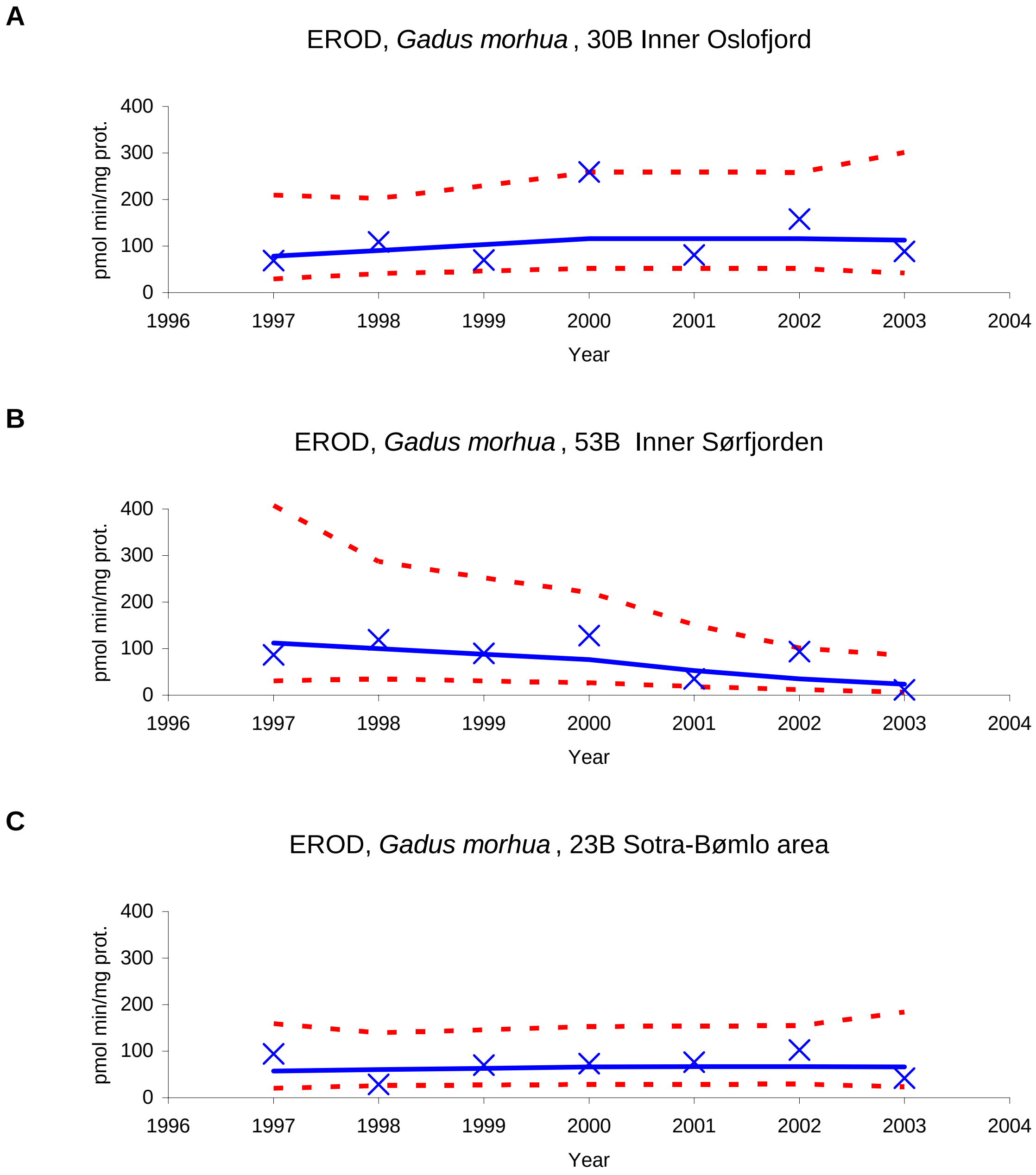


Figure 15. Activity of cytochrome P4501A (EROD, pmol/min/mg protein) in liver from Atlantic cod collected at the indicated stations 2003. (cf. Appendix F and Appendix H, and key in Figure 20).

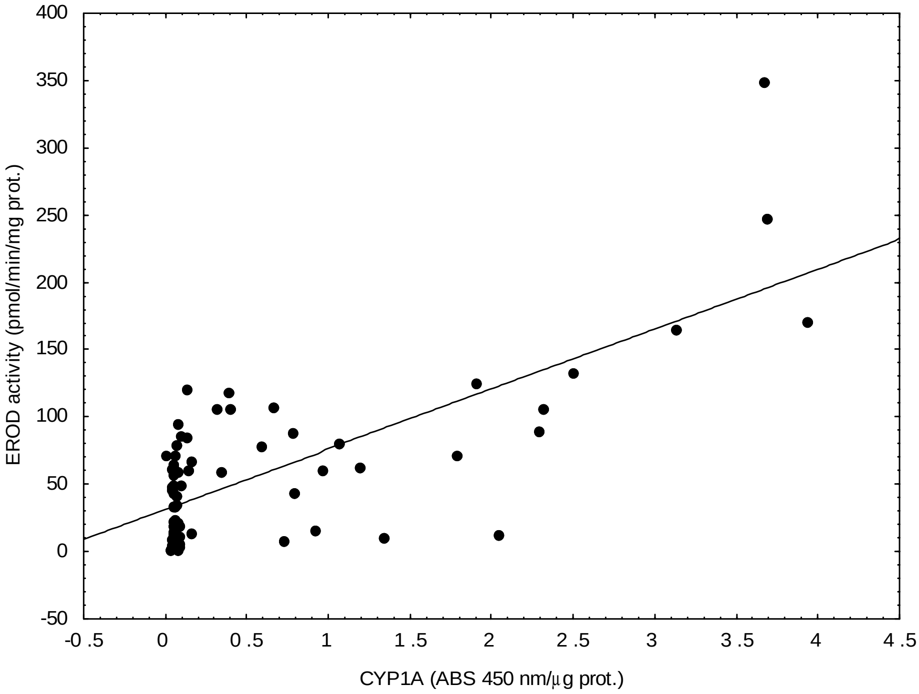


Figure 16. Concentration of cytochrome P4501A protein (CYP1A) versus EROD activity. The regression is significant ($p<0.0001$) with a correlation coefficient $R^2=0.53$.

1.4.4. Concluding remarks

The application of BEM methods within JAMP through the years 1997-2001 has indicated that the location 15B, previously regarded as only diffusely polluted, has an input of PAH which is sufficient to markedly affect fish in the area. For 2002-2003, however, the median concentrations of OH-pyrene in cod at 15B were below those at stations 30B and 53B. The variability at this station was relatively high indicating large differences among the 25 cod sampled. In 2003, the median concentration of OH-pyrene in cod was still higher at station 30B, than at station 53B. Chronic exposure to PAHs may lead to liver lesions and reproductive disorders in fish, as shown through National Ocean and Atmospheric Administration's (NOAA (USA)) studies in Puget Sound. The highest levels of PAH metabolites observed in the bile of cod from station 15B are high compared to other studies, but it is not at present possible to infer population effects on cod in the area. It would be relevant to include DNA adduct analyses at some stage to clarify whether the cellular repair system of cod is sufficient to protect against damage from PAH radicals.

Results for the period 1997-2003 clearly indicated that there are lead effects, shown by decreased activity of the enzyme ALA-D in the two most strongly polluted areas, i.e. cod from the inner Oslofjord (30B) and cod from the inner Sørfjord (53B).

Median EROD activity at station 53B was lower than at the less contaminated 23B station. Previous years have also shown that EROD in fish at stations 30B and 53B are not consistently higher than at other, presumed cleaner stations. At all three stations, median EROD activities were lower in 2003 than in 2002. The EROD activities correlated significantly with amount of CYP1A protein (measured as ABS 450 nm/µg protein).

1.5. Effects and concentrations of organotin

Effects from organotin in dogwhelks (*Nucella lapillus*) were investigated at nine stations. Organotin concentrations in dogwhelks and blue mussels (*Mytilus edulis*) were quantified at fourteen stations. The stations are located along the coast of Norway and samples were collected September-October 2003 (Appendix E and maps in Appendix F).

TBT-induced development of male sex-characters in females, known as imposex (VDSI and RPSI), was analysed according to OSPAR-JAMP guidelines. Detailed information about the chemical analyses of the animals is given in Følsvik *et al*. (1999).

1.5.1. Dogwhelks

Effects from organotin were observed at all stations in 2003 except for st,11G in northern Norway (Appendix I). Concentrations of organotin were relatively low (≤ 0.050 mg/kg d.w., Class I) at the coastal locations in Southwest of Norway, but lowest at the northern locations. Most heavily affected were snails from western Norway and the Haugesund location (st.227G, VDSI=4.1) and the highest organotin levels were also found at Haugesund (median >0.800 d.w., Class III, cf. Appendix H and Appendix I. This is the highest concentration measured in the period 1997-2003 (Figure 17). Except for western Norway (22G) and Haugesund (227G), concentrations had generally decreased compared to 2002 (cf. Green *et al*. 2003). However, no statistically significant temporal trends for the period 1997-2003 were found at Haugesund (227G) or Færder (36G).

The results for 1997-2003 indicates higher concentrations and imposex-indexes at the near harbour station Haugesund (227G) compared to the more remote station Færder (36G) in the outer Oslofjord (Figure 17, Appendix H).

At Færder (36G) the VDSI values for 1993-2003 are lower than 1991 (Figure 18, Appendix H). The values for Haugesund area (227G) are slightly worse in 1991 and 2000-2002 than for other years.

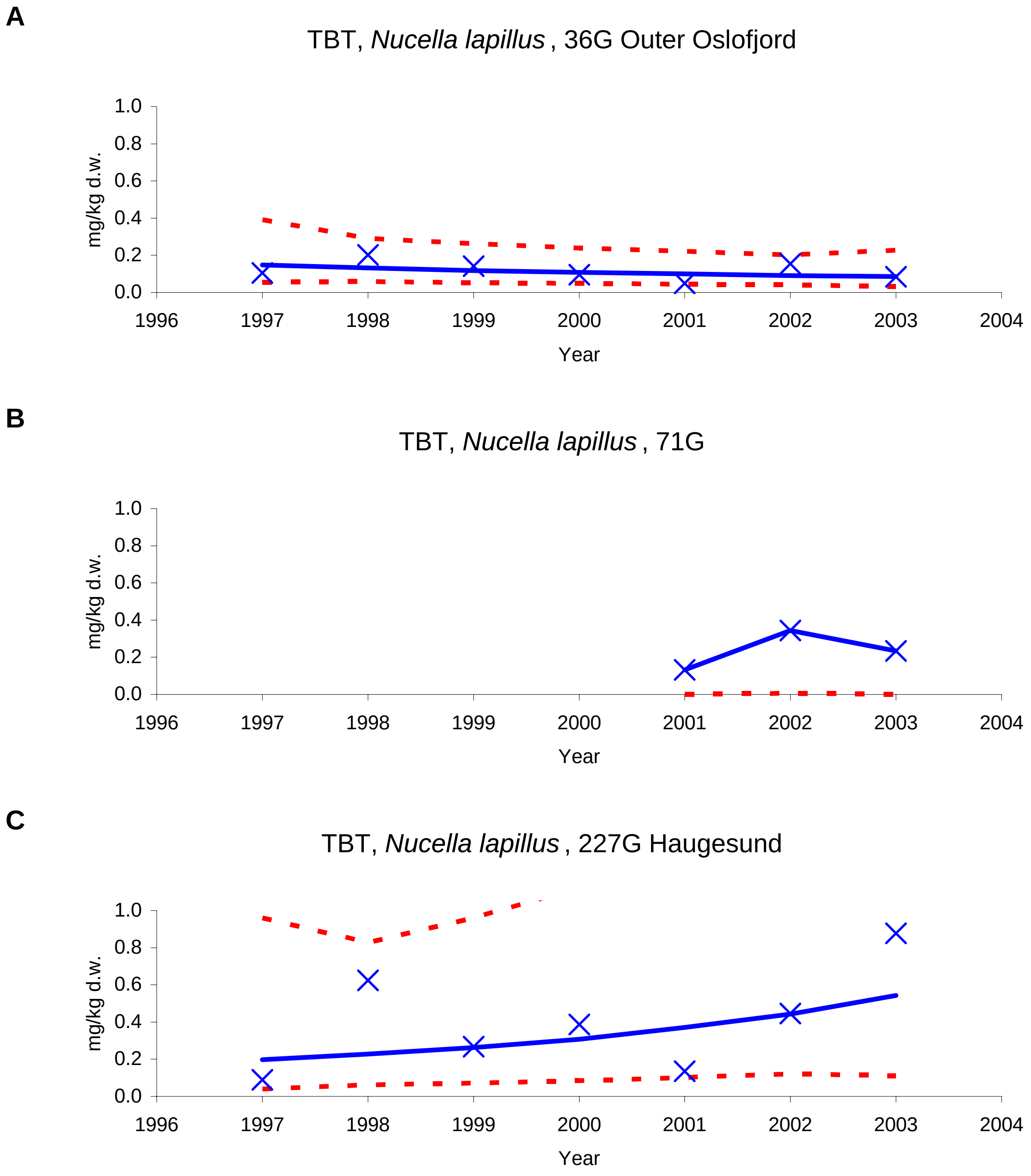


Figure 17. Median concentration of TBT (on a formulation basis) in dog whelks (*Nucella lapillus*) from outer Oslofjord (st.36G), Langesundsfjord (west of Oslofjord) (st.71G) and Haugesund (St.227G), mg/kg (mg TBT/kg) dry weight. NB: (cf. Appendix F and Appendix H, and key in Figure 20). **Note: for some years the upper confidence interval line is off-scale in Figures B and C.**

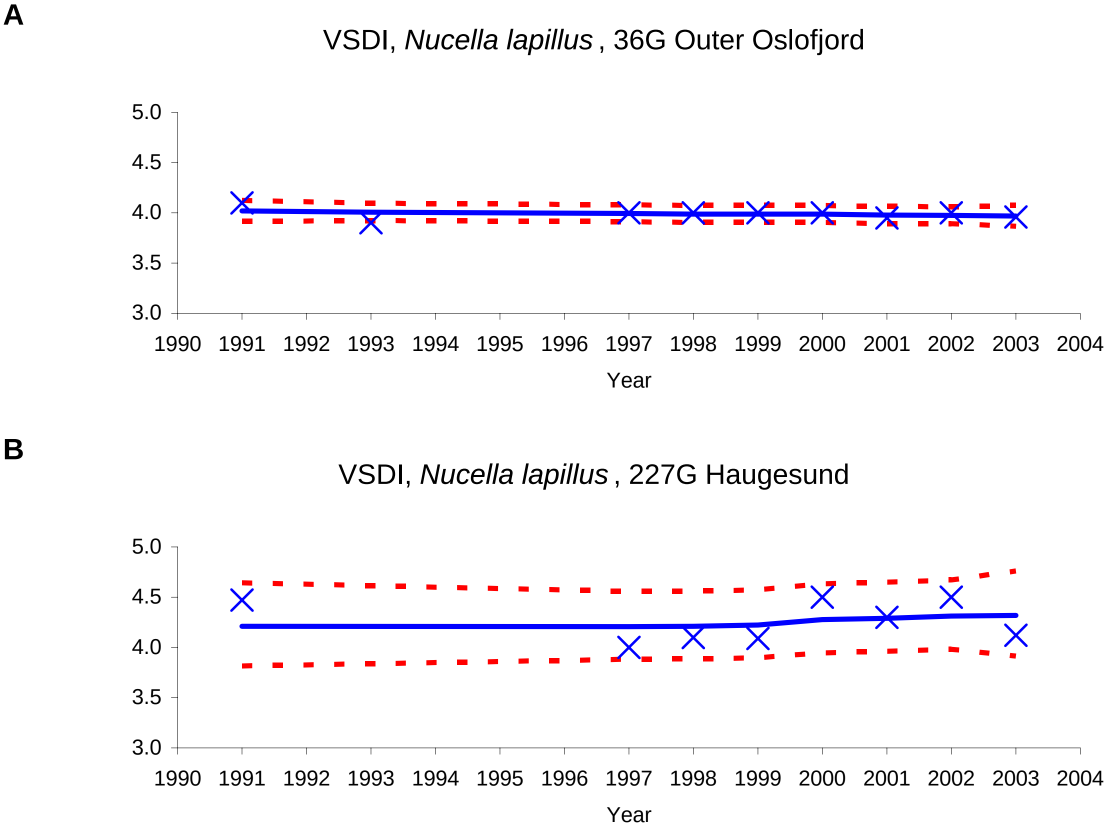


Figure 18. Imposex (VDSI) in dogwhelks (*Nucella lapillus*) at 2 stations in southern Norway; Færder (36G) and Haugesund (227G). Data from 1991 (Harding *et al*. (1992) and 1993 (Walday *et al*. 1997). (cf. Appendix F and Appendix H, and key in Figure 20).

1.5.2. Mussels

Concentrations of organotin in mussels for 2003 were high in the near harbour stations (301, 30A, 712, 713 and 227A) and western Norway (22A), while they were low at the northern stations (10A, 11X) and at Farsund (15A). Levels (median) ranged between 0.006 and 1.08 mg/kg d.w.. According to the Norwegian classification of environmental quality (Molvær *et al.* 1997) inner Oslofjord (st. 301) was severely polluted (Class V) from TBT, while the other inner Oslofjord station (30A), the Breviksfjord (712, 713), Espevær (22A) and Haugesund (227X) were markedly polluted (Class III) from TBT. The northern stations (10A, 11X) and the Lista area (15A) were only slightly polluted (Class I), while the rest of the samples were moderately polluted (Class II). Compared to previous years, most concentrations were lower in 2003, but an increase was observed at near harbour station in Haugesund (227X) (Figure 19) and Espevær, western Norway (st. 22A). Also the remote Færder station (36A) had concentrations somewhat higher than in 2002. However, no significant temporal trends for the period 1997-2003 were found at any station.

1.5.3. Concluding remark

The presence of organotin (as TBT) in Norwegian waters still exceeded acceptable levels in 2003, in particular close to harbours. Concentrations of organotin in mussels and dogwhelks were elevated, and biological effects from TBT were found in dogwhelks from all of the investigated areas, except one northern station. No significant trends were found, however TBT concentrations in mussels were mostly lower than in 2002. It is a cause for concern that the ban on the use of TBT in antifouling on boats <25 m of length has not lead to a clear improvement in the investigated areas.

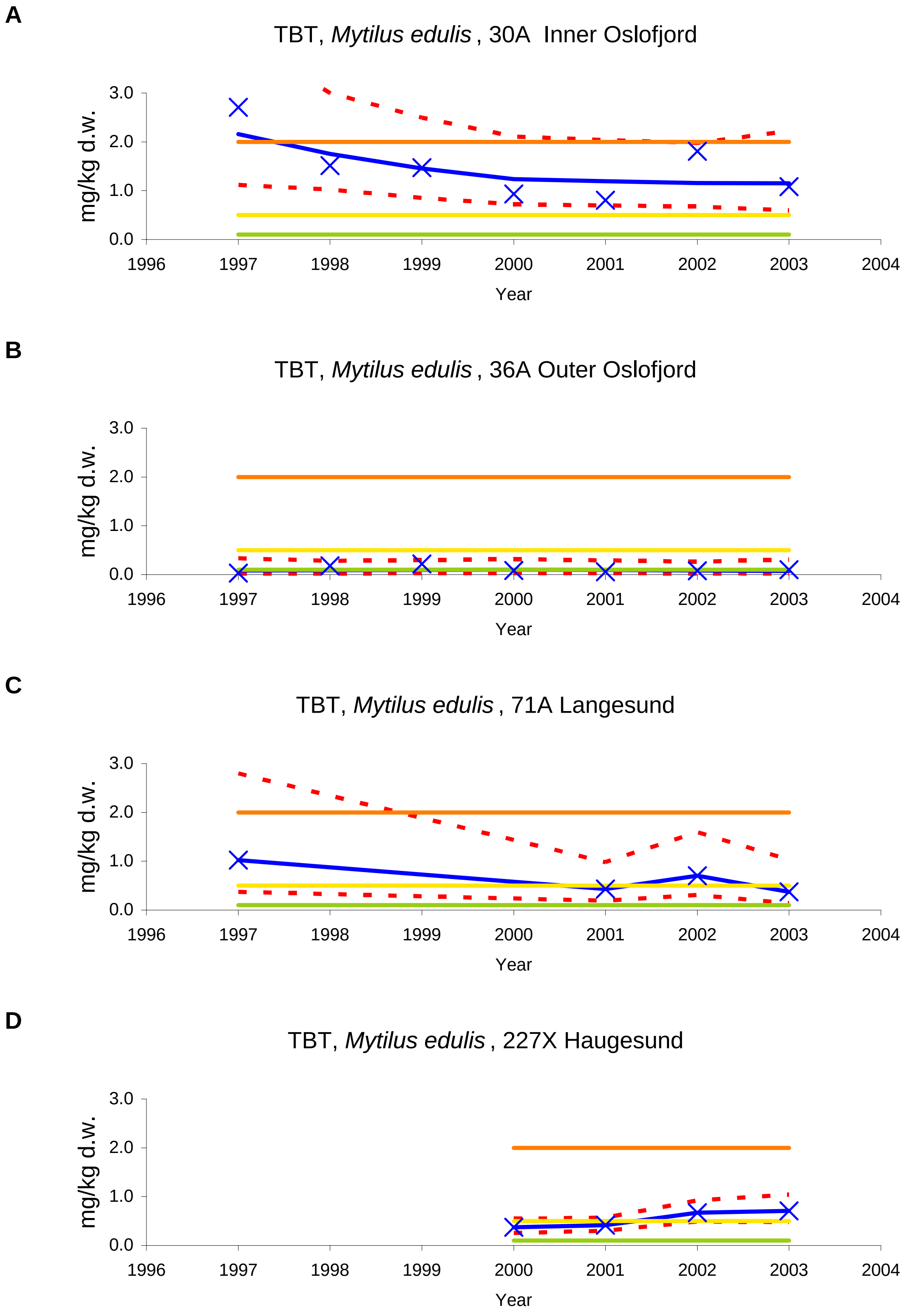


Figure 19. Median concentration of TBT (on a formulation basis) in blue mussels (*Mytilus edulis*) from inner (st.30A) to outer (st.36A) Oslofjord, Langesundsfjord (west of Oslofjord) (st.71A) and Haugesund (St.227X), mg/kg (mg TBT/kg) dry weight. (cf. Appendix F and Appendix H, and key in Figure 20). **Note: for 1997 in Figure A the upper confidence interval line is off-scale. Note: horizontal line for Class I is near x-axis**

1.6. Overall conclusions

In regards to JMP/JAMP Purpose A (health assessment), attention should be called to the list from Norwegian Food Safety Authority (SNT) which names the restrictions and recommendations concerning the sale and consumption in Norway for seafood taken from Norwegian fjord areas (Table 3). Furthermore, SNT has issued general advice to avoid consumption of seafood taken in or in close proximity to harbours (http://www.miljostatus.no/templates/PageWithRight-Listing____2701.aspx).

In regards to JMP/JAMP Purpose C (spatial distribution assessment), the concentrations found in 2003 are indicated in the bar graphs shown in Appendix I. Provisional “high background" levels were used to identify elevated concentrations. This assessment revealed no new areas of concern that are not currently under surveillance.

In regards to JMP/JAMP Purpose D (temporal trend assessment), and considering where statistically significant linear trends have been found, the following cases should be noted:
- ΣPCB-7 in mussels from the inner Oslofjord has decreased;
- Mercury in cod fillet from the inner Oslofjord has increased since 1984;
- Cadmium in cod liver from the inner Oslofjord has increased since 1990;
- HCB in mussel from Langesundsfjorden has decreased since 1983;
- ΣPCB-7 and ppDDE in flounder fillet from the innder Sørfjorden has decreased since 1990;
- Mercury in flounder fillet from the inner Sørfjorden has increased since 1988;
- Cadmium in mussels from four stations in the Hardangerfjord/Sørfjorden has decreased since 1987;
- Lead in mussels from two stations in the Hardangerfjorden has decreased since 1990;
- Cadmium in mussels from Lofoten area has increased since 1992.

Study of the power of temporal trend monitoring was useful in assessing existing sampling strategies, however, modifications might be needed to account for local conditions (see Appendix O in Green *et al.* 2000).

The 2003 investigation also includes results on Norwegian Pollution Control Authority Pollution Indices (Appendix J), and discussion of the results of biological effects methods including imposex and intersex (chapters 1.4 and 1.5).

Table 3. Summary of action taken by the Norwegian Food Safety Authority (*Mattilsynet* SNT, http://www.mattilsynet.no/portal/; http://www.lovdata.no/for/sf/hd/td-19961129-1240-0.html) in co-operation with SFT (http://www.miljostatus.no/templates/PageWithRightListing____2701.aspx) concerning the consumption and sale of fish products along the Norwegian Coast. (Area designations from SFT, pers. comm. 2004) Restrictions on sale vary and may concern the whole or part of fish product.

Area of concern (km^2)	Main parameters of concern	Last year of issue/ evaluation	Main fish/shellfish product of concerned	Recommendations or restrictions of concern:
Mid [1] and Inner Oslofjord (498.9) (includes Drammensfj.)	PCB	2004	fish liver, eel	Consumption and sale
Tønsberg area (23.7) (includes (Vrengen)	PCB	2004	fish liver, eel, mussels	Consumption
Inner Sandefjordfjord (1.5)	PCB	1993	fish liver	Consumption and sale
Grenlandsfjords, Langesundsfjord (90.3)	Chl.org[2]/ Dioxins	2004	fish, shellfish	Consumption and sale
Kragerø (3.2)	PAH Dioxins	2004	eel, mussels	Consumption
Tvedestrand (2.3)	PCB	2000	fish liver	Consumption and sale
Arendal (8.0)	PCB	2000	fish liver	Consumption and sale
Inner Kristiansandsfjord (33.3)	Chl.org [2]/ Dioxins/PCB	2000	fish, shellfish	Consumption and sale
Farsund area (42.0)	PCB PAH	2000	fish liver, mussels	Consumption and sale
Fedafjord (11.2)	PAH	1995	mussels	Consumption and sale
Flekkefjord (4.2)	PCB	2000	fish liver	Consumption and sale
Stavanger (4.0)	PCB PAH	2001	fish liver, mussels	Consumption
Sandnes (1.7)	PAH	2001	Mussels	Consumption
Karmsund-Eidsbotn (24.1)	PCB, PAH	2004	fish liver [3], shellfish	Consumption and sale
Saudafjord (24.1)	PAH	1992	fish liver, mussels	Consumption and sale
Sørfjord (62.2)	Cd Pb Hg PCB	2004	fish, shellfish	Consumption and sale
Bergen area (169.9)	PCB	1998	fish, shellfish	Consumption and sale
Årdalsfjord (30.4)	PAH Pb Cd	2004	mussels	Consumption and sale
Sunndalsfjord (100.1)	PAH	2004	fish liver, mussels	Consumption and sale
Hommelvik (2.6)	PAH	1985	mussels	Consumption and sale
Inner Trondheimfjorden (1.2)	PAH PCB	2004	fish liver, mussels	Consumption
Brønnøysund (7.0)	PAH	2003	mussels	Consumption
Vefsnfjord (76.4)	PAH	2004	mussels	Consumption and sale
Sandnessjøen (0.4)	PAH	2003	mussels	Consumption
Inner Ranfjord (15.1)	PAH Pb Hg	1997	mussels	Consumption and sale
Narvik (11.6)	PCB	2003	fish	Consumption
Ramsund (5.4)	PCB	2000	fish, shellfish	Consumption and sale
Harstad (2.9)	PCB heavy metals	2004	fish liver, mussels	Consumption and sale
Tromsø (17.7)	PAH	2004	Mussels	Consumption and sale
Hammerfest (4.1)	PAH	2004	mussels	Consumption and sale
Honningsvåg (3.3)	PAH	2004	mussels	Consumption and sale

[1] Includes, Hvitsten, Moss, Horten og Holmenstrand

[2] Organochlorine compounds

[3] Concerns only Eidsbotn

The JAMP issues to which these investigations are relevant are shown in Table 4.

Table 4. JAMP issues relating to the Norwegian JAMP (cf., SIME 2002).

Subject	JAMP issue	Question	Recent Norwegian contribution
Hg, Cd and Pb	JAMP issue 1.2.	What are the concentrations and fluxes in sediments and biota?	1996-1997: Levels in sediment (cf., Green *et al.* 2000) 2002: Levels and trends in biota (annual investigations since 1981, Chapter 1.3) 2002: INDEX for blue mussels from selected stations (annual investigations since 1995, cf. Chapter 1.3.8)
TBT	JAMP issue 1.3.	To what extent do biological effects occur in the vicinity of major shipping routes offshore installations, marinas and shipyards	2002: Levels and trends in mussels and snails (annual investigations since 1997, cf. Chapter 1.5)
PCBs	JAMP issue 1.7.	Do high concentrations pose a risk to the marine ecosystem	[as for JAMP issue 1.2]
PCBs	JAMP issue 1.8.	Do high concentrations of non-ortho and mono-ortho CBs in seafood pose a risk to human health?	1995: INDEX for blue mussels from selected stations (cf. Green 1997) 1996: Levels in cod (cf. Green *et al.* 2000)
PAHs	JAMP issue 1.10.	What are the concentrations in the maritime 1) area?	1992: Levels in shellfish (Green *et al.* 1995) 1992-1993: Levels in fish and mussels for selected stations (Knutzen & Green 1995) 1996-1997: Levels in sediment (cf., Green *et al.* 2000) 2002: INDEX for blue mussels from selected stations (annual investigations since 1995, Chapter 1.3.8)
PAHs	JAMP issue 1.11.	Do PAHs affect fish and shellfish?	1998: Biological effects methods in cod (cf. Chapter 1.4)
Other synthetic organic compounds	JAMP issue 1.12.	How widespread are synthetic organic compounds within the maritime 1) area?	2002: Levels and trends in biota (annual investigations since 1983 of selected organochlorines, cf. Chapter 1.3) 1996: Introductory investigation of organochlorines in cod livers (cf. Green *et al.* 2000)
Chlorinated dioxins and dibenzofurans	JAMP issue 1.15. 2)	What concentrations occur and have the policy goals (for the relevant parts of the maritime 1) area) been met?	1995: INDEX for blue mussels from selected stations (cf. Green 1997) 1996: Introductory investigation of organochlorines in cod livers (cf. Green *et al.* 2000)
Biological effects of pollutants	JAMP issue 1.17.	Where do pollutants cause deleterious biological effects?	2002: Southern Coast, planar PCBs, metals, PAHs in cod (annual investigations since 1997, cf. Chapter 1.4)
Chemicals used	JAMP issue 5.3.	In which areas do pesticides and antibiotics affect marine biota?	2002: Levels and trends in biota (cf. Chapter 1.3)
Ecosystem health	JAMP issue 6.1. 2)	How can ecosystem health be assessed in order to determine the extent of human impact?	Results for the other issues are also relevant here

1) Not defined in original text

2) See SIME 1997

2. Technical Details

2.1. Compliance with guidelines/procedures

2.1.1. JAMP programme

Samples were collected and analysed, where practical, according to OSPAR guidelines (OSPAR 1990, 1997) and screened and submitted to ICES by agreed procedures (ICES 1996). The most important point of concern are those stations where insufficient number of fish were collected (cf. Appendix G).

2.1.2. Overconcentrations and classification of environmental quality

This report focuses on the principle cases where *median* concentrations exceeded the upper limit to Class I in the Norwegian Pollution Control Authority's (SFT's) **environmental quality classification system** (cf. Molvær *et al.* 1997). The relevant extract from the system is shown in Table 5 and show five classes from Class I, “slightly polluted”, to Class V, “extremely polluted”. However, the system does not cover all the contaminants in indicator species-tissues used in JAMP. To assess concentrations not included in the system provisional "high background" values were used (Table 6). The factor by which concentrations exceeded “high background” is termed **overconcentration**. It should be noted that there is in general a need for periodic review and supplement of this list of limits in the light of results from reference localities and introduction of new analytical methods, and/or units. Because of changes in the limits, assessments of overconcentrations for years prior to 1997 made in this report may not correspond to figures and assessments made in previous national comments. The median concentration can be found in the tables in Appendix H or figures in Appendix I.

A review of provisional "high background" concentrations based on recent JAMP-data generally confirmed that the reference concentrations (i.e., upper limit for Class I) in SFT's classification system, but recommended the following revisions (Knutzen & Green 2001b, concentrations in µg/kg wet weight):

- Cod liver - ΣDDT: Either increase limit from 200 to 300 or preferably replace ΣDDT with p,p-DDE and keep the limit at 200
- Cod liver - ΣHCH: Decrease limit from 50 to 30.
- Cod liver - TEPCDD/PCDF: Decrease limit from 0.015 to 0.01
- Cod fillet - ΣPCB7: Decrease limit from 5 to 3
- Cod fillet - ΣHCH: Decrease limit from 0.5 to 0,3
- Blue mussel - ΣPCB7: Decrease limit from 4 to 3

Mostly based on data from other studies the review (Knutzen & Green 2001b, Green & Knutzen 2003) also suggested the following decreases for Class I in fillet of flounder (µg/kg w.w.):

- ΣPCB7: from 5 to 3.
- From 2 for ΣDDT to 1 for p,p-DDE

The review did not recommend changes in the Class I limits for mercury in fish fillet (1 mg/kg w.w.) or mercury, cadmium, lead, zinc and copper in mussels (in the same order 0.2; 2; 3; 200 and 10 mg/kg d.w.). However, for chromium and nickel in mussels limits should be decreased from 3 to 2 and from 5 to 3 mg/kg d.w., respectively. Further, reference values for organochlorines were indicated for fillet and liver of fish species that are not included in the classification system (dab, plaice, lemon sole) and for lead and cadmium in liver of cod.

These recommendations for changes have been taken into account in this report. However, corresponding adjustment of Classes II-V has not been done but should be considered once the above mentioned Class I revisions have been accepted by SFT. SFT is considering these recommendations in a current review of their classification system.

No attempt has been made to compensate for differences in size groups or number of individuals of mussels or fish. The exception was with mercury in fish fillet where six data sets in both cod and flatfish in this study showed significant differences between “small” and “large” fish (Appendix H). In regards to mussels, there is some evidence that concentrations do not vary significantly among the three size groups employed for this study (i.e. 2-3, 3-4 and 4-5 cm) (WGSAEM 1993).

With respect to Purpose A (health risk assessment), the Norwegian Food Safety Authority (SNT) is responsible for official commentary as to possible health risk due to consumption of seafood. Hence, the results of the JAMP pertaining to this purpose are presented only as a partial basis for evaluation.

Table 5. Extracts of the Norwegian Pollution Control Authority revised environmental classification system of contaminants in blue mussels and fish (from Molvær *et al.* 1997 and revised (shaded) Class I concentrations as suggested in this report).

Contaminant			**Classification (upper limit for Classes I-IV)**				
			Degree of pollution				
			I	**II**	**III**	**IV**	**V**
			Slight	***Moderate***	***Marked***	***Severe***	***Extreme***
BLUE MUSSEL							
Lead	mg/kg	d.w.	3	15	40	100	>100
Cadmium	mg/kg	d.w.	2	5	20	40	>40
Copper	mg/kg	d.w.	10	30	100	200	>200
Mercury	mg/kg	d.w.	0.2	0.5	1.5	4	>4
Zinc	mg/kg	d.w.	200	400	1000	2500	>2500
TBT 1)	mg/kg	d.w.	0.1	0.5	2	5	>5
∑PCB-7	µg/kg	w.w.	3	15	40	100	>100
		d.w. 2)	*15*	*75*	*200*	*500*	*>500*
∑DDT	µg/kg	w.w.	2	5	10	30	>30
		d.w. 2)	*10*	*25*	*50*	*150*	*>150*
∑HCH	µg/kg	w.w.	1	3	10	30	>30
		d.w. 2)	*5*	*15*	*50*	*150*	*>150*
HCB	µg/kg	w.w.	0.1	0.3	1	5	>5
HCB in d.w. 2)		*d.w.* 2)	*0.5*	*1.5*	*5*	*25*	*>25*
$TE_{PCDF/D}$ 3)	µg/t 4)	w.w.	0.2	0.5	1.5	3	>3
COD, fillet							
Mercury	mg/kg	w.w.	0.1	0.3	0.5	1	>1
∑PCB-7	µg/kg	w.w.	3	20	50	150	>150
∑DDT	µg/kg	w.w.	1	3	10	25	>25
∑HCH	µg/kg	w.w.	0.3	2	5	15	>15
HCB	µg/kg	w.w.	0.2	0.5	2	5	>5
COD, liver							
∑PCB-7	µg/kg	w.w.	500	1500	4000	10000	>10000
∑DDT	µg/kg	w.w.	200	500	1500	3000	>3000
∑HCH	µg/kg	w.w.	50	200	500	1000	>1000
HCB	µg/kg	w.w.	20	50	200	400	>400
$TE_{PCDF/D}$ 2)	µg/t 4)	w.w.	10	40	100	300	>300

1) Tributyltin on a formula basis

2) Conversion assuming 20% dry weight

3) TCDDN (Appendix B)

4) µg/1000 kg (Appendix B)

Table 6. Provisional "high background levels" of selected contaminants, in **mg/kg dry weight** (blue mussel) and **mg/kg wet weight** (blue mussel and fish). The respective "high background" limits are from Knutzen & Skei (1990) with mostly minor adjustments (Knutzen & Green 1995; Molvær *et al.* 1997), except for dab where the suggested limit is based on JAMP-data (Knutzen & Green 1995). Especially uncertain values are marked with "?".

Cont.	**Blue mussel** [1]		**Cod** [1]		**Flounder** [1]		**Dab** [1]		**Plaice** [1]	
			liver	**fillet**	**liver**	**fillet**	**liver**	**fillet**	**liver**	**fillet**
	mg/kg d.w.	mg/kg w.w.	mg/kg w.w.	mg/kg w.w.	mg/kg w.w.	mg/kg w.w.	mg/kg w.w.	mg/kg w.w.	mg/kg w.w.	mg/kg w.w.
Lead	3.0 $^{2)}$	0.6 $^{3)}$	0.1		0.3 ?		0.3 ?		0.2 ?	
Cadmium	2.0 $^{2)}$	0.4 $^{3)}$	0.1		0.3 ?		0.3 ?		0.2 ?	
Copper	10 $^{2)}$	2 $^{3)}$	20		10 ?		30 ?		10 ?	
Mercury	0.2 $^{2)}$	0.04 $^{3)}$		0.1 $^{2)}$		0.1 ?		0.1		0.1 ?
Zinc	200 $^{2)}$	40 $^{3)}$	30		50 ?		60 ?		50 ?	
∑PCB-7 $^{8)}$	0.015$^{3,9)}$	0.003$^{2\ 9)}$	0.15 $^{2)}$	0.003$^{9)}$	0.1	0.003 $^{9)}$	0.5	0.005 $^{9)}$	0.05 ?	0.004 $^{9)}$
ppDDE	0.010 $^{3)}$	0.002 $^{6)}$	0.2 $^{9)}$		0.03	0.001 $^{9)}$	0.1	0.002 $^{9)}$	0.01 ? $^{6)}$	0.001 $^{9)}$
γ HCH	0.005 $^{3)}$	0.001 $^{6)}$	0.03 $^{9)}$	0.003$^{9)}$	0.01	0.0003$^{9)}$	0.03	0.0005 $^{9)}$	0.005 ?$^{6)}$	0.0003$^{9)}$
HCB	0.0005 $^{3)}$	0.0001 $^{2)}$	0.02 $^{2)}$		0.005	0.0001$^{9)}$	0.01	0.0002 $^{9)}$	0.005 ?	0.0002$^{9)}$
TCDDN	0.000001 $^{3)}$		0.00001 $^{9)}$							
		0.0000002 $^{2)}$								

[1]) Respectively: *Mytilus edulis, Gadus morhua, Platichthys flesus* and *Limanda limanda*.
[2]) From the Norwegian Pollution Control Authority Environmental Class I ("good") (Molvær *et al.* 1997).
[3]) Conversion assuming 20% dry weight.
[4]) Approximately 25% of ΣPCB-7 (Knutzen & Green 1995)
[5]) 1.5-2 times 75% quartile (cf. Annex B in Knutzen & Green 1995)
[6]) Assumed equal to limit for ΣDDT or ΣHCH, respectively, from the Norwegian Pollution Control Authority Environmental Class I ("good") (Molvær *et al.* 1997). Hence, limits for ppDDE and γHCH are probably too high (lacking sufficient and reliable reference values)
[7]) Mean plus 2 times standard deviation (cf. Annex B in Knutzen & Green 1995)
[8]) Estimated as sum of 7 individual PCB compounds (CB-28, -52, -101, -118, -138, -153 and -180) and assumed to be ca. 50% and 70 % of total PCB for blue mussel and cod/flatfish, respectively.
[9]) With respect to revisions suggested by Knutzen & Green (2001b) and Green & Knutzen (2003), see text.

2.1.3. Comparison with previous data

A simple 3-model approach has been developed to study time trends for contaminants in biota based on *median* concentrations (ASMO 1994). A variation of this method was applied to mercury in fish fillet to distinguish trends in "small" and "large" individuals, the size of which may vary from year to year, station to station, depending on the catch. To determine the "small" fish, the sample is sorted by length and split into two groups of one or even numbers. The fish with median length in the smaller group is the "small" fish, and the median length in the larger group is the "large" fish. The concentration in these two fish (one per group) determine the concentrations in the two groups. The method was first used on a large-scale basis by the Ad Hoc Working Group on Monitoring that met in Copenhagen 8-12. November 1993 (MON 1993). At this meeting it was agreed to apply the method on contaminants in fish muscle and liver on a wet weight basis and contaminants in soft tissue of mussels on a dry weight basis. The results for this assessment are presented earlier (cf. ASMO 1994). The method has been applied to Norwegian data and results are shown in Appendix G. The results can be presented as in Figure 20.

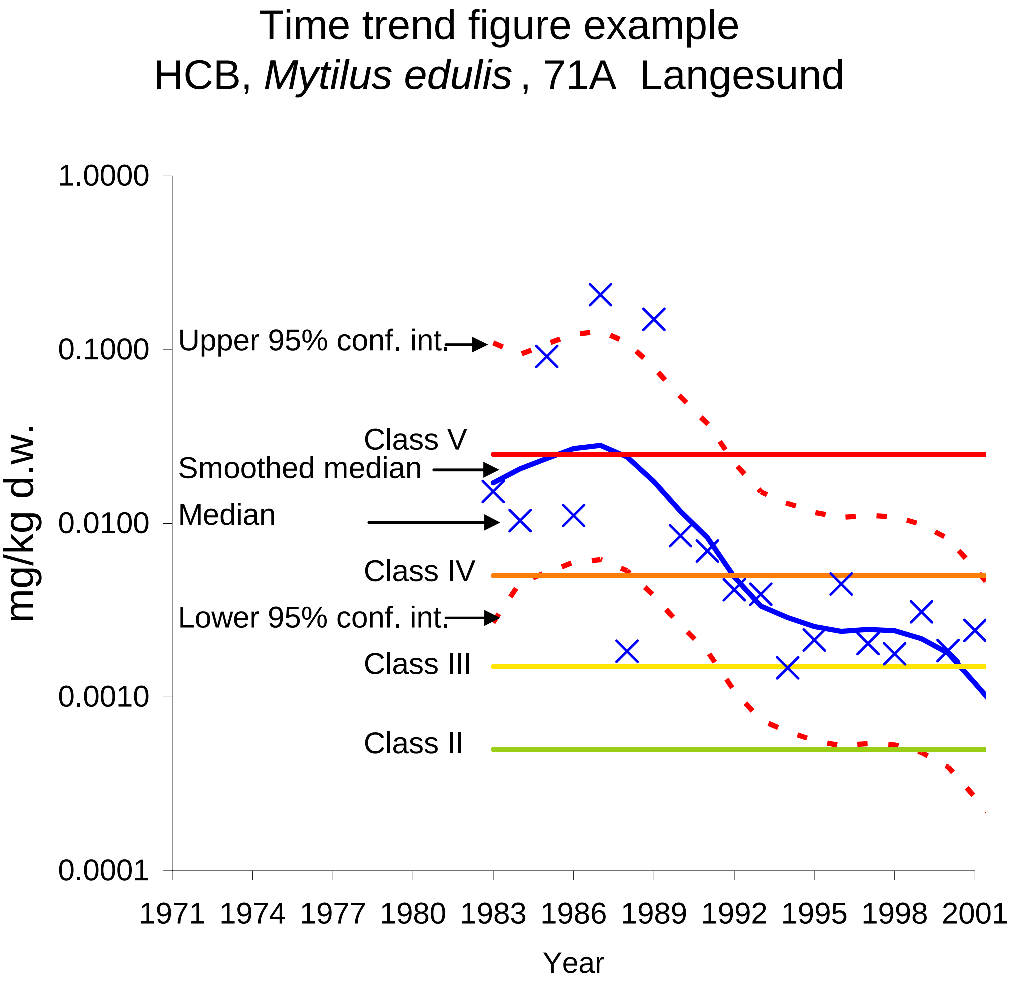


Figure 20. Example presentation and variation in contaminant concentration with time, indicating median concentrations, running mean of median values (Loess smoother), 95% confidence intervals. The horizontal lines indicate the lower boundaries to SFT classes of pollution: Class II (moderate=upper boundary to Class I (slight)), III (marked), IV (severe) and V (extreme), or alternatively the Class II boundary is replaced by the upper boundary to provisional "high background level" as in which case no class-boundaries are shown. (see text and refer to Table 6).

The method of calculating the smoother is in accordance to the methods employed at Ad Hoc Working Group on Monitoring that met in Copenhagen 23-27. February 1998 (MON 1998). A Loess smoother is based on a running seven-year interval, a non-parametric curve fitted to median log-concentrations (Nicholson *et al.*1997). For statistical tests based on a fitted smoother to be valid the contaminants indices should be independent to a constant level of variance and the residuals for the fitted model should be lognormally distributed (cf. Nicholson *et al.* 1998).

The National Comments since 1994 have included two additional analyses. The first is that the smoothed median for the last three sampling years is linearly projected for the next three years. This deviates from previous reports where the upper 95 confidence interval was used to assess the likelihood of overconcentrations (Nicholson, *et al.* 1994). The projected estimate is based on the results for the temporal trend analyses of at least 6 years of data.

The second is an estimate of the power of the temporal trend series expressed as the number of years to detect a 10% change per year with a 90% power (cf. Nicholson *et al.* 1997). The fewer the years the easier it is to detect a trend. The power is based on the percentage relative standard deviation (RLSD) estimated using the robust method described by ASMO (1994) and Nicholson *et al.* (1998). The estimate was made for series with at least 3 years of data and covers the *entire* period monitored. This fixed means of treating all the datasets may give misleading results especially where non-linear temporal changes are known to occur, such as for HCB in blue mussels from Langesundsfjord (Figure 4).

The statistical analysis was carried out on temporal trend data series for cadmium, copper, mercury, lead, zinc, the ΣPCB-7 (congeners: 28, 53, 101, 118, 138, 153, 180), ppDDE (ICES code DDEPP), γ-HCH (ICES code HCHG) and HCB. Except for ΣPCB-7 , assessment focused on individual compounds instead of “sum variables”.

2.1.4. The effect of depuration and freezing on mussels

Based on samples collected in the Sørfjord and Hardangerfjord, the JAMP-method of pre-treatment of mussels (i.e., depuration and then cleaning) contrasted significantly to the Index-method (freezing then cleaning) (Green *et al.* 2001a). Using the JAMP-method, cadmium concentrations were significantly higher (24%), whereas significant lower concentrations were found for lead (45%), zinc (14%), PCBs (CB101, -118, -138, -153 27-52%) and DDTs (50-64%). Lower concentrations indicated that these contaminants are lost by depuration and gut emptying.

The results from a previous study from this region indicated no significant difference between the methods for mercury, cadmium, copper, lead and zinc (Green 1989). A study on mussels from the mouth of the Glomma River in Southern Norway showed that lead and copper were significantly lower in depurated samples (Green *et al.* 1996); however, no differences were found for PCBs or DDTs (on a lipid basis). The PCB concentrations found in the Glomma study were 3-4 times higher than Sørfjord/Hardangerfjord.

Mercury was the only contaminant common to all three studies that had consistent results; that there is no significant difference between the two methods.

The difference in methods has indicated an effect on the concentration of contaminants in mussels. However, with the exception of mercury, the results for Sørfjord/Hardangerfjord 2003 are inconsistent with two other studies in Norway. Revision of JAMP guidelines and assessment of data should take these results into consideration.

2.2. Information on Quality Assurance

NIVA has participated in all the QUASIMEME international intercalibration exercises, including Round 36. These exercises have included nearly all the contaminants analysed for JAMP. Quality assurance programme for NIVA is similar to the 2002 programme (cf. Green *et al.* 2003). In addition, NIVA was accredited in 1993 and are now accredited in accordance with the NS-EN ISO/IEC 17025 standard by the Norwegian Accreditation (reference P009). A summary of the quality assurance programme at NIVA is given in Appendix D. The results were generally acceptable.

2.3. Description of the Programme

The sampling for 2003 involved sampling of blue mussel at 43 stations and cod or at least one flatfish species was sampled at 18 stations (cf. Appendix E). The Norwegian JAMP has been expanded since 1989 to include monitoring in more diffusely polluted areas. Though new stations are initially intended for annual monitoring (temporal trends), there has not always been sufficient funds to do this for every station. Sample/station reduction measures have been taken to reduce costs. Furthermore, sufficient samples have not always been practical to obtain. When this applies to mussels, a new site in the vicinity is often chosen. As for fish, the quota of 25 individuals (±10%), indicated in Appendix E, as either 25 individuals or 5 bulked samples consisting of 5 fish per bulked sample, was met for all stations in 2003 except plaice from st.98F (20 individuals).

Concentrations of metals, organochlorines (including pesticides) and polycyclic aromatic hydrocarbons in mussels and fish were determined at the Norwegian Institute for Water Research (JAMP code NIVA).

An overview of the methods applied up to and including 2003 sample material has been presented by Green *et al*. (2001b). An overview of the samples collected from 1981 to 2003 is given in Appendix E. An overview of analyses applied from 1981 to 2003 for biological material is given in Appendix C. Parameter abbreviations are given in Appendix B.

The data is stored at NIVA in MS ACCESS 1997. The tables are generated using MS ACCESS 97 and MS EXCEL 97.

3. References

Titles translated to English in square brackets [ ] are not official.

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Appendix A
Quality assurance programme

Accreditation

The laboratories at NIVA, both the chemical, microbiological and the ecotoxicological laboratories, were accredited in 1993 for quality assurance system by the National Measurement Service - Norwegian Accreditation and based on European Standard EN45000. NIVA has reference number P009. The chemical laboratoruim satisfy the requirements in NS-EN ISO/IEC 17025.

Summary of quality control results

Standard reference materiales were analysed regularly (Table 7). Dogfish muscle (DORM-2) or dogfish liver (DOLT-3) was used as SRM for the control of the determination of metals. Mackerel oil (350) and mussel tissue (2977) was used as SRM for controls of PCBs and PAHs, respectively. NIES 11 was used for tin organic compounds. Cyprinid fish (EDF2525) at NILU was used as SRM for control of determination of dioxins.

Following results for round 34 were used (July-October 2003):
- QTM059BT and QTM060BT for metals in biota,
- QOR076BT and QOR077BT for organochlorines in biota.
- QPH31BT and QPH032BT for PAH in Biota

The results for biota from QUASIMEME Round 34 were reported to ICES with the data for the 2003 samples analysed in 2003-2004. The results from this round for two samples were acceptable (z-scores between -2 and 2; a z-score is an expression for between-laboratory-variation), the exceptions were the results for QUASIMEME sample 1 for CB105 and CB138 (QOR076BT). The results from sample 1 were reported to ICES. It should be noted that measurements of PCBs in SRM were satisfactory (Table 7), i.e. within the SRM confidence interval. However, the results for some PAHs in SRM were too low.

NIVA also participated in Round 34 for sediments. NIVA has also participated in QUASIMEME exercises up to Round 36 (January and April 2004) and 38 (October 2004) but the QUASIMEME assessment of the participant's results were not available before submission to ICES.

Table 7. Summary of the quality control results for the 2003 biota samples analysed 2003. The Standard Reference Materials (SRM) were DORM-2* (dogfish muscle) for mussels and fish fillet, DOLT-3* (dogfish liver) for fish liver, 350** (mackerel oil) for mussels and fish liver and 2977** (mussel tissue) for mussels. SRM was analysed in series with the JAMP-samples for analyses of metals (mg/kg w.w.), NIES 11 for organochlorines or PAH (µg/kg w.w.) and EDF2525**** for fish (cyprinid) was analysed for dioxin(ng/kg) by NILU. Tissue types were: mussel softbody (SB), fish liver (LI) and fish fillet (MU). SRMs were measured several times (N) over a number of weeks (W).

Code	Contaminant	Tissue type	SRM type	SRM value ± confidence interval	N	W	Mean value	Standard deviation
Cd	**cadmium**	SB	DORM	0.043 ± 0.008	10	10	0.049	0.002
		LI	DOLT	19.4 ± 0.6	14	19	19.7	0.99
Cu	**copper**	SB	DORM	2.34 ± 0.16	10	10	2.22	0.20
		LI	DOLT	31.2 ± 1.0	14	19	31.4	0.85
Pb	**Lead**	SB	DORM	0.065 ± 0.007	10	10	0.072	0.02
		LI	DOLT	0.319 ± 0.045	13	19	0.312	0.045
Hg	**Mercury**	SB	DORM	4.64 ± 0.26	12	20	4.72	0.11
Zn	**Zinc**	SB	DORM	25.6 ± 2.3	10	10	27.7	2.18
		LI	DOLT	86.6 ± 2.4	14	19	97.3	5.73
CB-28	**PCB congener CB-28**	(all)	350	22.5 ± 4	11	22	17.9	1.13
CB-52	**PCB congener CB-52**	(all)	350	62 ± 9	11	22	62.7	7.3
CB-101	**PCB congener CB-101**	(all)	350	164 ± 9	11	22	156	11.9
CB-118	**PCB congener CB-118**	(all)	350	142 ± 20	11	22	129	16.6

Code	Contaminant	Tissue type	SRM type	SRM value ± confidence interval	N	W	Mean value	Standard deviation
CB-153	**PCB congener CB-153**	(all)	350	317 ± 20	11	22	297	22.3
CB-180	**PCB congener CB-180**	(all)	350	73 ± 13	11	22	67.1	5.11
BAA	benzo[*a*]anthracene1)	SB	2977	20.34 ± 0.78	3	13	17.7	2.08
BAP	benzo[*a*]pyrene1)	SB	2977	8.35 ± 0.72	3	13	4.1	0.87
BBF	benzo[*b*]fluoranthene1)	SB	2977	11.01 ± 0.28	3	13	4.93	0.75
BEP	**benzo[*e*]pyrene**	SB	2977	13.1 ± 1.1	3	13	12.7	1.15
BGHIP	**benzo[*ghi*]perylene**	SB	2977	9.53 ± 0.43	3	13	7.2	0.81
BKF	**benzo[*k*]fluoranthene**	SB	2977	4 ± 1	3	13	4.93	0.75
CHRTR	chrysene+triphenylene1 2)	SB	2977	88 ± 2.2	3	13	37	3.61
FLU	**Fluoranthene**	SB	2977	38.7 ± 1.0	3	13	32.7	5.77
ICDP	**indeno[1,2,3-*cd*]pyrene**	SB	2977	4.84 ± 0.81	3	13	3.16	0.49
PER	**Perylene**	SB	2977	3.50 ± 0.76	3	13	1.77	0.32
PYR	**Pyrene**	SB	2977	78.9 ± 3.5	3	13	75	12.3
TBTIN	**Tributyl-tin**	SB	11	1159 ± 88	3	1	1151	7.81
TPTIN	**Triphenyl-tin**	SB	11	5109 ±363	4	1	2556	133
CB 126	**3,3,4,4,5-PeCB**	MU	2525	647 ± 148	1	1	707	
CB 169	**3,3,4,4,5,5-HxCB**	MU	2525	50 ± 12	1	1	64.4	
CB77	**3,3,4,4-TeCB**	MU	2525	1945 ± 354	1	1	2000	
CDD1N	**1,2,3,7,8-HxCDD**	MU	2525	4.0 ± 0.57	1	1	3.68	
CDD4X	**1,2,3,4,7,8-HxCDD**	MU	2525	0.77 ± 0.27	1	1	0.38	
CDD6X	**1,2,3,6,7,8- HxCDF**	MU	2525	2.7 ± 1.2	1	1	1.96	
CDD9X	**1,2,3,7,8,9-HpCDF**	MU	2525	0.63 ± 0.23	1	1	0.35	
CDDO	**OCDD**	MU	2525	7.2 ± 3.7	1	1	1.98	
CDF2N	**2,3,4,7,8-PeCDF**	MU	2525	14 ± 1.3	1	1	17.1	
CDF2T	**2,3,7,8 TCDF**	MU	2525	22 ± 1.6	1	1	29.6	
CDF4X	**2,3,4,6,7,8 HxCDF**	MU	2525	2.3 ± 1.9	1	1	1.28	
CDF6P	**1,2,3,4,6,7,8,-HxCDF**	MU	2525	4.4 ± 6.0	1	1	0.42	
CDF6X	**1,2,3,6,7,8-HxCDF**	MU	2525	2.7 ± 1.2	1	1	1.74	
CDF9P	**1,2,3,4,7,8,9-HpCDF**	MU	2525	0.63 ± 0.23	1	1	0.07	
CDFDN	**1,2,3,7,8/1,2,3,4,8-PeCDF**	MU	2525	4.9 ± 0.56	1	1	6.03	
CDFDX	**1,2,3,4,7,8/1,2,3,4,7,9-HxCDF**	MU	2525	8.2 ± 3.7	1	1	7.10	
CDFO	**OCDF**	MU	2525	2.6 * 1.3	1	1	0.26	
TCDD	**2,3,7,8-Tetra-DiBpD(TCDD)**	MU	2525	17 * 1.4	1	1	18.3	

*) National Research Council Canada, Division of Chemistry, Marine Analytical Chemistry Standards

**) BCR, Community Bureau of Reference, Commission of the European Communities

***) National Institute of Standards & Technology (NIST)

****) CIL, US.

1) Not certified (see NIST certificate)

2) Calculated from separate values for chrysene and triphenylene; respectively, $(49+39) \pm \sqrt{(2^{2} + 1^{2})}$

Appendix B
Abbreviations

Abbreviation[1]	English	*Norwegian*
ELEMENTS		
Al	aluminium	*aluminium*
As	arsenic	*arsen*
Cd	cadmium	*kadmium*
Co	cobalt	*kobolt*
Cr	chromium	*krom*
Cu	copper	*kobber*
Fe	iron	*jern*
Hg	mercury	*kvikksølv*
Li	lithium	*litium*
Mn	manganese	*mangan*
Ni	nickel	*nikkel*
Pb	lead	*bly*
Pb210	lead-210	*bly-210*
Se	selenium	*selen*
Ti	titanium	*titan*
Zn	zinc	*sink*
METAL COMPOUNDS		
TBT	tributyltin	*tributyltinn*
PAHs		
PAH	polycyclic aromatic hydrocarbons	*polysykliske aromatiske hydrokarboner*
ACNE	acenaphthene	*acenaften*
ACNLE	acenaphthylene	*acenaftylen*
ANT	anthracene	*antracen*
BAA [3]	benzo[*a*]anthracene	*benzo[a]antracen*
BAP [3]	benzo[*a*]pyrene	*benzo[a]pyren*
BBF [3]	benzo[*b*]fluoranthene	*benzo[b]fluoranten*
BBJKF [3]	benzo[*b,j,k*]fluoranthene	*benzo[b,j,k]fluoranten*
BBJKF [3]	benzo[b+j,k]fluoranthene	*benzo[b+j,k]fluoranten*
BBKF [3]	benzo[*b+k*]fluoranthene	*benzo[b+k]fluoranten*
BEP	benzo[*e*]pyrene	*benzo[e]pyren*
BGHIP	benzo[*ghi*]perylene	*benzo[ghi]perylen*
BIPN [2]	biphenyl	*bifenyl*
BJKF [3]	benzo[*j,k*]fluoranthene	*benzo[j,k]fluorantren*
BKF [3]	benzo[*k*]fluoranthene	*benzo[k]fluorantren*
CHR	chrysene	*chrysen*
CHRTR	chrysene+triphenylene	*chrysen+trifenylen*
COR	coronene	*coronen*
DBAHA [3]	dibenz[*a,h*]anthracene	*dibenz[a,h]anthracen*
DBA3A [3]	dibenz[*a,c/a,h*]anthracene	*dibenz[a,c/a,h]antracen*
DBP [3]	dibenzopyrenes	*dibenzopyren*
DBT	dibenzothiophene	*dibenzothiofen*
DBTC1	C_1-dibenzothiophenes	*C_1-dibenzotiofen*
DBTC2	C_2-dibenzothiophenes	*C_2-dibenzotiofen*

Abbreviation[1]	English	*Norwegian*
DBTC3	C_3-dibenzothiophenes	*C_3-dibenzotiofen*
FLE	fluorene	*fluoren*
FLU	fluoranthene	*fluoranten*
ICDP [3]	indeno[*1,2,3-cd*]pyrene	*indeno[1,2,3-cd]pyren*
NAP [2]	naphthalene	*naftalen*
NAPC1 [2]	C_1-naphthalenes	*C_1-naftalen*
NAPC2 [2]	C_2-naphthalenes	*C_2-naftalen*
NAPC3 [2]	C_3-naphthalenes	*C_3-naftalen*
NAP1M [2]	1-methylnaphthalene	*1-metylnaftalen*
NAP2M [2]	2-methylnaphthalene	*2-metylnaftalen*
NAPD2 [2]	1,6-dimethylnaphthalene	*1,6-dimetylnaftalen*
NAPD3 [2]	1,5-dimethylnaphthalene	*1,5-dimetylnaftalen*
NAPDI [2]	2,6-dimethylnaphthalene	*2,6-dimetylnaftalen*
NAPT2 [2]	2,3,6-trimethylnaphthalene	*2,3,6-trimetylnaftalen*
NAPT3 [2]	1,2,4-trimethylnaphthalene	*1,2,4-trimetylnaftalen*
NAPT4 [2]	1,2,3-trimethylnaphthalene	*1,2,3-trimetylnaftalen*
NAPTM [2]	2,3,5-trimethylnaphthalene	*2,3,5-trimetylnaftalen*
NPD	Collective term for naphthalenes, phenanthrenes and dibenzothiophenes	*Sammebetegnelse for naftalen, fenantren og dibenzotiofens*
PA	phenanthrene	*fenantren*
PAC1	C_1-phenanthrenes	*C_1-fenantren*
PAC2	C_2-phenanthrenes	*C_2-fenantren*
PAM1	1-methylphenanthrene	*1-metylfenantren*
PAM2	2-methylphenanthrene	*2-metylfenantren*
PADM1	3,6-dimethylphenanthrene	*3,6-dimetylfenantren*
PADM2	9,10-dimethylphenanthrene	*9,10-dimetylfenantren*
PER	perylene	*perylen*
PYR	pyrene	*pyren*
DI-Σn	sum of "n" dicyclic "PAH"s (footnote 2)	*sum "n" disykliske "PAH" (fotnote 2)*
P-Σn / P_S	sum "n" PAH (DI-Σn not included)	*sum "n" PAH (DI-Σn ikke inkludert)*
PK-Σn / PK_S	sum carcinogen PAHs (footnote 3)	*sum kreftfremkallende PAH (fotnote 3)*
PAHΣΣ	DI-Σn + P-Σn etc.	*DI-Σn + P-Σn mm..*
SPAH	"total" PAH, specific compounds not quantified (outdated analytical method)	*"total" PAH, spesifikk forbindelser ikke kvantifisert (foreldret metode)*
BAP_P	% BAP of PAHΣΣ	*% BAP av PAHΣΣ*
BAPPP	% BAP of P-Σn	*% BAP av P-Σn*
BPK_P	% BAP of PK-Σn	*% BAP av PK-Σn*
PKn_P	% PK-Σn of PAHΣΣ	*% PK-Σn av PAHΣΣ*
PKnPP	% PK-Σn of P-Σn	*% PK-Σn av P-Σn*
PCBs		
PCB	polychlorinated biphenyls	*polyklorerte bifenyler*
CB	individual chlorobiphenyls (CB)	*enkelte klorobifenyl*
CB28	CB28 (IUPAC)	*CB28 (IUPAC)*
CB31	CB31 (IUPAC)	*CB31 (IUPAC)*
CB44	CB44 (IUPAC)	*CB44 (IUPAC)*
CB52	CB52 (IUPAC)	*CB52 (IUPAC)*
CB77 [4]	CB77 (IUPAC)	*CB77 (IUPAC)*

Abbreviation[1]	English	*Norwegian*
CB81 [4]	CB81 (IUPAC)	*CB81 (IUPAC)*
CB95	CB95 (IUPAC)	*CB95 (IUPAC)*
CB101	CB101 (IUPAC)	*CB101 (IUPAC)*
CB105	CB105 (IUPAC)	*CB105 (IUPAC)*
CB110	CB110 (IUPAC)	*CB110 (IUPAC)*
CB118	CB118 (IUPAC)	*CB118 (IUPAC)*
CB126 [4]	CB126 (IUPAC)	*CB126 (IUPAC)*
CB128	CB128 (IUPAC)	*CB128 (IUPAC)*
CB138	CB138 (IUPAC)	*CB138 (IUPAC)*
CB149	CB149 (IUPAC)	*CB149 (IUPAC)*
CB153	CB153 (IUPAC)	*CB153 (IUPAC)*
CB156	CB156 (IUPAC)	*CB156 (IUPAC)*
CB169 [4]	CB169 (IUPAC)	*CB169 (IUPAC)*
CB170	CB170 (IUPAC)	*CB170 (IUPAC)*
CB180	CB180 (IUPAC)	*CB180 (IUPAC)*
CB194	CB194 (IUPAC)	*CB194 (IUPAC)*
CB209	CB209 (IUPAC)	*CB209 (IUPAC)*
CB-Σ7	CB: 28+52+101+118+138+153+180	*CB: 28+52+101+118+138+153+180*
CB-ΣΣ	sum of CBs, includes CB-Σ7	*sum CBer, inkluderer CB-Σ7*
TECBW	Sum of CB-toxicity equivalents after WHO model, see **TEQ**	*Sum CB- toksitets ekvivalenter etter WHO modell, se **TEQ***
TECBS	Sum of CB-toxicity equivalents after SAFE model, see **TEQ**	*Sum CB-toksitets ekvivalenter etter SAFE modell, se **TEQ***
DIOXINs		
TCDD	2, 3, 7, 8-tetrachloro-dibenzo dioxin	*2, 3, 7, 8-tetrakloro-dibenzo dioksin*
CDDST	Sum of tetrachloro-dibenzo dioxins	*Sum tetrakloro-dibenzo dioksiner*
CDD1N	1, 2, 3, 7, 8-pentachloro-dibenzo dioxin	*1, 2, 3, 7, 8-pentakloro-dibenzo dioksin*
CDDSN	Sum of pentachloro-dibenzo dioxins	*Sum pentakloro-dibenzo dioksiner*
CDD4X	1, 2, 3, 4, 7, 8-hexachloro-dibenzo dioxin	*1, 2, 3, 4, 7, 8-heksakloro-dibenzo dioksin*
CDD6X	1, 2, 3, 6, 7, 8-hexachloro-dibenzo dioxin	*1, 2, 3, 6, 7, 8-heksakloro-dibenzo dioksin*
CDD9X	1, 2, 3, 7, 8, 9-hexachloro-dibenzo dioxin	*1, 2, 3, 7, 8, 9-heksakloro-dibenzo dioksin*
CDDSX	Sum of hexachloro-dibenzo dioxins	*Sum heksakloro-dibenzo dioksiner*
CDD6P	1, 2, 3, 4, 6, 7, 8-heptachloro-dibenzo dioxin	*1, 2, 3, 4, 6, 7, 8-heptakloro-dibenzo dioksin*
CDDSP	Sum of heptachloro-dibenzo dioxins	*Sum heptakloro-dibenzo dioksiner*
CDDO	Octachloro-dibenzo dioxin	*Oktakloro-dibenzo dioksin*
PCDD	Sum of polychlorinated dibenzo-p-dioxins	*Sum polyklorinaterte-dibenzo-p-dioksiner*
CDF2T	2, 3, 7, 8-tetrachloro-dibenzofuran	*2, 3, 7, 8-tetrakloro-dibenzofuran*
CDFST	Sum of tetrachloro-dibenzofurans	*Sum tetrakloro-dibenzofuraner*
CDFDN	1, 2, 3, 7, 8/1, 2, 3, 4, 8-pentachloro-dibenzofuran	*1, 2, 3, 7, 8/1, 2, 3, 4, 8-pentakloro-dibenzofuran*
CDF2N	2, 3, 4, 7, 8-pentachloro-dibenzofurans	*2, 3, 4, 7, 8-pentakloro-dibenzofuran*
CDFSN	Sum of pentachloro-dibenzofurans	*Sum pentakloro-dibenzofuraner*
CDFDX	1, 2, 3, 4, 7, 8/1, 2, 3, 4, 7, 9-hexachloro-dibenzofuran	*1, 2, 3, 4, 7, 8/1, 2, 3, 4, 7, 9-heksakloro-dibenzofuran*
CDF6X	1, 2, 3, 6, 7, 8-hexachloro-dibenzofuran	*1, 2, 3, 6, 7, 8-heksakloro-dibenzofuran*
CDF9X	1, 2, 3, 7, 8, 9-hexachloro-dibenzofuran	*1, 2, 3, 7, 8, 9-heksakloro-dibenzofuran*
CDF4X	2, 3, 4, 6, 7, 8-hexachloro-dibenzofuran	*2, 3, 4, 6, 7, 8-heksakloro-dibenzofuran*

Abbreviation[1]	English	*Norwegian*
CDFSX	Sum of hexachloro-dibenzofurans	*Sum heksakloro-dibenzofuraner*
CDF6P	1, 2, 3, 4, 6, 7, 8-heptachloro-dibenzofuran	*1, 2, 3, 4, 6, 7, 8-heptakloro-dibenzofuran*
CDF9P	1, 2, 3, 4, 7, 8, 9-heptachloro-dibenzofuran	*1, 2, 3, 4, 7, 8, 9-heptakloro-dibenzofuran*
CDFSP	Sum of heptachloro-dibenzofurans	*Sum heptakloro-dibenzofuraner*
CDFO	Octachloro-dibenzofurans	*Octakloro-dibenzofuran*
PCDF	Sum of polychlorinated dibenzo-furans	*Sum polyklorinated dibenzo-furaner*
CDDFS	Sum of PCDD and PCDF	*Sum PCDD og PCDF*
TCDDN	Sum of TCDD-toxicity equivalents after Nordic model, see **TEQ**	*Sum TCDD- toksitets ekvivalenter etter Nordisk modell, se* ***TEQ***
TCDDI	Sum of TCDD-toxicity equivalents after international model, see **TEQ**	*Sum TCDD-toksitets ekvivalenter etter internasjonale modell, se* ***TEQ***
PESTICIDES		
ALD	aldrin	*aldrin*
DIELD	dieldrin	*dieldrin*
ENDA	endrin	*endrin*
CCDAN	cis-chlordane (=α-chlordane)	*cis-klordan (=α-klordan)*
TCDAN	trans-chlordane (=γ-chlordane)	*trans-klordan (=γ-klordan)*
OCDAN	oxy-chlordane	*oksy-klordan*
TNONC	trans-nonachlor	*trans-nonaklor*
TCDAN	trans-chlordane	*trans-klordan*
OCS	octachlorostyrene	*oktaklorstyren*
QCB	pentachlorobenzene	*pentaklorbenzen*
DDD	dichlorodiphenyldichloroethane 1,1-dichloro-2,2-bis-(4-chlorophenyl)ethane	*diklordifenyldikloretan* *1,1-dikloro-2,2-bis-(4-klorofenyl)etan*
DDE	dichlorodiphenyldichloroethylene (principle metabolite of DDT) 1,1-dichloro-2,2-bis-(4-chlorophenyl)ethylene*	*diklordifenyldikloretylen (hovedmetabolitt av DDT)* *1,1-dikloro-2,2-bis-(4-klorofenyl)etylen*
DDT	dichlorodiphenyltrichloroethane 1,1,1-trichloro-2,2-bis-(4-chlorophenyl)ethane	*diklordifenyltrikloretan* *1,1,1-trikloro-2,2-bis-(4-klorofenyl)etan*
DDEOP	o,p'-DDE	*o,p'-DDE*
DDEPP	p,p'-DDE	*p,p'-DDE*
DDTOP	o,p'-DDT	*o,p'-DDT*
DDTPP	p,p'-DDT	*p,p'-DDT*
TDEPP	p,p'-DDD	*p,p'-DDD*
DDTEP	p,p'-DDE + p,p'-DDT	*p,p'-DDE + p,p'-DDT*
DD-nΣ	sum of DDT and metabolites, n = number of compounds	*sum DDT og metabolitter,* *n = antall forbindelser*
HCB	hexachlorobenzene	*heksaklorbenzen*
HCHG	Lindane γ HCH = gamma hexachlorocyclohexane (γ BHC = gamma benzenehexachloride, outdated synonym)	*Lindan* *γ HCH = gamma heksaklorsykloheksan* *(γ BHC = gamma benzenheksaklorid, foreldret betegnelse)*
HCHA	α HCH = alpha HCH	*α HCH = alpha HCH*
HCHB	β HCH = beta HCH	*β HCH = beta HCH*
HC-nΣ	sum of HCHs, n = count	*sum av HCHs, n = antall*

Abbreviation[1]	English	*Norwegian*
EOCl	extractable organically bound chlorine	*ekstraherbart organisk bundet klor*
EPOCl	extractable persistent organically bound chlorine	*ekstraherbart persistent organisk bundet klor*
NTOT	total organic nitrogen	*total organisk nitrogen*
CTOT	total organic carbon	*total organisk karbon*
CORG	organic carbon	*organisk karbon*
GSAMT	grain size	*kornfordeling*
MOCON	moisture content	*vanninnhold*
INSTITUTES		
IFEN	Institute for Energy Technology	*Institutt for energiteknikk*
FIER	Institute for Nutrition, Fisheries Directorate	*Fiskeridirektoratets Ernæringsinstitutt*
FORC	FORCE Institutes, Div. for Isotope Technique and Analysis [DK]	*FORCE Institutterne, Div. for Isotopteknik og Analyse [DK]*
IMRN	Institute of Marine Research (IMR)	*Havforskningsinstituttet*
NACE	Nordic Analytical Center	*Nordisk Analyse Center*
NILU	Norwegian Institute for Air Research	*Norsk institutt forluftforskning*
NIVA	Norwegian Institute for Water Research	*Norsk institutt for vannforskning*
SERI	Swedish Environmental Research Institute	*Institutionen för vatten- och luftvårdsforskning*
VETN	Norwegian Veterinary Institute	*Veterinærinstituttet*
SIIF	Fondation for Scientific and Industrial Research at the Norwegian Institute of Technology - SINTEF (a division, previously: Center for Industrial Research SI)	*Stiftelsen for industriell og teknisk forskning ved Norges tekniske høgskole- SINTEF (en avdeling, tidligere: Senter for industriforskning SI)*

[1]) After: ICES Environmental Data Reporting Formats. International Council for the Exploration of the Sea. July 1996 and supplementary codes related to non-ortho and mono-ortho PCBs and “dioxins” (ICES pers. comm.)

[2]) Indicates "PAH" compounds that are dicyclic and not truly PAHs typically identified during the analyses of PAH, include naphthalenes and "biphenyls".

[3]) Indicates PAH compounds potentially cancerogenic for humans according to IARC (1987), i.e., categories 2A+2B (possibly and probably carcinogenic).

[4]) Indicates non ortho- co-planer PCB compounds i.e., those that lack Cl in positions 1, 1', 5, and 5'

*) The Pesticide Index, second edition. The Royal Society of Chemistry, 1991.

Other abbreviations *andre forkortelser*

	English	*Norwegian*
TEQ	"Toxicity equivalency factors" for the most toxic compounds within the following groups:	*"Toxisitetsekvivalentfaktorer" for de giftigste forbindelsene innen følgende grupper.*
	• polychlorinated dibenzo-p-dioxins and dibenzofurans (**PCDD/PCDFs**). Equivalents calculated after Nordic model (Ahlborg 1989) [1] or international model (Int./EPA, cf. Van den Berg *et al.*, 1998) [2]	• *polyklorerte dibenzo-p-dioksiner og dibenzofuraner (**PCDD/PCDF**). Ekvivalentberegning etter nordisk modell (Ahlborg 1989) [1] eller etter internasjonal modell (Int./EPA, cf. Van den Berg et al. 1998) [2]*
	• non-ortho and mono-ortho substituted chlorobiphenyls after WHO model (Ahlborg *et al.*, 1994) [3] or Safe (1994, cf. NILU pers. comm.)	• *non-orto og mono-orto substituerte klorobifenyler etter WHO modell (Ahlborg et al., 1994) [3] eller Safe (1994, cf. NILU pers. medd.)*
ppm	parts per million, mg/kg	*deler pr. milliondeler, mg/kg*
ppb	parts per billion, µg/kg	*deler pr. milliarddeler, µg/kg*
ppp	parts per trillion, ng/kg	*deler pr. tusen-milliarddeler, ng/kg*
d.w.	dry weight basis	*tørrvekt basis*
w.w.	wet weight or fresh weight basis	*våtvekt eller friskvekt basis*

[1]) Ahlborg, U.G., 1989. Nordic risk assessment of PCDDs and PCDFs. Chemosphere 19:603-608.

[2]) Van den Berg, Birnbaum, L, Bosveld, A. T. C. and co-workers, 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environ Hlth. Perspect. 106:775-792.

[3]) Ahlborg, U.G., Becking G.B., Birnbaum, L.S., Brouwer, A, Derks, H.J.G.M., Feely, M., Golor, G., Hanberg, A., Larsen, J.C., J.C., Liem, A.K.G., Safe, S.H., Schlatter, C., Wärn, F., Younes, M., Yrjänheikki, E., 1994. Toxic equivalency factors for dioxin-like PCBs. Report on a WHO-ECEH and IPSC consultation , December 1993. Chemosphere 28:1049-1067.

Appendix C
Analytical overview

Sorted by:
Contaminant, year, laboratory, intercalibration

Abbreviations are defined in Appendix B and Appendix D

Contamin.	**Contaminant defined in Appendix B**
Mon. Year	**Monitoring year**
Lab.	**Analytical laboratory (cf. Appendix B)**
Intercalibr. +basis	**Intercalibration exercise (cf. Appendix D) and basis where W = wet weight and D = dry weight .**
Detect limit	**"Normal" detection limit**
Count below d.lim	**Number of analyses below normal detection limit**
N (<) above d.lim	**Number of analyses where detection limit was higher than normal.**

Tissue			Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter- calibr. +basis	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
ACNE	1992-NIVA	W	309	0.2	8			309	0.2	46		
	1995-NIVA	W						309	0.2	72		20
	1996-NIVA	W						309	0.2	65		19
	1997-NIVA	W						309	0.5	34		
	1998-NIVA	CI W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	38		
	2001-NIVA	W						309	0.5	42		
	2002-NIVA	W						309	0.5	43		
	2003-NIVA	MQ W						309	0.5	46		
ACNLE	1992-NIVA	W	309	0.2	8			309	0.2	46		
	1995-NIVA	W						309	0.2	72		49
	1996-NIVA	W						309	0.2	65		42
	1997-NIVA	W						309	0.5	34		
	1998-NIVA	W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	41		
	2002-NIVA	W						309	0.5	42		
	2003-NIVA	MQ W						309	0.5	55		
AG	1996-NIVA	W						999	miss	3		
ANT	1992-NIVA	W	309	0.2	8			309	0.2	45		
	1995-NIVA	W						309	0.2	72		28
	1996-NIVA	W						309	0.2	65		30
	1997-NIVA	W						309	0.5	35		
	1998-NIVA	CI W						309	0.5	39		
	1999-NIVA	EK W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	42		
	2002-NIVA	W						309	0.5	43		
	2003-NIVA	MQ W						309	0.5	56		
AS	1996-NIVA	W						999	miss	3		
BAP	1992-NIVA	W	309	0.2	8			309	0.2	45		
	1995-NIVA	W						309	0.2	72		21
	1996-NIVA	W						309	0.2	65		26
	1997-NIVA	AL W						309	0.5	36		
	1998-NIVA	CI W						309	0.5	39		
	1999-NIVA	EK W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	42		
	2002-NIVA	W						309	0.5	43		
	2003-NIVA	MQ W						309	0.5	56		
BBF	1992-NIVA	W	309	0.2	8			309	0.2	45		
	1995-NIVA	W						309	0.2	59		9
	1996-NIVA	W						309	0.2	57		6
BBJKF	1995-NIVA	W						309	0.2	12		
	1996-NIVA	W						309	0.2	8		
	1997-NIVA	W						309	0.2	36		1
	1998-NIVA	W						309	0.2	39		
	1999-NIVA	W						309	0.2	34		
	2000-NIVA	W						309	0.2	39		10
	2001-NIVA	W						309	0.2	42		
	2002-NIVA	W						309	0.2	43		9
	2003-NIVA	W						309	0.2	50		9
BD100	2001-NILU	W		miss	6				miss	6		
	2002-NILU	W						843	0.02	2		
BD138	2001-NILU	W		miss	6		6		miss	6		6
BD153	1996-NILU	W		miss	4		4					
	2001-NILU	W		miss	6		4		miss	6		4

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter-calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2002-NILU		W						843	0.01	2		
BD154	2001-NILU		W		miss	6				miss	6		4
	2002-NILU		W						843	0.01	2		
BD183	2001-NILU		W		miss	6		3		miss	6		6
	2002-NILU		W						843	0.01	2		
BD209	2001-NILU		W		miss	6		5		miss	6		1
	2002-NILU		W						843	0.03	2		
BDE28	2001-NILU		W		miss	6				miss	6		1
	2002-NILU		W						843	0.01	2		
BDE47	1996-NILU		W		miss	4							
	2001-NILU		W		miss	6				miss	6		
	2002-NILU		W						843	0.11	2		
BDE99	1996-NILU		W		miss	4							
	2001-NILU		W		miss	6				miss	6		1
	2002-NILU		W						843	0.06	2		
BEP	1992-NIVA		W	309	0.2	8			309	0.2	45		
	1995-NIVA		W						309	0.2	72		5
	1996-NIVA		W						309	0.2	65		6
	1997-NIVA		W						309	0.2	36		
	1998-NIVA	CI	W						309	0.2	38		
	1999-NIVA	EK	W						309	0.2	34		
	2000-NIVA		W						309	0.2	39		10
	2001-NIVA		W						309	0.2	42		
	2002-NIVA		W						309	0.2	43		9
	2003-NIVA	MQ	W						309	0.2	56		10
BGHIP	1992-NIVA		W	309	0.2	8			309	0.2	46		
	1995-NIVA		W						309	0.2	72		20
	1996-NIVA		W						309	0.2	65		10
	1997-NIVA		W						309	0.5	36		
	1998-NIVA	CI	W						309	0.5	35		
	1999-NIVA	EK	W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA	MQ	W						309	0.5	56		
BIPN	1992-NIVA		W	309	0.2	8			309	0.2	46		
	1995-NIVA		W						309	0.2	72		52
	1996-NIVA		W						309	0.2	62		39
	1997-NIVA		W						309	0.5	34		
	1998-NIVA		W						309	0.5	39	1	
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	38		1
	2001-NIVA		W						309	0.5	41		
	2002-NIVA		W						309	0.5	42		
	2003-NIVA		W						309	0.5	55		1
BJKF	1992-NIVA		W	309	0.2	8			309	0.2	45		
	1995-NIVA		W						309	0.2	24		21
	1996-NIVA		W						309	0.2	57		16
BAA	1992-NIVA		W	309	0.2	8			309	0.2	44		
	1995-NIVA		W						309	0.2	72		9
	1996-NIVA		W						309	0.2	65		8
	1997-NIVA		W						309	0.5	36		
	1998-NIVA	CI	W						309	0.5	39		
	1999-NIVA	EK	W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA	MQ	W						309	0.5	56		
CB101	1987-SIIF		W						111	0.2	21	1	

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter-calibr.	+basis	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1988-SIIF		D						111	0.1	6		
	1988-SIIF		W						111	0.1	22		
	1989-NACE		W	510	20	93							
	1989-SIIF		W						111	0.1	36		
	1990-NIVA	2G	W	340	1	169	1		341	0.05	58		
	1990-SIIF	2G	W						111	0.4	41	6	
	1991-NIVA	2H	W	340	1	179		8	341	0.05	68		
	1991-SIIF	2H	W						111	0.2	35		1
	1992-NIVA	2J	W	340	5	192	3		341	0.1	146		
	1993-NIVA	2K	W	340	4	212	12		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	3		341	0.05	170	39	
	1995-NIVA		W	340	3	318	10		341	0.05	231	10	
	1996-NIVA		W	340	3	332	14		341	0.05	243	9	
	1997-NIVA		W	340	3	260	24						
	1997-NIVA	AJ	W						341	0.05	221	4	
	1998-NIVA		W	340	3	284	19	1					
	1998-NIVA	CH	W						341	0.05	203	1	3
	1999-NIVA		W	340	3	249	6						
	1999-NIVA	EG	W						341	0.05	232		13
	2000-NIVA		W	340	3	230	24						
	2000-NIVA	GU	W						341	0.05	186	11	7
	2001-NIVA		W	340	3	250	19	4					
	2001-NIVA	IO	W						341	0.05	211		16
	2002-NIVA		W	340	3	241	13						
	2002-NIVA	LJ	W						341	0.05	212		17
	2003-NIVA		W	340	3	239	18						
	2003-NIVA	MO	W						341	0.05	175		6
CB105	1991-NIVA	2H	W	340	1	87		1	341	0.05	47		
	1992-NIVA		W	340	5	192	3		341	0.1	146		
	1993-NIVA	QM	W	340	4	212	21		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	8		341	0.05	170	53	
	1995-NIVA		W	340	3	318	13		341	0.05	230	34	
	1996-NIVA		W	340	3	332	22		341	0.05	237	23	
	1997-NIVA		W	340	3	260	24		341	0.05	221	3	1
	1998-NIVA		W	340	3	284	31	19					
	1998-NIVA	CH	W						341	0.05	207	11	16
	1999-NIVA		W	340	3	249	17						
	1999-NIVA	EG	W						341	0.05	232	4	62
	2000-NIVA		W	340	3	230	32						
	2000-NIVA	GU	W						341	0.05	186	21	40
	2001-NIVA		W	340	3	250	29	2					
	2001-NIVA	IO	W						341	0.05	211		76
	2002-NIVA		W	340	3	249	30		341	0.05	210		59
	2003-NIVA		W	340	3	239	23						
	2003-NIVA	MO	W						341	0.05	183		45
CB118	1989-NACE		W	510	20	93							
	1989-SIIF		W						111	0.1	36		
	1990-NIVA	2G	W	340	1	169			341	0.05	58		
	1990-SIIF	2G	W						111	0.2	41	1	
	1991-NIVA	2H	W	340	1	179			341	0.05	68		
	1991-SIIF	2H	W						111	0.2	35		1
	1992-NIVA	2J	W	340	5	192	2		341	0.1	146		
	1993-NIVA	2K	W	340	4	212	10		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	2		341	0.05	170	25	
	1995-NIVA		W	340	3	318	2		341	0.05	231	2	
	1996-NIVA		W	340	3	332	6		341	0.05	243	4	
	1997-NIVA		W	340	3	260	5						
	1997-NIVA	AJ	W						341	0.05	221		
	1998-NIVA		W	340	3	284	6	1					
	1998-NIVA	CH	W						341	0.05	209	3	1

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1999-NIVA		W	340	3	249	2						
	1999-NIVA	EG	W						341	0.05	232		7
	2000-NIVA		W	340	3	230	5						
	2000-NIVA	GU	W						341	0.05	186	6	7
	2001-NIVA		W	340	3	250	1	1					
	2001-NIVA	IO	W						341	0.05	211		21
	2002-NIVA		W	340	3	249	7						
	2002-NIVA	LJ	W						341	0.05	212		22
	2003-NIVA		W	340	3	239	6						
	2003-NIVA	MO	W						341	0.05	183		18
CB126	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	0.0001	4			841	0.0001	18		
	2002-NILU		W						841	0.0001	12		
	2003-NILU		W						841	0.0001	12		
CB138	1988-SIIF		D						111	0.1	6		
	1988-SIIF		W						111	0.1	21		
	1989-NACE		W	510	20	93							
	1989-SIIF		W						111	0.1	36		
	1990-NIVA	2G	W	340	1	169			341	0.05	58		
	1990-SIIF	2G	W						111	0.3	41		
	1991-NIVA	2H	W	340	1	179			341	0.05	68		
	1991-SIIF	2H	W						111	0.3	35		1
	1992-NIVA	2J	W	340	5	192			341	0.1	143		
	1993-NIVA	QM	W	340	4	212	3		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300			341	0.05	170	12	
	1995-NIVA		W	340	3	318	2		341	0.05	230		
	1996-NIVA		W	340	3	331	1		341	0.05	241		
	1997-NIVA		W	340	3	260	1						
	1997-NIVA	AJ	W						341	0.05	221		1
	1998-NIVA		W	340	3	284	3						
	1998-NIVA	CH	W						341	0.05	209		
	1999-NIVA		W	340	3	249							
	1999-NIVA	EG	W						341	0.05	232		1
	2000-NIVA		W	340	3	230	3						
	2000-NIVA	GU	W						341	0.05	186	3	
	2001-NIVA		W	340	3	250	1	1					
	2001-NIVA	IO	W						341	0.05	211		7
	2002-NIVA		W	340	3	249	3		341	0.05	212		6
	2003-NIVA		W	340	3	239	4						
	2003-NIVA	MO	W						341	0.05	183		4
CB153	1988-SIIF		D						111	0.1	6		
	1988-SIIF		W						111	0.1	22		
	1989-NACE		W	510	20	93							
	1989-SIIF		W						111	0.1	36		
	1990-NIVA	2G	W	340	1	169			341	0.05	58		
	1990-SIIF	2G	W						111	0.3	41		
	1991-NIVA	2H	W	340	1	179			341	0.05	68		
	1991-SIIF	2H	W						111	0.5	35		1
	1992-NIVA	2J	W	340	5	192			341	0.1	146		
	1993-NIVA	2K	W	340	4	212	3		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300			341	0.05	170	9	
	1995-NIVA		W	340	3	318	1		341	0.05	231		
	1996-NIVA		W	340	3	332	1		341	0.05	243		
	1997-NIVA		W	340	3	260							
	1997-NIVA	AJ	W						341	0.05	221		
	1998-NIVA		W	340	3	284	1						
	1998-NIVA	CH	W						341	0.05	209	1	1
	1999-NIVA		W	340	3	249							
	1999-NIVA	EG	W						341	0.05	232		1
	2000-NIVA		W	340	3	230	3						

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Lab. Year	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2000-NIVA	GU	W						341	0.05	186	1	
	2001-NIVA		W	340	3	250		1					
	2001-NIVA	IO	W						341	0.05	211		5
	2002-NIVA		W	340	3	249	1						
	2002-NIVA	LJ	W						341	0.05	212		4
	2003-NIVA		W	340	3	239	1						
	2003-NIVA	MO	W						341	0.05	183		1
CB156	1991-NIVA	2H	W	340	1	87		15	341	0.05	47		5
	1992-NIVA		W	340	5	192	3		341	0.1	146		
	1993-NIVA	QM	W	340	4	212	31		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	24	1	341	0.05	167	73	
	1995-NIVA		W	340	3	317	27		341	0.05	231	68	
	1996-NIVA		W	340	3	332	48		341	0.05	243	62	
	1997-NIVA		W	340	3	260	46						
	1997-NIVA	AJ	W						341	0.05	221	9	10
	1998-NIVA		W	340	3	284	52	70					
	1998-NIVA	CH	W						341	0.05	209	37	47
	1999-NIVA		W	340	3	249	39	2					
	1999-NIVA	EG	W						341	0.05	231	12	139
	2000-NIVA		W	340	3	230	71	5					
	2000-NIVA	GU	W						341	0.05	186	28	95
	2001-NIVA		W	340	3	250	82	3					
	2001-NIVA	IO	W						341	0.05	211	9	134
	2002-NIVA		W	340	3	249	99		341	0.05	210		102
	2003-NIVA		W	340	3	236	60						
	2003-NIVA	MO	W						341	0.05	183		83
CB169	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	0.0001	4			841	0.0001	18	2	
	2002-NILU		W						841	0.0001	12		
	2003-NILU		W						841	0.0001	12	1	1
CB180	1987-SIIF		W						111	0.2	21	6	
	1988-SIIF		D						111	0.1	6		
	1988-SIIF		W						111	0.1	22		
	1989-NACE		W	510	20	93	1						
	1989-SIIF		W						111	0.1	36		
	1990-NIVA	2G	W	340	1	169			341	0.05	58		
	1990-SIIF	2G	W						111	0.2	41	8	
	1991-NIVA	2H	W	340	1	179			341	0.05	68		
	1991-SIIF	2H	W						111	0.2	35		
	1992-NIVA	2J	W	340	5	192	3		341	0.1	146		
	1993-NIVA	2K	W	340	4	212	15		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	3		341	0.05	167	49	
	1995-NIVA		W	340	3	318	5		341	0.05	231	22	
	1996-NIVA		W	340	3	332	14		341	0.05	243	25	
	1997-NIVA		W	340	3	260	18						
	1997-NIVA	AJ	W						341	0.05	221	1	1
	1998-NIVA		W	340	3	284	20	14					
	1998-NIVA	CH	W						341	0.05	209	19	44
	1999-NIVA		W	340	3	249	7	1					
	1999-NIVA	EG	W						341	0.05	232	2	78
	2000-NIVA		W	340	3	230	15						
	2000-NIVA	GU	W						341	0.05	186	15	83
	2001-NIVA		W	340	3	250	17	1					
	2001-NIVA	IO	W						341	0.05	211		99
	2002-NIVA		W	340	3	249	24						
	2002-NIVA	LJ	W						341	0.05	212		104
	2003-NIVA		W	340	3	238	13						
	2003-NIVA	MO	W						341	0.05	183		71
CB209	1990-NIVA		W	340	2	169	24	11	341	0.05	58		
	1991-NIVA		W	340	2	179	11	88	341	0.05	68	5	13

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1992-NIVA		W	340	5	192	3		341	0.1	146		1
	1993-NIVA		W	340	4	212	46	14	341	0.1	138		
	1994-NIVA		W	340	3	300	29	24	341	0.05	170	96	
	1995-NIVA		W	340	3	318	36		341	0.05	231	95	5
	1996-NIVA		W	340	3	332	255		341	0.05	243	107	9
	1997-NIVA		W	340	3	260	196		341	0.05	221	30	14
	1998-NIVA		W	340	3	283	120	121	341	0.05	209	54	69
	1999-NIVA		W	340	3	243	163	17	341	0.05	230	19	178
	2000-NIVA		W	340	3	228	151	18	341	0.05	178	33	111
	2001-NIVA		W	340	3	250	184	10	341	0.05	211	21	185
	2002-NIVA		W	340	3	248	207	1	341	0.05	209		114
	2003-NIVA		W	340	3	236	126		341	0.05	177		99
CB28	1988-SIIF		D						111	0.1	6		
	1988-SIIF		W						111	0.1	22		
	1989-NACE		W	510	20	93							
	1989-SIIF		W						111	0.1	36		1
	1990-NIVA	2G	W	340	1	169	2	2	341	0.05	58		
	1990-SIIF	2G	W						111	0.2	41	7	
	1991-NIVA	2H	W	340	1	179	2	52	341	0.05	68	5	4
	1991-SIIF	2H	W						111	0.3	35		
	1992-NIVA	2J	W	340	5	192	3		341	0.1	143		
	1993-NIVA	2K	W	340	4	212	44	5	341	0.1	138		
	1994-NIVA	2Z	W	340	3	282	18	4	341	0.05	168	76	
	1995-NIVA		W	340	3	313	27		341	0.05	231	80	
	1996-NIVA		W	340	3	332	107		341	0.05	242	70	
	1997-NIVA		W	340	3	260	81						
	1997-NIVA	AJ	W						341	0.05	221	22	14
	1998-NIVA		W	340	3	284	96	99					
	1998-NIVA	CH	W						341	0.05	207	36	46
	1999-NIVA		W	340	3	249	96	18					
	1999-NIVA	EG	W						341	0.05	232	14	145
	2000-NIVA		W	340	3	230	110	7					
	2000-NIVA	GU	W						341	0.05	186	26	66
	2001-NIVA		W	340	3	250	146	10					
	2001-NIVA	IO	W						341	0.05	211	17	150
	2002-NIVA		W	340	3	249	144	1					
	2002-NIVA	LJ	W						341	0.05	207		101
	2003-NIVA		W	340	3	238	97						
	2003-NIVA	MO	W						341	0.05	173		75
CB52	1987-SIIF		W						111	0.2	20	1	
	1988-SIIF		D						111	0.1	6		
	1988-SIIF		W						111	0.1	22		
	1989-NACE		W	510	20	93							
	1989-SIIF		W						111	0.1	36		
	1990-NIVA	2G	W	340	1	169	2	6	341	0.05	58		
	1990-SIIF	2G	W						111	0.4	41	7	
	1991-NIVA	2H	W	340	1	179	1	37	341	0.05	68	5	1
	1991-SIIF	2H	W						111	0.3	35		
	1992-NIVA	2J	W	340	5	192	3		341	0.1	143		
	1993-NIVA	2K	W	340	4	212	40		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	9		341	0.05	170	64	
	1995-NIVA		W	340	3	312	19		341	0.05	220	28	
	1996-NIVA		W	340	3	332	49		341	0.05	241	31	
	1997-NIVA		W	340	3	260	116						
	1997-NIVA	AJ	W						341	0.05	221	25	10
	1998-NIVA		W	340	3	281	47	44	341	0.05	169	12	17
	1999-NIVA		W	340	3	249	52	11					
	1999-NIVA	EG	W						341	0.05	222	7	73
	2000-NIVA		W	340	3	230	65	4					
	2000-NIVA	GU	W						341	0.05	183	22	23

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2001-NIVA		W	340	3	250	66	4					
	2001-NIVA	IO	W						341	0.05	186	7	58
	2002-NIVA		W	340	3	193	29						
	2002-NIVA	LJ	W						341	0.05	162		55
	2003-NIVA		W	340	3	239	54						
	2003-NIVA	MO	W						341	0.05	147		41
CB77	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	0.0001	4			841	0.0001	18		
	2002-NILU		W						841	0.0001	12		
	2003-NILU		W						841	0.0001	12		
CB81	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	0.0001	4			841	0.0001	18		
	2002-NILU		W						841	0.0001	12		
	2003-NILU		W						841	0.0001	12		
CD	1981-SIIF	1E	W	130	10	28			130	5	27		
	1981-SIIF	1F	W						130	10	7		
	1982-SIIF	1F	W						130	10	18		
	1982-VETN		W	230	10	54							
	1983-SIIF	1F	W						130	10	17		
	1983-VETN	1Z	W	230	10	46							
	1984-FIER	1H	W	402	1	23							
	1984-SIIF	1G	W						130	10	27		
	1984-VETN	1Z	W	230	10	66							
	1985-SIIF	1G	D						130	10	35		
	1985-VETN	1Z	W	230	10	45		3					
	1986-NIVA	1H	D	312	30	56	1		312	30	20		
	1987-FIER	1G	W	402	1	37							
	1987-NIVA	1H	D	312	30	57		4	312	30	42		
	1988-NIVA	1H	D	312	30	61	11	1	312	30	55		
	1989-NIVA	1H	D	312	30	135	11	8	312	30	3		
	1989-NIVA	1H	W						312	30	36		
	1990-NIVA	1H	D						312	10	6		
	1990-NIVA	1H	W	312	10	189	9	2	312	30	77	5	
	1991-NIVA	1H	D						312	10	6		
	1991-NIVA	1H	W	312	10	190	29	2	312	10	67		
	1992-NIVA	1H	D						312	10	6		
	1992-NIVA	1H	W	312	10	191	4		312	10	111		
	1993-NIVA	1H	D						312	50	5		
	1993-NIVA	1H	W	312	50	221	98		312	50	79		
	1994-NIVA	1Z	D						312	50	5		
	1994-NIVA	1Z	W	312	50	302	134		312	50	81		
	1995-NIVA		D						312	50	6		
	1995-NIVA		W	312	50	318	129		312	50	139	2	
	1996-NIVA	V1	D						312	50	6		
	1996-NIVA	V1	W						312	50	125		
	1996-NIVA	V2	W	312	50	368	128						
	1997-NIVA		W	312	50	287	90						
	1997-NIVA	AH	D						312	50	6		
	1997-NIVA	AH	W						312	50	107		
	1998-NIVA		D						312	50	6		
	1998-NIVA		W	312	50	285	101		312	50	93		
	1999-NIVA		W	312	50	235	79						
	1999-NIVA	EF	D						312	50	6		
	1999-NIVA	EF	W						312	50	132	15	
	2000-NIVA		W	312	50	227	82						
	2000-NIVA	GS	D						312	50	7		
	2000-NIVA	GS	W						312	50	90		
	2001-NIVA		W	312	50	261	103						
	2001-NIVA	IM	D						312	50	6		
	2001-NIVA	IM	W						312	50	93		

Tissue			Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter-calibr. +basis	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2002-NIVA	W	315	50	230	126						
	2002-NIVA	LH D						315	50	6		
	2002-NIVA	LH W						315	50	110		
	2003-NIVA	W	315	50	233	121						
	2003-NIVA	MM W						315	50	99		
CDD1N	1995-NILU	W						841	2E-05	6	1	1
	1996-NILU	W	841	1E-05	4			841	1E-05	18		2
	2002-NILU	W						841	1E-05	12		2
	2003-NILU	W						841	1E-05	12		6
CDD4X	1995-NILU	W						841	2E-05	6	3	1
	1996-NILU	W	841	2E-05	4			841	2E-05	18		1
	2002-NILU	W						841	2E-05	12		2
	2003-NILU	W						841	2E-05	12		6
CDD6P	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	4E-05	4			841	4E-05	18		
	2002-NILU	W						841	4E-05	12	1	
	2003-NILU	W						841	4E-05	12		2
CDD6X	1995-NILU	W						841	2E-05	6		1
	1996-NILU	W	841	2E-05	4			841	2E-05	18		1
	2002-NILU	W						841	2E-05	12	2	1
	2003-NILU	W						841	2E-05	12		6
CDD9X	1995-NILU	W						841	2E-05	6	2	1
	1996-NILU	W	841	2E-05	3		1	841	2E-05	18		1
	2002-NILU	W						841	2E-05	12	2	2
	2003-NILU	W						841	2E-05	12		8
CDDO	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	0.0001	4			841	0.0001	18		
	2002-NILU	W						841	0.0001	12		
	2003-NILU	W						841	0.0001	12		
CDDSN	1995-NILU	W						841	2E-05	5		
	1996-NILU	W	841	1E-05	3			841	1E-05	18		3
	2002-NILU	W						841	1E-05	10		
CDDSP	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	4E-05	4			841	4E-05	18		
	2002-NILU	W						841	4E-05	11	1	
CDDST	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	1E-05	4			841	1E-05	18		
	2002-NILU	W						841	1E-05	12		
CDDSX	1995-NILU	W						841	2E-05	5		
	1996-NILU	W	841	2E-05	3			841	2E-05	18		2
	2002-NILU	W						841	2E-05	11		
CDF2N	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	1E-05	4			841	1E-05	18		1
	2002-NILU	W						841	1E-05	12		
	2003-NILU	W						841	1E-05	12		3
CDF2T	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	1E-05	4			841	1E-05	18		
	2002-NILU	W						841	1E-05	12		
	2003-NILU	W						841	1E-05	12		
CDF4X	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	2E-05	4			841	2E-05	18		1
	2002-NILU	W						841	2E-05	12	4	
	2003-NILU	W						841	2E-05	12	1	3
CDF6P	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	4E-05	4			841	4E-05	18	2	1
	2002-NILU	W						841	4E-05	12	3	
	2003-NILU	W						841	4E-05	12	1	2
CDF6X	1995-NILU	W						841	2E-05	6		
	1996-NILU	W	841	2E-05	4			841	2E-05	18		1

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2002-NILU		W						841	2E-05	12		1
	2003-NILU		W						841	2E-05	12	1	2
CDF9P	1995-NILU		W						841	2E-05	6	2	1
	1996-NILU		W	841	8E-05	4			841	8E-05	17	3	1
	2002-NILU		W						841	8E-05	12	2	2
	2003-NILU		W						841	8E-05	12	3	4
CDF9X	1995-NILU		W						841	2E-05	6	3	1
	1996-NILU		W	841	2E-05	4			841	2E-05	18		1
	2002-NILU		W						841	2E-05	12		3
	2003-NILU		W						841	2E-05	12		7
CDFDN	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	1E-05	4			841	1E-05	18		1
	2002-NILU		W						841	1E-05	12		
	2003-NILU		W						841	1E-05	12		1
CDFDX	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	2E-05	4			841	2E-05	18		1
	2002-NILU		W						841	2E-05	12		1
	2003-NILU		W						841	2E-05	12	1	4
CDFO	1995-NILU		W						841	2E-05	6		1
	1996-NILU		W	841	0.0001	4			841	0.0001	18	3	1
	2002-NILU		W						841	0.0001	11	1	
	2003-NILU		W						841	0.0001	12	1	2
CDFSN	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	1E-05	4			841	1E-05	18		1
	2002-NILU		W						841	1E-05	12		
CDFSP	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	8E-05	4			841	8E-05	18	6	1
	2002-NILU		W						841	8E-05	12	4	
CDFST	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	1E-05	4			841	1E-05	18		
	2002-NILU		W						841	1E-05	12		
CDFSX	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	2E-05	4			841	2E-05	18		1
	2002-NILU		W						841	2E-05	12	1	
CHR	1992-NIVA		W	309	0.2	8			309	0.2	44		
	1995-NIVA		W						309	0.2	56		
	1996-NIVA		W						309	0.2	65		3
CHRTR	1995-NIVA		W						309	0.2	15		2
	1997-NIVA		W						309	0.5	36		
	1998-NIVA		W						309	0.5	39		
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA		W						309	0.5	56		
CO	1996-NIVA		W						999	miss	3		
COR	1992-NIVA		W	309	0.2	8			309	0.2	46		
CR	1992-NIVA		W						312	10	6		
	1996-NIVA		W						999	miss	3		
CU	1983-SIIF	1G	W						130	10	12		
	1984-SIIF	1G	W						130	10	27		
	1986-NIVA	1H	D	311	150	56			311	150	20		
	1987-FIER	1G	W	404	50	37							
	1987-NIVA	1H	D	311	150	57			311	150	42		
	1988-NIVA	1H	D	311	150	61			311	150	55		
	1989-NIVA	1H	D	311	150	135			311	150	3		
	1989-NIVA	1H	W						311	150	36		
	1990-NIVA	1H	D						311	150	6		
	1990-NIVA	1H	W	311	150	189			311	150	77		

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter-calibr.	+basis	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1991-NIVA	1H	D						311	50	6		
	1991-NIVA	1H	W	311	50	193	2		311	50	67		
	1992-NIVA	1H	D						311	10	6		
	1992-NIVA	1H	W	311	10	191			311	10	111		
	1993-NIVA	1H	D						311	10	5		
	1993-NIVA	1H	W	311	10	221			311	10	79		
	1994-NIVA	1Z	D						311	10	5		
	1994-NIVA	1Z	W	311	10	302			311	10	81		
	1995-NIVA		D						311	10	6		
	1995-NIVA		W	311	10	318			311	10	124		
	1996-NIVA	V1	D						311	10	6		
	1996-NIVA	V1	W						311	10	113		
	1996-NIVA	V2	W	311	10	368							
	1997-NIVA		W	311	5000a	287	1						
	1997-NIVA	AH	D						311	10	6		
	1997-NIVA	AH	W						311	10	96		
	1998-NIVA		W	311	10	285							
	1998-NIVA	CF	D						311	10	6		
	1998-NIVA	CF	W						311	10	51		
	1999-NIVA		W	311	10	235							
	1999-NIVA	EF	D						311	10	6		
	1999-NIVA	EF	W						311	10	99		
	2000-NIVA		W	311	10	227							
	2000-NIVA	GS	D						311	10	7		
	2000-NIVA	GS	W						311	10	51		
	2001-NIVA		W	311	10	261							
	2001-NIVA	IM	D						311	10	6		
	2001-NIVA	IM	W						311	10	51		
	2002-NIVA		W	315	10	230							
	2002-NIVA	LH	D						315	10	6		
	2002-NIVA	LH	W						315	10	65		
	2003-NIVA		W	315	10	233							
	2003-NIVA	MM	W						315	10	51		
DBA3A	1992-NIVA		W	309	0.2	8			309	0.2	46		
	1995-NIVA		W						309	0.2	71		48
	1996-NIVA		W						309	0.2	65		53
	1997-NIVA		W						309	0.5	36		
	1998-NIVA		W						309	0.5	39		
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA	MQ	W						309	0.5	56		
DBP	1992-NIVA		W	309	0.2	8			309	0.2	46		
DBT	1998-NIVA		W						309	0.5	39		
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA	MQ	W						309	0.5	56		20
DBTC1	1995-NIVA		W						309	0.2	57		14
	1996-NIVA		W						309	0.2	65		9
DBTC2	1995-NIVA		W						309	0.2	56		9
	1996-NIVA		W						309	0.2	62		11
DBTC3	1995-NIVA		W						309	0.2	57		4
	1996-NIVA		W						309	0.2	65		5
DBTIN	1997-NIVA		D						320	5	13		
	1998-NIVA		D						320	5	15		
	1999-NIVA		D						320	5	13		
	1999-NIVA		W						320	5	6	2	

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter-calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2000-NIVA		W						320	0.5	23		
	2001-GALG		W						520	0.15	11		
	2001-NIVA		W						320	0.5	16		1
	2002-EFDH		W						720	2	33	5	
	2003-NIVA		W						720	2	36	14	
DBTIO	1997-NIVA		W						309	0.5	34		
DDEPP	1982-VETN		W	210	50	53							
	1983-VETN	2E	W	210	50	48			211a	50	48		
	1984-VETN	2E	W	210	50	66							
	1985-VETN	2E	W	210	50	45							
	1986-NACE	2Z	W	510	20	56							
	1987-NACE	2Z	W	510	40	53							
	1988-NACE	2Z	W	510	40	61							
	1989-NACE	2Z	W	510	20	93							
	1990-NIVA		W	340	1	169			341	0.05	58		
	1991-NIVA		W	340	1	179			341	0.05	68		
	1992-NIVA		W	340	5	192	2		341	0.1	146		
	1993-NIVA		W	340	4	212	3		341	0.1	138		
	1994-NIVA	2Z	W	340	4	300			341	0.1	170	27	
	1995-NIVA		W	340	4	318	2		341	0.1	231	30	
	1996-NIVA		W	340	4	332	2		341	0.1	243	47	
	1997-NIVA		W	340	4	260	3		341	0.1	221	1	
	1998-NIVA		W	340	4	284	6						
	1998-NIVA	CH	W						341	0.1	209	4	
	1999-NIVA		W	340	4	249							
	1999-NIVA	EG	W						341	0.1	232	2	
	2000-NIVA		W	340	4	230	7						
	2000-NIVA	GU	W						341	0.1	185	6	
	2001-NIVA		W	340	4	250		1					
	2001-NIVA	IO	W						341	0.1	211	1	7
	2002-NIVA		W	340	4	249	4		341	0.1	210	5	
	2003-NIVA	MO	W	340	4	239	4		341	0.1	183	3	
DDTEP	1983-SIIF		W						111	0.5	12		
	1984-SIIF		W						111	0.5	24		1
	1985-SIIF		W						111	0.5	27	1	5
	1986-SIIF		W						111	0.5	21		
	1987-SIIF		W						111	0.5	21	1	
	1988-SIIF		D						111	0.5	6		
	1988-SIIF		W						111	0.5	22	1	
	1989-SIIF		W						111	0.5	36	1	
	1990-SIIF		W						111	0.2	41	1	
	1991-SIIF		W						111	0.3	35		
DDTPP	1986-NACE		W	510	40	56							
	1987-NACE		W	510	40	53							
	1988-NACE		W	510	40	61							
	1989-NACE		W	510	20	93							
	1995-NIVA		W						340	0.05	78		
	1996-NIVA		W	340	0.05	54		4	340	0.05	51		
	1997-NIVA		W	340	2	32							
	1997-NIVA	AJ	W						340	0.05	48		
	1998-NIVA		W	340	2	37	1	8	340	0.05	74		28
	1999-NIVA		W	340	2	29		4	340	0.05	99		7
	2000-NIVA		W	340	2	22			340	0.05	54		6
	2001-NIVA		W	340	2	46		2	340	0.05	53		11
	2002-NIVA		W	340	2	32		10	340	0.05	67		21
	2003-NIVA		W	340	2	35		10	340	0.05	45		22
DPTIN	1997-NIVA		D						320	5	13	5	
	1998-NIVA		D						320	2	15		6
	1999-NIVA		D						320	5	13	12	
	1999-NIVA		W						320	5	6	6	

Tissue			Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Lab. Year	Inter- calibr. +basis	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2000-NIVA	W						320	0.5	23	1	1
	2001-NIVA	W						320	0.5	16		16
	2003-NIVA	W						720	2	36	36	
EOCL	1989-SIIF	W						605	170	5		
EPOCL	1986-NACE	W	610	800	56							
	1986-SIIF	W						605	5000	21	21	
	1987-NACE	W	610	800	53							
	1987-SIIF	W						605	40	20		
	1988-NACE	W	610	800	60							
	1988-SIIF	W						605	40	27		
	1989-NACE	W	610	800	89	1						
	1989-SIIF	W						605	40	35		
	1990-NIVA	W	615	40	117		3					
	1990-SIIF	W						605	40	41		
	1991-NIVA	W	615	40	116		12					
	1991-SIIF	W						605	130	35		
	1997-IFEN	W						607	50	6		
	1998-IFEN	W						607	1	6		
	2000-SINT	W						607	1	6		
	2001-SINT	W						607	1	6		
FLE	1992-NIVA	W	309	0.2	8			309	0.2	45		
	1995-NIVA	W						309	0.2	72		22
	1996-NIVA	W						309	0.2	65		6
	1997-NIVA	AL W						309	0.5	34		
	1998-NIVA	CI W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	42		
	2002-NIVA	W						309	0.5	43		
	2003-NIVA	MQ W						309	0.5	56		
FLU	1992-NIVA	W	309	0.2	8			309	0.2	44		
	1995-NIVA	W						309	0.2	72		
	1996-NIVA	W						309	0.2	65		
	1997-NIVA	AL W						309	0.2	36		
	1998-NIVA	CI W						309	0.2	39		
	1999-NIVA	EK W						309	0.2	34		
	2000-NIVA	W						309	0.2	39		
	2001-NIVA	W						309	0.2	42		
	2002-NIVA	W						309	0.2	43		3
	2003-NIVA	MQ W						309	0.2	56		
HBCDA	2001-NILU	W		miss	4				miss	5		2
HBCDB	2001-NILU	W		miss	4		4		miss	5		5
HBCDG	2001-NILU	W		miss	5		4		miss	4		4
HCB	1983-SIIF	W						111	0.5	12		
	1983-VETN	2Z W	210	10	48			211a	10	48		
	1984-SIIF	W						111	0.2	24		1
	1984-VETN	2Z W	210	10	66							
	1985-SIIF	W						111	0.2	30	6	2
	1985-VETN	2Z W	210	10	45		4					
	1986-NACE	2Z W	510	10	56							
	1986-SIIF	2Z W						111	0.2	21	3	
	1987-NACE	2Z W	510	40	53							
	1987-SIIF	2Z W						111	0.2	21	4	
	1988-NACE	2Z W	510	40	61							
	1988-SIIF	2Z D						111	0.2	6		
	1988-SIIF	2Z W						111	0.2	22	2	
	1989-NACE	2Z W	510	20	93							
	1989-SIIF	2Z W						111	0.05	36		
	1990-NIVA	W	340	1	169	2		341	0.05	58		
	1990-SIIF	2Z W						111	0.05	41	3	

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1991-NIVA		W	340	1	179	4	13	341	0.05	68	5	1
	1991-SIIF	2Z	W						111	0.1	35		
	1992-NIVA		W	340	5	189	3		341	0.1	146		
	1993-NIVA		W	340	4	212	31		341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	24	1	341	0.05	170	37	
	1995-NIVA		W	340	3	317	37		341	0.05	231	32	
	1996-NIVA		W	340	3	332	52		341	0.05	243	37	
	1997-NIVA		W	340	2	260	39						
	1997-NIVA	AJ	W						341	0.05	221	7	
	1998-NIVA		W	340	2	284	48	13	341	0.05	209	68	2
	1999-NIVA		W	340	2	249	18						
	1999-NIVA	EG	W						341	0.05	232	19	8
	2000-NIVA		W	340	2	230	40						
	2000-NIVA	GU	W						341	0.05	186	43	1
	2001-NIVA		W	340	2	250	36	1	341	0.05	211	36	3
	2002-NIVA		W	340	2	249	39		341	0.05	210	29	2
	2003-NIVA		W	340	2	239	31						
	2003-NIVA	MO	W						341	0.05	174	18	
HCHA	1990-NIVA		W	340	1	168			341	0.05	58		
	1991-NIVA		W	340	1	179	2	111	341	0.05	68	5	10
	1992-NIVA		W	340	5	192	3		341	0.1	146		
	1993-NIVA		W	340	4	212	45	22	341	0.1	138		
	1994-NIVA	2Z	W	340	3	296	32	3	341	0.05	170	85	
	1995-NIVA		W	340	3	318	45		341	0.05	231	100	
	1996-NIVA		W	340	3	332	111		341	0.05	237	100	
	1997-NIVA		W	340	0.5	260	2	10	341	0.05	221	20	11
	1998-NIVA		W	340	0.5	284	8	208	341	0.05	208	26	121
	1999-NIVA		W	340	0.5	249	17	78	341	0.05	232	23	151
	2000-NIVA		W	340	0.5	230	31	62	341	0.05	186	42	84
	2001-NIVA		W	340	0.5	250	25	50	341	0.05	211	20	184
	2002-NIVA		W	340	0.5	249	23	149	341	0.05	210		121
	2003-NIVA		W	340	0.5	239	4	201	341	0.05	183		99
HCHG	1986-NACE		W	510	30	56	1						
	1986-SIIF		W						111	3	21		
	1987-NACE		W	510	40	53							
	1987-SIIF		W						111	5	21		1
	1988-NACE		W	510	40	61							
	1989-NACE		W	510	20	93							
	1989-SIIF		W						111	50	36		
	1990-NIVA		W	340	1	169	1	9	341	0.05	58		
	1990-SIIF		W						111	0.1	41		
	1991-NIVA		W	340	1	179	3	18	341	0.05	68	5	1
	1991-SIIF		W						111	0.3	35		
	1992-NIVA		W	340	5	192	3		341	0.1	146		
	1993-NIVA		W	340	4	212	42	17	341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	24	1	341	0.05	170	46	
	1995-NIVA		W	340	3	313	31		341	0.05	219	29	
	1996-NIVA		W	340	3	330	68		341	0.05	226	8	
	1997-NIVA		W	340	2	260	47						
	1997-NIVA	AJ	W						341	0.05	221	3	9
	1998-NIVA		W	340	2	284	25	63	341	0.05	209	10	23
	1999-NIVA		W	340	2	249	52	3	341	0.05	232	19	62
	2000-NIVA		W	340	2	230	65	29	341	0.05	186	27	10
	2001-NIVA		W	340	2	250	96	20	341	0.05	211	21	160
	2002-NIVA		W	340	2	249	147	13	341	0.05	210		83
	2003-NIVA		W	340	2	239	96	85	341	0.05	181		102
HG	1981-SIIF	1E	W	120	10	15		1	120	10	35		
	1982-SIIF	1E	W						120	10	18		
	1982-VETN		W	220	10	51			220	10	54		
	1983-SIIF	1E	W						120	10	17		

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1983-VETN	1Z	W						220	10	48		
	1984-FIER	1G	W						401	10	39		
	1984-SIIF	1G	W						120	10	27	6	
	1984-VETN	1Z	W						220	10	66		
	1985-SIIF	1G	D						120	10	30		
	1985-VETN	1Z	W						220	10	90		
	1986-NIVA	1H	D						310	10	74		
	1987-FIER	1G	W						401	10	38		
	1987-NIVA	1H	D						310	10	98		14
	1988-NIVA	1H	D						310	10	116		
	1989-NIVA	1H	D						310	100	137		
	1989-NIVA	1H	W						310	10	36	5	
	1990-NIVA	1H	D						310	10	6		
	1990-NIVA	1H	W						310	10	266		
	1991-NIVA	1H	D						310	100	6		
	1991-NIVA	1H	W						310	100a	264	126	
	1992-NIVA	1H	D						310	100	6		
	1992-NIVA	1H	W						310	100a	303	122	
	1993-NIVA	1H	D						310	5	5		
	1993-NIVA	1H	W						310	5	300		
	1994-NIVA	1Z	D						310	5	5		
	1994-NIVA	1Z	W						310	5	381		
	1995-NIVA		D						310	5	6		
	1995-NIVA		W						310	5	442	1	
	1996-NIVA	V1	D						310	5	6		
	1996-NIVA	V1	W						310	5	481		
	1997-NIVA	AH	D						310	5	6		
	1997-NIVA	AH	W						310	5	383		
	1998-NIVA	CF	D						310	5	6		
	1998-NIVA	CF	W						310	5	381		
	1999-NIVA		W	310	5	3							
	1999-NIVA	EF	D						310	5	6		
	1999-NIVA	EF	W						310	5	386		
	2000-NIVA	GS	D						310	5	7		
	2000-NIVA	GS	W						310	5	330		
	2001-NIVA	IM	D						310	5	6		
	2001-NIVA	IM	W						310	5	356		
	2002-NIVA	LH	D						310	5	6		
	2002-NIVA	LH	W						310	5	366		
	2003-NIVA	MM	W						310	5	347	2	
ICDP	1992-NIVA		W	309	0.2	8			309	0.2	46		
	1995-NIVA		W						309	0.2	72		29
	1996-NIVA		W						309	0.2	65		23
	1997-NIVA		W						309	0.5	36		
	1998-NIVA	CI	W						309	0.5	37	2	
	1999-NIVA	EK	W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA	MQ	W						309	0.5	56		
MBTIN	1997-NIVA		D						320	5	13	4	
	1998-NIVA		D						320	5	15		
	1999-NIVA		D						320	5	13		
	1999-NIVA		W						320	5	6	6	
	2000-NIVA		W						320	0.5	23		
	2001-GALG		W						520	0.2	11		
	2001-NIVA		W						320	0.5	16		5
	2002-EFDH		W						720	0.8	33		15
	2003-NIVA		W						720	0.8	36	1	31
MN	1984-SIIF		W						132	40	27		

Tissue			Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Lab. Year	Inter- calibr. +basis	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1985-SIIF	D						132	40	35		
MPTIN	1997-NIVA	D						320	5	13	5	
	1998-NIVA	D						320	2	15		6
	1999-NIVA	D						320	5	13	13	
	1999-NIVA	W						320	5	6	6	
	2000-NIVA	W						320	0.5	23	3	
	2001-NIVA	W						320	0.5	16		15
	2002-EFDH	W						720	4	1		
	2003-NIVA	W						720	4	36	36	
NAP	1992-NIVA	W	309	0.2	8			309	0.2	46		
	1995-NIVA	W						309	0.2	70		21
	1996-NIVA	W						309	0.2	61		11
	1997-NIVA	W						309	0.2	34		1
	1998-NIVA	CI W						309	0.2	37		
	1999-NIVA	W						309	0.2	34		1
	2000-NIVA	W						309	0.2	37		7
	2001-NIVA	W						309	0.2	41		4
	2002-NIVA	W						309	0.2	42		19
	2003-NIVA	MQ W						309	0.2	55		40
NAP1M	1992-NIVA	W	309	0.2	8			309	0.2	46		
	1995-NIVA	W						309	0.2	15		13
	1997-NIVA	W						309	0.5	34		
	1998-NIVA	W						309	0.5	37		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	41		
	2002-NIVA	W						309	0.5	42		9
	2003-NIVA	W						309	0.5	55		1
NAP2M	1992-NIVA	W	309	0.2	8			309	0.2	46		
	1995-NIVA	W						309	0.2	15		13
	1997-NIVA	W						309	0.5	34		
	1998-NIVA	W						309	0.5	37		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	41		
	2002-NIVA	W						309	0.5	42		9
	2003-NIVA	W						309	0.5	55		4
NAPC1	1995-NIVA	W						309	0.2	55		6
	1996-NIVA	W						309	0.2	61		
NAPC2	1995-NIVA	W						309	0.2	57		6
	1996-NIVA	W						309	0.2	60		
NAPC3	1995-NIVA	W						309	0.2	57		5
	1996-NIVA	W						309	0.2	60		
NAPD2	1997-NIVA	W						309	0.5	34		
	1998-NIVA	W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	41		
	2002-NIVA	W						309	0.5	42		
	2003-NIVA	W						309	0.5	55		
NAPD3	1997-NIVA	W						309	0.5	34		
	1998-NIVA	W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	41		
	2002-NIVA	W						309	0.5	42		
	2003-NIVA	W						309	0.5	38		
NAPDI	1992-NIVA	W	309	0.2	8			309	0.2	46		
	1995-NIVA	W						309	0.2	15		6

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Lab. Year	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1997-NIVA		W						309	0.5	34		
	1998-NIVA		W						309	0.5	39		
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	41		
	2002-NIVA		W						309	0.5	42		
	2003-NIVA		W						309	0.5	55		
NAPT2	1997-NIVA		W						309	0.5	34		
	1998-NIVA		W						309	0.5	39		
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA		W						309	0.5	56		
NAPT3	1997-NIVA		W						309	0.5	34		
	1998-NIVA		W						309	0.5	39		
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA		W						309	0.5	56		
NAPT4	1997-NIVA		W						309	0.5	34		
	1998-NIVA		W						309	0.5	39		
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA		W						309	0.5	56		
NAPTM	1992-NIVA		W	309	0.2	8			309	0.2	46		
	1995-NIVA		W						309	0.2	15		11
	1997-NIVA		W						309	0.5	34		
	1998-NIVA		W						309	0.5	39		
	1999-NIVA		W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA		W						309	0.5	56		9
NI	1983-SIIF	1G	W						130	20	12		
	1992-NIVA		W						312	10	6		
	1996-NIVA		W						999	miss	3		
OCS	1990-NIVA		W	340	2	169	31	24	341	0.05	58		1
	1991-NIVA		W	340	2	179	14	81	341	0.05	62	5	8
	1992-NIVA		W	340	5	192	3		341	0.1	146		
	1993-NIVA		W	340	4	212	51	16	341	0.1	138		
	1994-NIVA		W	340	3	300	39	22	341	0.05	170	101	
	1995-NIVA		W	340	3	318	44		341	0.05	231	108	
	1996-NIVA		W	340	3	332	287		341	0.05	243	114	
	1997-NIVA		W	340	2	260	100		341	0.05	221	30	14
	1998-NIVA		W	340	2	277	132	101	341	0.05	209	188	1
	1999-NIVA		W	340	2	249	148	2	341	0.05	232	86	26
	2000-NIVA		W	340	2	230	140	21	341	0.05	186	103	59
	2001-NIVA		W	340	2	250	189	2	341	0.05	211	94	69
	2002-NIVA		W	340	2	218	183		341	0.05	201	96	6
	2003-NIVA		W	340	2	217	178		341	0.05	180	79	
PA	1992-NIVA		W	309	0.2	8			309	0.2	45		
	1995-NIVA		W						309	0.2	72		
	1996-NIVA		W						309	0.2	65		
	1997-NIVA	AL	W						309	0.2	36		
	1998-NIVA	CI	W						309	0.2	39		
	1999-NIVA	EK	W						309	0.2	34		

Tissue			Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter- calibr. +basis	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2000-NIVA	W						309	0.2	39		
	2001-NIVA	W						309	0.2	42		
	2002-NIVA	W						309	0.2	43		
	2003-NIVA	MQ W						309	0.2	56		
PAC1	1995-NIVA	W						309	0.2	57		1
	1996-NIVA	W						309	0.2	65		
PAC2	1995-NIVA	W						309	0.2	56		
	1996-NIVA	W						309	0.2	65		2
PADM1	1997-NIVA	W						309	0.5	36		
	1998-NIVA	W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	42		
	2002-NIVA	W						309	0.5	43		
	2003-NIVA	W						309	0.5	56		
PADM2	1997-NIVA	W						309	0.5	36		
	1998-NIVA	W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		1
	2001-NIVA	W						309	0.5	42		
	2002-NIVA	W						309	0.5	43		
	2003-NIVA	W						309	0.5	56		
PAH	1987-NIVA	W	309	0.02	1							
PAM1	1992-NIVA	W	309	0.2	8			309	0.2	45		
	1995-NIVA	W						309	0.2	15		2
	1997-NIVA	W						309	0.5	36		
	1998-NIVA	W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	39		
	2001-NIVA	W						309	0.5	42		
	2002-NIVA	W						309	0.5	43		
	2003-NIVA	W						309	0.5	55		9
PAM2	1997-NIVA	W						309	0.5	36		
	1998-NIVA	W						309	0.5	39		
	1999-NIVA	W						309	0.5	34		
	2000-NIVA	W						309	0.5	38		
	2001-NIVA	W						309	0.5	42		
	2002-NIVA	W						309	0.5	43		
	2003-NIVA	W						309	0.5	56		
PB	1983-SIIF	1G W						130	20	12		
	1984-SIIF	1G W						130	20	27		2
	1985-SIIF	1G D						130	20	35		
	1986-NIVA	1Z D	312	150	56	4		312	150	20		
	1987-FIER	1G W	403	10	37	1						
	1987-NIVA	1Z D	312	150	57		12	312	150	42		
	1988-NIVA	1Z D	312	150	61	17	3	312	150	55		
	1989-NIVA	1Z D	312	150	135	9	9	312	150	3		
	1989-NIVA	1Z W						312	150	36		
	1990-NIVA	1Z D						312	50	6		
	1990-NIVA	1Z W	312	50	187	3	1	312	150	77	3	
	1991-NIVA	1Z D						312	50	6		
	1991-NIVA	1Z W	312	50	193	14		312	50	67		
	1992-NIVA	1Z D						312	50	6		
	1992-NIVA	1Z W	312	50	191	119		312	50	111	2	
	1993-NIVA	1H D						312	30	5		
	1993-NIVA	1H W	312	30	221	40		312	30	79		
	1994-NIVA	1Z D						312	30	5		
	1994-NIVA	1Z W	312	30	302	3		312	30	81		
	1995-NIVA	D						312	30	6		
	1995-NIVA	W	312	30	318	162	30	312	30	124		

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter-calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1996-NIVA	V1	D						312	30	6		
	1996-NIVA	V1	W						312	30	110		
	1996-NIVA	V2	W	312	30	368		109					
	1997-NIVA		D						312	40	6		
	1997-NIVA		W	312	40	287	10	28	312	40	92		
	1998-NIVA		W	312	40	285	126	2					
	1998-NIVA	CF	D						312	40	6		
	1998-NIVA	CF	W						312	40	90		
	1999-NIVA		W	312	40	235	118	11					
	1999-NIVA	EF	D						312	40	6		
	1999-NIVA	EF	W						312	40	129	10	
	2000-NIVA		W	312	40	227	67	4					
	2000-NIVA	GS	D						312	40	7		
	2000-NIVA	GS	W						312	40	87		
	2001-NIVA		W	312	40	261	156	6					
	2001-NIVA	IM	D						312	40	6		
	2001-NIVA	IM	W						312	40	90		
	2002-NIVA		D						315	40	6		
	2002-NIVA		W	315	40	230	164		315	40	107		
	2003-NIVA	MM	W	315	40	233	179	1	315	40	96		
PBB15	1996-NILU		W		miss	4		3					
	2001-NILU		W		miss	6		6		miss	6		3
	2002-NILU		W						843	0.01	2		
PBB49	2001-NILU		W		miss	6		1		miss	6		3
	2002-NILU		W						843	0.01	2		
PBB52	1996-NILU		W		miss	4							
	2001-NILU		W		miss	6		1		miss	6		5
	2002-NILU		W						843	0.01	2		
PCB	1981-SIIF	2D	W	110	10	27			110	10	35		
	1982-SIIF	2D	W						111	5	17		
	1982-VETN		W	210	50	53			211	50	54		
	1983-SIIF	2E	W						111	5	14		
	1983-VETN	2E	W						211	50	48		
	1983-VETN	2Z	W	210	50	48							
	1984-SIIF	2E	W						111	5	24		
	1984-VETN	2E	W						211	50	66		
	1984-VETN	2Z	W	210	50	66							
	1985-SIIF	2E	W						111	5	32		6
	1985-VETN	2E	W						211	50	90		1
	1985-VETN	2Z	W	210	50	45							
	1986-NACE	2Z	W	511a	40a	56			511	20	56		
	1986-SIIF	2E	W						111	5	21		
	1987-NACE	2Z	W	510	40	53			511	20	54		
	1987-NIVA		W	340	0.1	2							
	1987-SIIF	2E	W						111	5	21		
	1988-NACE	2Z	W	510	40	61			511	20	13		
	1988-SIIF	2E	D						111	5	6		
	1988-SIIF	2E	W						111	5	22	4	
	1989-NACE	2Z	W	510	20	93			511	20	17		
	1989-SIIF	2E	W						111	5	36	6	
	1990-SIIF	2E	W						111	5	41		
	1991-SIIF	2E	W						111	5	35		
PCC26	1996-NILU		W						842	0.001	6		
PCC32	1996-NILU		W						842	0.003	6		4
PCC50	1996-NILU		W						842	0.001	6		
PCC62	1996-NILU		W						842	0.025	6		6
PCDD	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	0.0001	4			841	0.0001	18		
	2002-NILU		W						841	0.0001	12		

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Lab. Year	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
PCDF	1995-NILU		W						841	2E-05	6		
	1996-NILU		W	841	0.0001	4			841	0.0001	18		
	2002-NILU		W						841	0.0001	11		
PER	1992-NIVA		W	309	0.2	8			309	0.2	46		
	1995-NIVA		W						309	0.2	72		32
	1996-NIVA		W						309	0.2	65		40
	1997-NIVA		W						309	0.5	36		
	1998-NIVA		W						309	0.5	39		
	1999-NIVA	EK	W						309	0.5	34		
	2000-NIVA		W						309	0.5	39		
	2001-NIVA		W						309	0.5	42		
	2002-NIVA		W						309	0.5	43		
	2003-NIVA	MQ	W						309	0.5	56		
PYR	1992-NIVA		W	309	0.2	8			309	0.2	44		
	1995-NIVA		W						309	0.2	72		4
	1996-NIVA		W						309	0.2	65		1
	1997-NIVA	AL	W						309	0.2	36		
	1998-NIVA	CI	W						309	0.2	39		
	1999-NIVA	EK	W						309	0.2	34		
	2000-NIVA		W						309	0.2	39		
	2001-NIVA		W						309	0.2	42		
	2002-NIVA		W						309	0.2	43		3
	2003-NIVA	MQ	W						309	0.2	56		
QCB	1990-NIVA		W	340	2	169	33	39	341	0.05	58		
	1991-NIVA		W	340	2	178	13	97	341	0.05	63	5	13
	1992-NIVA		W	340	5	192	3		341	0.1	131		
	1993-NIVA		W	340	4	212	52	24	341	0.1	138		
	1994-NIVA		W	340	3	299	38	23	341	0.05	170	98	
	1995-NIVA		W	340	3	318	45		341	0.05	231	108	
	1996-NIVA		W	340	3	332	306		341	0.05	243	109	
	1997-NIVA		W	340	2	260	79		341	0.05	221	27	10
	1998-NIVA		W	340	2	284	121	101	341	0.05	209	177	1
	1999-NIVA		W	340	2	242	185	2	341	0.05	232	88	14
	2000-NIVA		W	340	2	230	198	1	341	0.05	186	123	1
	2001-NIVA		W	340	2	232	216	1	341	0.05	211	95	63
	2002-NIVA		W	340	2	248	235		341	0.05	210	99	4
	2003-NIVA		W	340	2	186	182		341	0.05	183	79	
SCCP	2001-NILU		W		miss	4				miss	3		
SE	1982-VETN		W	240	10	46			240	10	54		
TBA	2001-NILU		W		miss	6				miss	6		
	2002-NILU		W						843	0.35	1		
TBBPA	2001-NILU		W		miss	6				miss	6		
TBTIN	1997-NIVA		D						320	5	13		
	1998-NIVA		D						320	5	15		
	1999-NIVA		D						320	5	13		
	1999-NIVA		W						320	5	6		
	2000-NIVA		W						320	0.5	23		
	2001-GALG		W						520	0.12	11		
	2001-NIVA		W						320	0.5	16		
	2002-EFDH		W						720	0.2	32		
	2003-NIVA		W						720	0.2	36	1	2
TCDD	1995-NILU		W						841	2E-05	6	1	
	1996-NILU		W	841	1E-05	4			841	1E-05	18		
	2002-NILU		W						841	1E-05	12		
	2003-NILU		W						841	1E-05	12		2
TDEPP	1991-NIVA		W	340	1	138		1	341	0.05	68		
	1992-NIVA		W	340	5	191	3		341	0.1	146		
	1993-NIVA		W	340	4	212	24	3	341	0.1	138		
	1994-NIVA	2Z	W	340	3	300	17	5	341	0.05	170	47	

Tissue				Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year Lab.	Inter-calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	1995-NIVA		W	340	3	318	36		341	0.05	228	51	
	1996-NIVA		W	340	3	332	23		341	0.05	243	16	
	1997-NIVA		W	340	3	260	23						
	1997-NIVA	AJ	W						341	0.05	221	11	
	1998-NIVA		W	340	3	278	19	26					
	1998-NIVA	CH	W						341	0.05	209	1	44
	1999-NIVA		W	340	3	249	6	1					
	1999-NIVA	EG	W						341	0.05	232	2	71
	2000-NIVA		W	340	3	230	35	4					
	2000-NIVA	GU	W						341	0.05	185	11	67
	2001-NIVA		W	340	3	250	24	3	341	0.05	210	1	101
	2002-NIVA		W	340	3	248	24	3	341	0.05	210		124
	2003-NIVA		W	340	3	239	18	9	341	0.05	183		106
TPTIN	1997-NIVA		D						320	5	13		
	1998-NIVA		D						320	10	15		
	1999-NIVA		D						320	5	13		
	1999-NIVA		W						320	5	6	4	
	2000-NIVA		W						320	0.5	23		
	2001-GALG		W						520	0.1	11		1
	2001-NIVA		W						320	0.5	16		9
	2002-EFDH		W						720	2	24	13	
	2003-NIVA		W						720	2	36	35	
V	1996-NIVA		W						999	miss	3		
ZN	1983-SIIF	1G	W						131	400	12		
	1984-SIIF	1G	W						132	400	27		
	1985-SIIF	1G	D						132	400	35		
	1986-NIVA	1H	D	311	3000	56			311	3000	20		
	1987-FIER	1G	W	405	20	37							
	1987-NIVA	1H	D	311	3000	57			311	3000	42		
	1988-NIVA	1H	D	311	3000	61			311	3000	55		
	1989-NIVA	1H	D	311	3000	135		1	311	3000	3		
	1989-NIVA	1H	W						311	3000	36		
	1990-NIVA	1H	D						311	3000	6		
	1990-NIVA	1H	W	311	3000	189			311	3000	77		
	1991-NIVA	1H	D						311	1000	6		
	1991-NIVA	1H	W	311	1000	193			311	1000	67		
	1992-NIVA	1H	D						311	1000	6		
	1992-NIVA	1H	W	311	1000	191			311	1000	111		
	1993-NIVA	1H	D						311	1000	5		
	1993-NIVA	1H	W	311	1000	221			311	1000	79		
	1994-NIVA	1Z	D						311	1000	5		
	1994-NIVA	1Z	W	311	1000	302			311	1000	81		
	1995-NIVA		D						311	1000	6		
	1995-NIVA		W	311	1000	318			311	1000	142		
	1996-NIVA	V1	D						311	1000	6		
	1996-NIVA	V1	W						311	1000	131		
	1996-NIVA	V2	W	311	1000	368							
	1997-NIVA		W	311	1000	287							
	1997-NIVA	AH	D						311	1000	6		
	1997-NIVA	AH	W						311	1000	110		
	1998-NIVA		W	311	1000	285							
	1998-NIVA	CF	D						311	1000	6		
	1998-NIVA	CF	W						311	1000	51		
	1999-NIVA		W	311	1000	235							
	1999-NIVA	EF	D						311	1000	6		
	1999-NIVA	EF	W						311	1000	99		
	2000-NIVA		W	311	1000	227							
	2000-NIVA	GS	D						311	1000	7		
	2000-NIVA	GS	W						311	1000	51		
	2001-NIVA		W	311	1000	261							

Tissue					Fish liver					Fish fillet, Shrimp tail, Mussel, Other				
Contamin.	Mon. Year	Lab.	Inter- calibr. +basis		Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim	Analys method code	Detect limit (ppb)	Total value count	Count below d.lim	N (<) above d.lim
	2001-NIVA		IM	D						311	1000	6		
	2001-NIVA		IM	W						311	1000	51		
	2002-NIVA			W	315	1000	230							
	2002-NIVA		LI	D						315	1000	6		
	2002-NIVA		LI	W						315	1000	65		
	2003-NIVA			W	315	1000	233							
	2003-NIVA		MM	W						315	1000	51		
Sum of counts							77581	11754	2889			73999	5584	6744

a(7) > ambigous value (Maximum value displayed)

Appendix D
Participation in intercalibration exercises

Appendix D1

Participation in intercalibration exercises other than QUASIMEME

Sea water:

4H	ICES/JMG Fifth Round Intercalibration on Trace Metals in Sea Water - Section 4, analysis for Hg - 1983 - (5/TM/SW:4).
4I	JMG Sixth Intercalibration on Trace Metals in Estuarine Waters - 1986 - (6/TM/SW).
4Z	Intercalibration exercise for SIIF/SERI (Cd) and NIVA/IAMK (IAMK=Chalmers Inst., Göteborg) - 1985.

Seabed sediment:

7E	ICES, First Intercalibration Exercise on Trace metals in Marine Sediments - 1984 - (1/TM/MS).
8B	ICES/OSPAR, First Intercomparison Exercise on Organochlorines (individual chlorobiphenyl congeners) in Marine Sediments - Phase 1, analysis of standard solutions - 1989 - (1/OC/MS:1).
8C	ICES/OSPAR, First Intercomparison Exercise on Organochlorines (individual chlorobiphenyl congeners) in Marine Sediments - Phase 2, analysis of standard solutions - 1991 - (1/OC/MS:2).
8B	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 1 - (analysis of standard solutions) - 1989 - (1/OC/MS-1).
8C	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 2 - 1990 - (1/OC/MS-2).
8D	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 3a (1/OC/MS-3a) 1991.
8E	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 3b - (1/OC/MS-3b) 1992.
8F	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 4 - (1/OC/MS-4) 1993.

Marine biota:

1E	ICES, Fifth Intercalibration Exercise on Trace Metals in Biological Tissues - 1978 - (5/TM/BT).
1F	ICES, Sixth Intercalibration Exercise on Trace Metals (Cadmium and Lead only) in Biological Tissues - 1979 - (6/TM/BT).
1G	ICES, Seventh Intercalibration Exercise on Trace Metals in Biological Tissues - Part A - 1983 - (7/TM/BT).
1H	ICES, Seventh Intercalibration Exercise on Trace Metals in Biological Tissues - Part B - 1985 - (7/TM/BT) (preliminary report 1987).
1Z VETN	Interlabcalibration exercise with VETN and SIIF 1983, mercury and cadmium in cod filet and liver.

1Z NIVA	Interlabcalibration exercise with VETN, NACE and NIVA 1986 (Hg, Cd, Cu, Pb and Zn in 6 samples).
2D	ICES Fourth Intercalibration Exercise on Organochlorines (mainly PCBs) in Biological Tissues (Sample No.5) - 1979 - (4/OC/BT).
2E	ICES Fifth Intercalibration Exercise on Organochlorines (PCBs only) in Biological Tissues - 1982 - (5/OC/BT).
2G	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 1 - (analysis of standard solutions) - 1989 - (7/OC/BT-1).
2H	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 2 - 1990 - (7/OC/BT-2).
2I	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 3a - (7/OC/BT-3a) 1991.
2J	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 3b - (7/OC/BT-3b) 1992.
2K	ICES/IOC/OSPAR Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media - Step 4 - (7/OC/BT-4) 1993.
2Z VETN	Interlabcalibration exercise with VETN among others, 1983, PCB and HCB in cod liver.
2Z NACE	Interlabcalibration exercise with NACE, VETNand SIIF 1986 (PCB (all labs), DDE, OCS, HCB and DCB (NACE and VETN).

Appendix D2

Participation in QUASIMEME intercalibration exercises

IC	Code	Year	No.	Group	Matrix
QM	QOR002BT	1993	80	BT-2	CB's in standard solution and biota - Fish oil
V1	QTM028BT	1996	280	BT-1	Trace metals in cod muscle and cod liver
V2	QTM029BT	1996	280	BT-1	Trace metals in cod muscle and cod liver
AJ	QOR054BT	1997	347	BT-2	Chlorobiphenyls and organochlorine pesticides in biota
AL	QPH008BT	1997	348	BT-4	PAHs in biota
AH	QTM036BT	1997	346	BT-1	Metals in biota
CI	QPH010BT	1998	394	BT-4	Polyaromatic hydrocarbons in biota
CH	QOR059BT	1998	393	BT-2	Chlorobiphenyls and organochlorine pesticides in Biota
CF	QTM042BT	1998	392	BT-1	Trace metals in Biota
EF	QTM046BT	1999	433	BT-1	Trace metals in biota
EG	QOR062BT	1999	434	BT-2	Chlorobiphenyls and organochlorine pesticides in biota
EK	QPH012BT	1999	435	BT-4	Polyaromatic hydrocarbons in biota
GU	QOR066BT	2000	473	BT-2	Chlorobiphenyls and organochlorine pesticides in biota
GS	QTM049BT	2000	472	BT-1	Trace metals in biota
IO	QOR070BT	2001	510	BT-2	Chlorobiphenyls and organochlorine pesticides in biota
IM	QTM053BT	2001	509	BT-1	Trace metals in biota
	QTM057BT	2003	549	BT-1	Trace metals in biota
	QOR074BT	2003	550	BT-2	Chlorobiphenyls and organochlorine pesticides in biota

Appendix E
Overview of localities and sample counts 1981-2003

Station positions are shown on maps in Appendix F

jmpco:JAMP area code (J99 = unclassified)
jmpst: station code
stnam: station code
Lon: Longitude
Lat: Latitude
icear: ICES area
speci: species code (English, Norwegian (Latin))
    MYTI EDU - blue mussel, blåskjell (*Mytilus edulis*)
    NUCE LAP - dog whelk, purpursnegl (*Nucella lapillus*)
    BROS BRO - tusk, brosme (*Brosme brosme)*
    CHIM MON - rat fish, havmus (*Chimaera monstrosa*)
    GADU MOR - Atlantic cod, torsk (*Gadus morhua*)
    LEPI WHI - megrim, glassvar (*Lepidorhombus whiff-iagonis*)
    LIMA LIM - dab, sandflyndre (*Limanda limanda*)
    MICR KIT - lemon sole, lomre (*Microstomus kitt*)
    MOLV MOL - ling, lange (*Molva molva*)
    PAND BOR - shrimp, reker (*Pandalus borealis)*
    PLAT FLE - flounder, skrubbe (*Platichthys flesus*)
    PLEU PLA - plaice, rødspette (*Pleuronectes platessa*)
tissu: tissue:
SB - soft body
LI - liver
MU - fillet
TM - tail muscle

STATIONS AND SAMPLE COUNT FOR BIOTA

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J26	01A	Sponvika	59° 5.10	11° 13.90	47G13	MYTI EDU	SB		3			3					3													
J26	02A	Fugleskjær	59° 6.90	10° 59.00	47G09	MYTI EDU	SB		3			3					3													
J26	03A	Tisler	58° 58.80	10° 57.50	46G07	MYTI EDU	SB		2			3					3													
J26	301	Akershuskaia	59° 54.23	10° 45.47	48G07	MYTI EDU	SB												2											
J26	302	Ormøya	59° 52.69	10° 45.46	48G07	MYTI EDU	SB												2											
J26	303	Malmøya	59° 51.78	10° 45.95	48G07	MYTI EDU	SB												2											
J26	304	Gåsøya	59° 51.11	10° 35.51	48G04	MYTI EDU	SB												3											3
J26	305	Lysaker	59° 54.36	10° 38.60	48G04	MYTI EDU	SB												2											
J26	306	Håøya	59° 42.69	10° 33.35	48G05	MYTI EDU	SB												3											3
J26	30A	Gressholmen	59° 53.20	10° 42.658	48G07	MYTI EDU	SB				3	3	3	4	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3
J26	30G	Spro	59° 45.80	10° 34.50	48G05	PAND BOR	TM															1								
J26	30B	Oslo City area	59° 49.00	10° 33.00	48G05	GADU MOR	BI																		27	23	23	25	25	
J26	30B	Oslo City area	59° 49.00	10° 33.00	48G05	GADU MOR	BL																	20	30	25	25	25	25	
J26	30B	Oslo City area	59° 49.00	10° 33.00	48G05	GADU MOR	LI				29	25	25	25	25	25	25	24	21	24	25	25	50	50	50	25	25	28	30	25
J26	30B	Oslo City area	59° 49.00	10° 33.00	48G05	GADU MOR	MU				29	25	25	25	26	26	30	30	21	29	30	30	60	60	60	30	30	30	30	30
J26	30F	Oslo City area	59° 47.00	10° 34.00	48G05	PLEU PLA	LI												2		5	5								
J26	30F	Oslo City area	59° 47.00	10° 34.00	48G05	PLEU PLA	MU												2		5	5								
J26	30H	Storegrunn	59° 48.50	10° 33.50	48G05	PAND BOR	TM															1								
J26	30X	West of Nesodden	59° 48.50	10° 36.00	48G05	GADU MOR	LI												22											
J26	30X	West of Nesodden	59° 48.50	10° 36.00	48G05	GADU MOR	MU												22											
J26	40C	Steilene	59° 49.00	10° 33.00	48G05	PAND BOR	TM				1								2											
J26	31A	Solbergstrand	59° 36.90	10° 39.40	48G06	MYTI EDU	SB	2		6	3	3	3	3	3	3	3	3	3	3	3	2	4	3	3	3	3	3	3	3
J26	31B	Solbergstrand	59° 36.90	10° 39.40	48G06	GADU MOR	LI	10	27																					
J26	31B	Solbergstrand	59° 36.90	10° 39.40	48G06	GADU MOR	MU	10	27																					
J26	31B	Solbergstrand	59° 36.90	10° 39.40	48G06	PLAT FLE	LI	8																						
J26	31B	Solbergstrand	59° 36.90	10° 39.40	48G06	PLAT FLE	MU	8																						
J26	31C	Solbergstrand	59° 36.90	10° 39.40	48G06	PAND BOR	TM				1																			
J26	32A	Rødtangen	59° 31.50	10° 25.60	48G06	MYTI EDU	SB	1	3			3																		
J26	33B	Sande (east side)	59° 31.70	10° 21.00	48G06	PLAT FLE	LI			25		1	23	1	26	1	5	5	5	5	5	5	15	15	13	5	5	30	30	30
J26	33B	Sande (east side)	59° 31.70	10° 21.00	48G06	PLAT FLE	MU			25		25	1	1	26	1	5	5	5	5	5	5	15	15	13	5	5	30	30	30
J26	33C	Sande	59° 31.70	10° 21.00	48G06	PAND BOR	TM						1																	
J26	33X	Sande (west side)	59° 31.70	10° 20.40	48G06	PLAT FLE	LI										3													
J26	33X	Sande (west side)	59° 31.70	10° 20.40	48G06	PLAT FLE	MU										3													
J26	35A	Mølen	59° 29.20	10° 30.10	47G04	MYTI EDU	SB	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
J26	35C	Holmestrand-Mølen	59° 29.20	10° 30.10	47G04	PAND BOR	TM		1						1		2													

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J26	35C	Holmestrand-Mølen	59° 29.20	10° 30.10	47G04	PAND BOR	XX								1															
J26	36A	Færder	59° 1.60	10° 31.70	47G06	MYTI EDU	SB	1		5	3	3	3	3	3	3	3	3	3	3	3	3	5	3	3	3	3	3	3	3
J26	36G	Færder	59° 1.60	10° 31.70	47G06	NUCE LAP	SB																	1	1	1	1	1	1	1
J26	36B	Færder	59° 2.00	10° 32.00	47G06	GADU MOR	BI																	21	25	25	23	25		
J26	36B	Færder	59° 2.00	10° 32.00	47G06	GADU MOR	BL																	20	25	25	23	25		
J26	36B	Færder	59° 2.00	10° 32.00	47G06	GADU MOR	LI	10	27	23	24	14	25	25	25	25	24	25	25	25	25	25	26	25	25	25	23	28	30	25
J26	36B	Færder	59° 2.00	10° 32.00	47G06	GADU MOR	MU	10	27	23	24	14	25	25	26	26	29	30	30	30	30	30	30	30	30	30	27	30	30	30
J26	36F	Færder area	59° 4.00	10° 23.00	47G06	LIMA LIM	BI																			11	9	20		
J26	36F	Færder area	59° 4.00	10° 23.00	47G06	LIMA LIM	BL																			20	9	20		
J26	36F	Færder area	59° 4.00	10° 23.00	47G06	LIMA LIM	LI										5	5	5	5	5	5	5	5	5	30	30	30	30	30
J26	36F	Færder area	59° 4.00	10° 23.00	47G06	LIMA LIM	MU										5	5	5	5	5	5	5	5	5	30	30	30	30	30
J26	73A	Lyngholmen	59° 2.60	10° 18.10	47G03	MYTI EDU	SB										3													
J26	74A	Oddneskjær	58° 57.30	9° 52.10	46F97	MYTI EDU	SB										3													
J26	71A	Bjørkøya (Risøyodd.)	59° 1.40	9° 45.40	47F99	MYTI EDU	SB	1	3	3	3	2	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3
J26	71G	Fugløyskjær	58° 58.95	9° 48.50	46F97	NUCE LAP	SB																					1	1	1
J99	76A	Risøy	58° 43.60	9° 17.00	46F92	MYTI EDU	SB										3	3	3	3			3	3	3	3	3	3	3	3
J99	76A	Risøy	58° 43.60	9° 17.00	46F92	NUCE LAP	SB																							1
J99	76G	Risøy	58° 43.06	9° 17.00	46F92	NUCE LAP	SB																					1	1	
J99	77A	Flostafjord	58° 31.50	8° 56.90	46F89	MYTI EDU	SB										3	3												
J99	77B	Borøy area	58° 33.00	9° 1.00	45F93	GADU MOR	LI										14	25												
J99	77B	Borøy area	58° 33.00	9° 1.00	45F93	GADU MOR	MU										17	30												
J99	77B	Borøy area	58° 33.00	9° 1.00	45F93	LIMA LIM	LI											3												
J99	77C	Borøy area	58° 29.00	9° 10.00	45F91	PAND BOR	TM										2													
J99	79A	Gjerdsvoldsøyen east	58° 24.80	8° 45.30	45F87	MYTI EDU	SB										3	3												
J99	13A	Langøsund	57° 59.80	7° 34.60	45F74	MYTI EDU	SB										1	4												
J99	14A	Aavigen	58° 2.20	7° 13.20	45F73	MYTI EDU	SB										3	4												
J99	15A	Gåsøy (Ullerø)	58° 3.07	6° 53.16	45F69	MYTI EDU	SB										4	4		3	3	4	4	3	3	3	3	3	3	3
J99	15G	Gåøy	58° 3.01	6° 43.03	45F69	NUCE LAP	SB																					1	1	1
J99	15B	Ullerø area	58° 3.00	6° 43.00	45F69	GADU MOR	BI																	10	25	25		24	25	
J99	15B	Ullerø area	58° 3.00	6° 43.00	45F69	GADU MOR	BL																	24	25	25		23		
J99	15B	Ullerø area	58° 3.00	6° 43.00	45F69	GADU MOR	LI										25	24	23	30	23	25	26	25	25	25	25	25	25	25
J99	15B	Ullerø area	58° 3.00	6° 43.00	45F69	GADU MOR	MU										30	29	27	30	28	29	30	30	30	30	30	30	30	30
J99	15F	Ullerø area	58° 3.00	6° 43.00	45F69	LIMA LIM	BI																			20		22		
J99	15F	Ullerø area	58° 3.00	6° 43.00	45F69	LIMA LIM	BL																			25		25		
J99	15F	Ullerø area	58° 3.00	6° 43.00	45F69	LIMA LIM	LI											3		2	4	5	5	5	5	30	5	30	30	30
J99	15F	Ullerø area	58° 3.00	6° 43.00	45F69	LIMA LIM	MU											3		2	4	5	5	5	5	30	5	30	30	30
J99	15F	Ullerø area	58° 3.00	6° 43.00	45F69	PLEU PLA	LI												3	2										

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J99	15F	Ullerø area	58° 3.00	6° 43.00	45F69	PLEU PLA	MU												3	2										
J99	15F	Ullerø area	58° 3.00	6° 43.00	45F69	MICR KIT	LI														1									
J99	15F	Ullerø area	58° 3.00	6° 43.00	45F69	MICR KIT	MU														1									
J63	51A	Byrkjenes	60° 5.10	6° 33.10	49F66	MYTI EDU	SB							3	3							1	3	3	3	6	3	3	3	3
J63	52A	Eitrheimsneset	60° 5.80	6° 32.20	49F66	MYTI EDU	SB									3	3	3	3	2	3	3	3	3	3	6	3	3	3	3
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	GADU MOR	BI																	15	28	24	25	25	25	
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	GADU MOR	BL																	15	30	25	25	25	25	
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	GADU MOR	LI							13	26	12	25	25	22	25	25	25	50	30	30	25	25	25	25	25
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	GADU MOR	MU							12	26	15	30	30	26	30	30	30	56	36	36	30	30	30	30	30
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	PLAT FLE	BI																			25	11	12		
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	PLAT FLE	BL																			23	11	12		
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	PLAT FLE	LI				22				22	30	5	5	5	5	4	4	11	15	11	30	13	30	30	30
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	PLAT FLE	MU				22				22	30	5	5	5	5	4	4	11	15	11	30	13	30	30	30
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	GLYP CYN	LI							3																
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	GLYP CYN	MU							3																
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	SALM TRU	LI										12													
J63	53B	Inner Sørfjord	60° 10.00	6° 34.00	49F65	SALM TRU	MU										12													
J63	53D	Digraneset	60° 11.00	6° 34.05	49F65	BROS BRO	LI																					24		
J63	53D	Digraneset	60° 11.00	6° 34.05	49F65	BROS BRO	MU																					24		
J63	53D	Digraneset	60° 11.00	6° 34.05	49F65	MOLV MOL	LI																					30		
J63	53D	Digraneset	60° 11.00	6° 34.05	49F65	MOLV MOL	MU																					30		
J63	53D	Digraneset	60° 11.00	6° 34.05	49F65	CHIM MON	LI																					12		
J63	53D	Digraneset	60° 11.00	6° 34.05	49F65	CHIM MON	MU																					12		
J63	56D	Kvalnes	60° 15.00	6° 36.00	49F65	BROS BRO	LI																			3				
J63	56D	Kvalnes	60° 15.00	6° 36.00	49F65	BROS BRO	MU																			3				
J63	56D	Kvalnes	60° 15.00	6° 36.00	49F65	MOLV MOL	LI																			1				
J63	56D	Kvalnes	60° 15.00	6° 36.00	49F65	MOLV MOL	MU																			1				
J63	56D	Kvalnes	60° 15.00	6° 36.00	49F65	CHIM MON	LI																			1				
J63	56D	Kvalnes	60° 15.00	6° 36.00	49F65	CHIM MON	MU																			1				
J99	227X	Høievarde	59° 19.43	5° 19.11	47F52	MYTI EDU	SB																				3	3	3	3
J99	226X	Karmsund bridge (east)	59° 22.68	5° 17.91	47F51	MYTI EDU	SB																		1	3	3			
J99	222A	Kopervik harbour	59° 17.02	5° 18.94	47F52	MYTI EDU	SB																				3			
J99	220G	Smørstakk	59° 15.21	5° 21.14	47F55	NUCE LAP	SB																	1	1	1				
J99	221A	Stangeland	59° 16.62	5° 19.70	47F52	MYTI EDU	SB																		3	3				
J99	221G	Stangeland	59° 16.02	5° 19.70	47F52	NUCE LAP	SB																		1	1				
J99	227A	Melandholmen	59° 20.04	5° 18.90	47F51	MYTI EDU	SB																		3	3				
J99	227G	Melandholmen	59° 20.04	5° 18.90	47F51	NUCE LAP	SB																	1	1	1	1	1	1	1

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J99	226A	Karmsund bridge (west)	59° 22.68	5° 17.70	47F51	NUCE LAP	SB																	1			1			
J99	226G	Karmsund bridge (east)	59° 22.68	5° 17.91	47F51	NUCE LAP	SB																		1	1	1			
J99	224G	Heggjelen	59° 25.00	5° 13.90	47F51	NUCE LAP	SB																	1	1	1	1			
J63	56A	Kvalnes	60° 13.231	6° 36.120	49F65	MYTI EDU	SB							3	15	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3
J63	56A1	Kvalnes, north	60° 13.514	6° 36.255	49F65	MYTI EDU	SB																			3			3	
J63	56A3	Sekse	60° 15.683	6° 37.396	49F65	MYTI EDU	SB																						3	
J63	56A4	Rosstadnes	60° 17.219	6° 37.428	49F65	MYTI EDU	SB																						3	
J63	56A5	Lofthus, south	60° 19.351	6° 39.121	49F65	MYTI EDU	SB																						3	
J63	56A2	Kjeken	60° 20.329	6° 39.274	49F64	MYTI EDU	SB																			3			3	
J63	57A2	Ernes	60° 21.188	6° 39.738	49F64	MYTI EDU	SB																						3	
J63	57A1	Urdheim	60° 22.346	6° 40.689	49F67	MYTI EDU	SB																			3			3	
J63	57A	Krossanes	60° 23.225	6° 41.353	49F67	MYTI EDU	SB							3	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3
J62	63A	Ranaskjær	60° 25.10	6° 24.50	49F64	MYTI EDU	SB							3	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3
J62	65A	Vikingneset	60° 14.50	6° 9.60	49F62	MYTI EDU	SB							3	15	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	GADU MOR	BI																	25	24	25	15	25		
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	GADU MOR	BL																	25	25	25	13	24		
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	GADU MOR	LI							22	26	22	16	19	8	12	18	25	35	25	25	25	25	25	25	25
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	GADU MOR	MU							22	26	23	16	24	9	14	22	30	40	30	30	30	30	30	30	30
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	PLAT FLE	BI																			25	22	25		
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	PLAT FLE	BL																			25	23	23		
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	PLAT FLE	LI																3		4	30	30	30	30	30
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	PLAT FLE	MU																3		4	30	30	30	30	30
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	LIMA LIM	LI																		5					
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	LIMA LIM	MU																		5					
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	LEPI WHI	LI				19			1	26	30	5	5	3	5	5	5	5	5	5	5	5	30	30	28
J62	67B	Strandebarm	60° 16.00	6° 2.00	49F62	LEPI WHI	MU				19			1	26	30	5	5	3	5	5	5	5	5	5	5	5	30	30	28
J62	69A	Lille Terøy	59° 58.79	5° 45.35	48F57	MYTI EDU	SB												3	1	3	3	3	3	3	6	3	3	3	3
J99	21F	Åkrefjord	59° 45.00	6° 7.00	48F62	PLAT FLE	BI																			11				
J99	21F	Åkrefjord	59° 45.00	6° 7.00	48F62	PLAT FLE	BL																			11	25			
J99	21F	Åkrefjord	59° 45.00	6° 7.00	48F62	PLAT FLE	LI																			14	30	30	30	
J99	21F	Åkrefjord	59° 45.00	6° 7.00	48F62	PLAT FLE	MU																			14	30	30	30	
J99	21F	Åkrefjord	59° 45.00	6° 7.00	48F62	LIMA LIM	LI																						30	30
J99	21F	Åkrefjord	59° 45.00	6° 7.00	48F62	LIMA LIM	MU																						30	30
J99	21F	Åkrefjord	59° 45.00	6° 7.00	48F62	LEPI WHI	LI																			5				30
J99	21F	Åkrefjord	59° 45.00	6° 7.00	48F62	LEPI WHI	MU																			5				30
J99	21D	Åkrafjord	59° 48.00	6° 11.00	48F62	BROS BRO	LI																			1		24		
J99	21D	Åkrafjord	59° 48.00	6° 11.00	48F62	BROS BRO	MU																			1		24		

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J99	21D	Åkrafjord	59° 48.00	6° 11.00	48F62	MOLV MOL	LI																			1		24		
J99	21D	Åkrafjord	59° 48.00	6° 11.00	48F62	MOLV MOL	MU																			1		24		
J99	21D	Åkrafjord	59° 48.00	6° 11.00	48F62	CHIM MON	LI																			1		12		
J99	21D	Åkrafjord	59° 48.00	6° 11.00	48F62	CHIM MON	MU																			1		12		
J99	22A	Espevær, west	59° 35.20	5° 8.50	48F53	MYTI EDU	SB										3	3	3	3	3	3	5	3	3	3	3	3	3	3
J99	22G	Espevær vest	58° 34.75	5° 8.90	46F53	NUCE LAP	SB																					1	1	1
J99	22C	Bømlofjord	59° 34.00	5° 11.00	48F53	PAND BOR	TM										2													
J99	22F	Borøyfjorden	59° 43.00	5° 21.00	48F55	LIMA LIM	LI										5	5	4		5	2								
J99	22F	Borøyfjorden	59° 43.00	5° 21.00	48F55	LIMA LIM	MU										5	5	4		5	2								
J99	22F	Borøyfjorden	59° 43.00	5° 21.00	48F55	PLEU PLA	LI																5	5	5					
J99	22F	Borøyfjorden	59° 43.00	5° 21.00	48F55	PLEU PLA	MU																5	5	5					
J99	22F	Borøyfjorden	59° 43.00	5° 21.00	48F55	MICR KIT	LI													5										
J99	22F	Borøyfjorden	59° 43.00	5° 21.00	48F55	MICR KIT	MU													5										
J99	23A	Austvik	59° 52.20	5° 6.60	48F51	MYTI EDU	SB										3	3												
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	GADU MOR	BI																	22	23	24	23	25	25	
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	GADU MOR	BL																	25	25	25	24	25	25	
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	GADU MOR	LI										25	25	25	25	26	25	26	25	25	25	25	25	25	25
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	GADU MOR	MU										30	30	30	30	30	30	30	30	30	30	30	30	30	30
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	PLAT FLE	LI														1									
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	PLAT FLE	MU														1									
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	PLEU PLA	LI														3									
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	PLEU PLA	MU														3									
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	MICR KIT	LI														1	4								
J99	23B	Karihavet area	59° 54.00	5° 8.00	48F51	MICR KIT	MU														1	4								
J99	24A	Vardøy	60° 10.20	5° 0.80	49F52	MYTI EDU	SB										3	3												
J65	80A	Østmarknes	63° 27.50	10° 27.50	55G04	MYTI EDU	SB				1	2																		
J65	81A	Biologisk Stasjon	63° 26.50	10° 21.40	55G04	MYTI EDU	SB				1																			
J65	82A	Flakk	63° 27.00	10° 12.60	55G01	MYTI EDU	SB				1	2	2	3	1	2		3	2	2		3	3							
J65	83A	Frøsetskjær	63° 25.50	10° 7.80	55G01	MYTI EDU	SB				1																			
J65	84A	Trossavika	63° 20.80	9° 57.80	55F97	MYTI EDU	SB				2	3	3	3	3	3		3	3	3		3	3							
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	GADU MOR	LI				13	1	1	1	5															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	GADU MOR	MU				13	10	1	1	5															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	MICR KIT	LI								3															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	MICR KIT	MU								3															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	MELA AEG	LI						14	1	4															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	MELA AEG	MU						1	1	5															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	MERL MNG	LI							1	7															

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	MERL MNG	MU							1	7															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	POLL POL	LI					1	1		8															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	POLL POL	MU					16	1		8															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	POLL VIR	LI								4															
J65	84B	Trossavika	63° 20.80	9° 57.80	55F97	POLL VIR	MU								4															
J65	85A	Geitstrand	63° 21.90	9° 56.30	55F97	MYTI EDU	SB				1																			
J65	86A	Geitnes	63° 26.60	9° 59.20	55F97	MYTI EDU	SB				1																			
J65	87A	Ingdalsbukt	63° 27.80	9° 54.80	55F97	MYTI EDU	SB				1	1	1	1	1	1		1	2	1		2	2							
J65	88A	Rødberg	63° 29.20	10° 0.00	55G01	MYTI EDU	SB				1	1																		
J99	25A	Hinnøy	61° 22.20	4° 52.80	51F47	MYTI EDU	SB												3	3										
J99	26A	Hamnen	61° 52.70	5° 13.60	52F51	MYTI EDU	SB												6	3										
J99	27A	Grinden	62° 12.20	5° 25.40	53F55	MYTI EDU	SB												2											
J99	28A	Eiksundet	62° 15.00	5° 51.60	53F58	MYTI EDU	SB												6	3										
J99	91A	Nerdvika	63° 21.20	8° 9.60	55F81	MYTI EDU	SB												4	3	3									
J99	92A	Stokken	64° 2.21	10° 1.10	57G03	MYTI EDU	SB												7	3	3	3	3	3						
J99	92B	Stokken area	64° 9.85	9° 53.00	57F99	GADU MOR	LI													25	24	25	25							
J99	92B	Stokken area	64° 9.85	9° 53.00	57F99	GADU MOR	MU													30	29	30	30							
J99	92B	Stokken area	64° 9.85	9° 53.00	57F99	LIMA LIM	LI															1								
J99	92B	Stokken area	64° 9.85	9° 53.00	57F99	LIMA LIM	MU															1								
J99	92B	Stokken area	64° 9.85	9° 53.00	57F99	PLEU PLA	LI															1								
J99	92B	Stokken area	64° 9.85	9° 53.00	57F99	PLEU PLA	MU															1								
J99	93A	Sætervik	64° 23.68	10° 29.00	57G04	MYTI EDU	SB												7	3										
J99	94A	Landfast	65° 38.40	12° 0.50	60G23	MYTI EDU	SB												3	3										
J99	95A	Flatskjær	66° 42.60	13° 15.80	62G32	MYTI EDU	SB												3	3										
J99	96A	Breiviken	66° 17.60	12° 50.50	61G28	MYTI EDU	SB												6	3										
J99	97A	Klakholmen	67° 39.90	14° 44.60	64G49	MYTI EDU	SB												4	3										
J99	98A	Svolvær området	68° 14.942	14° 39.752	65G45	MYTI EDU	SB												4	3				3	3	3	3	3	3	3
J99	98G	svolvær området	68° 15.04	14° 40.06	65G48	NUCE LAP	SB																					1	1	1
J99	98B	Lille Molla	68° 12.00	14° 48.00	65G48	GADU MOR	BI																				14	22		
J99	98B	Lille Molla	68° 12.00	14° 48.00	65G48	GADU MOR	BL																				5	25		
J99	98B	Lille Molla	68° 12.00	14° 48.00	65G48	GADU MOR	LI												25	29	25	24	26	25	25	25	25	25	25	21
J99	98B	Lille Molla	68° 12.00	14° 48.00	65G48	GADU MOR	MU												30	29	30	29	30	30	30	30	30	30	30	25
J99	98B	Lille Molla	68° 12.00	14° 48.00	65G48	LIMA LIM	LI													4										
J99	98B	Lille Molla	68° 12.00	14° 48.00	65G48	LIMA LIM	MU													4										
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	LIMA LIM	LI														1	1	5							
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	LIMA LIM	MU														1	1	5							
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	PLEU PLA	BI																				18	24		

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	PLEU PLA	BL																				13	19		
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	PLEU PLA	LI													3		5		4	5	1	25	30	24	18
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	PLEU PLA	MU													3		5		4	5	1	25	30	24	18
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	MICR KIT	LI														1	1								
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	MICR KIT	MU														1	1								
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	GLYP CYN	LI															1								
J99	98F	Lille Molla	68° 12.00	14° 48.00	65G48	GLYP CYN	MU															1								
J99	98X	Skrova	68° 10.50	14° 40.15	65G48	MYTI EDU	SB														3	4	4							
J99	99A	Brunvær	68° 0.30	15° 5.60	65G53	MYTI EDU	SB												7	3										
J99	41A	Fensneset,Grytøya	68° 56.10	16° 38.47	66G64	MYTI EDU	SB														3	3	4	3						
J99	41G	Harstad,Trondenes	68° 49.30	16° 33.92	66G65	NUCE LAP	SB																				1			
J99	42A	Tennskjær,Malangen	69° 28.60	18° 18.00	67G81	MYTI EDU	SB														3	3								
J99	42G	Finnsnes,	69° 13.55	17° 58.50	67G78	NUCE LAP	SB																				1			
J99	43A	Lyngneset,Langfjord	70° 6.02	20° 32.79	69H06	MYTI EDU	SB														3	3		3						
J99	43G	Skjervøy	70° 2.16	20° 59.71	69H09	NUCE LAP	SB																				1			
J99	43B	Kvænangen	70° 9.00	21° 22.00	69H16	GADU MOR	LI														25	25	25							
J99	43B	Kvænangen	70° 9.00	21° 22.00	69H16	GADU MOR	MU														30	30	30							
J99	43F	Kvænangen,Olderfjord	70° 9.00	21° 22.00	69H16	LIMA LIM	LI																3							
J99	43F	Kvænangen,Olderfjord	70° 9.00	21° 22.00	69H16	LIMA LIM	MU																3							
J99	43F	Kvænangen,Olderfjord	70° 9.00	21° 22.00	69H16	MICR KIT	LI																1							
J99	43F	Kvænangen,Olderfjord	70° 9.00	21° 22.00	69H16	MICR KIT	MU																1							
J99	44A	Elenheimsundet	70° 30.97	22° 14.80	70H23	MYTI EDU	SB														3	3	4	3						
J99	44G	Alta	69° 59.40	23° 18.70	68H31	NUCE LAP	SB																				1			
J99	45A	Yttre Sauhamnneset	70° 45.81	24° 19.22	70H42	MYTI EDU	SB														3	3								
J99	45G	Sauhamneset	70° 45.80	24° 19.80	70H42	NUCE LAP	SB																				1			
J99	46A	Smines ved Altesula	70° 58.38	25° 48.14	70H57	MYTI EDU	SB														3	3	5							
J99	46G	Honningsvåg	70° 59.12	25° 57.77	70H57	NUCE LAP	SB																				1			
J99	46B	Hammerfest area	70° 50.00	23° 44.00	70H37	GADU MOR	LI														24	25								
J99	46B	Hammerfest area	70° 50.00	23° 44.00	70H37	GADU MOR	MU														29	30								
J99	47A	Kifjordneset	70° 52.89	27° 22.17	70H74	MYTI EDU	SB														3	3								
J99	47G	Kifjordneset	70° 52.86	27° 22.20	70H74	NUCE LAP	SB																				1			
J99	48A	Trollfjorden i Tanafjord	70° 41.61	28° 33.28	70H85	MYTI EDU	SB														3	3	3							
J99	48G	Mehamn	71° 2.55	27° 50.35	71H79	NUCE LAP	SB																				1			
J99	49A	Nordfjorden,Syltefj.	70° 33.01	30° 5.17	70J03	MYTI EDU	SB														3	3								
J99	10A	Skallneset	70° 6.650	30° 21.50	69J06	MYTI EDU	SB														3	3	4	3	3	3	3	3	3	3
J99	10B	Varangerfjorden	69° 56.00	29° 40.00	68H97	GADU MOR	BI																				22	21		
J99	10B	Varangerfjorden	69° 56.00	29° 40.00	68H97	GADU MOR	BL																				25	25		

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J99	10B	Varangerfjorden	69° 56.00	29° 40.00	68H97	GADU MOR	LI														21	25	25	23	25	25	25	25	25	25
J99	10B	Varangerfjorden	69° 56.00	29° 40.00	68H97	GADU MOR	MU														25	30	30	27	30	30	30	30	30	30
J99	10B	Varangerfjorden	69° 56.00	29° 40.00	68H97	BROS BRO	LI														1									
J99	10B	Varangerfjorden	69° 56.00	29° 40.00	68H97	BROS BRO	MU														1									
J99	10F	Skogerøy	69° 55.00	29° 51.00	68H97	PLEU PLA	BI																				15	25		
J99	10F	Skogerøy	69° 55.00	29° 51.00	68H97	PLEU PLA	BL																				11	24		
J99	10F	Skogerøy	69° 55.00	29° 51.00	68H97	PLEU PLA	LI																	5		4	18	30	30	22
J99	10F	Skogerøy	69° 55.00	29° 51.00	68H97	PLEU PLA	MU																	5		4	18	30	30	22
J99	11A	Sildkroneset,Bøkfj	69° 47.02	30° 11.10	68J02	MYTI EDU	SB														3	3	4	3						
J99	11G	Brashavn	69° 53.92	29° 44.65	68H97	NUCE LAP	SB																						1	1
J99	11X	Brashavn	69° 53.92	29° 44.65	68H97	MYTI EDU	SB																	3	3	3	3	3	3	3
J26	I001	Sponvikskansen	59° 5.40	11° 12.50	47G13	MYTI EDU	SB															3	3							
J26	I011	Kråkenebbet	59° 6.10	11° 17.30	47G13	MYTI EDU	SB															3	3							
J26	I021	Kjøkø,south	59° 7.79	10° 57.11	47G09	MYTI EDU	SB															3	3	3	3		3	3	3	
J26	I022	West Damholmen	59° 6.20	10° 57.90	47G09	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J26	I023	Singlekalven, south	59° 5.70	11° 8.20	47G13	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J26	I024	Kirkøy, north west	59° 4.90	10° 59.20	47G09	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J26	I301	Akershuskaia	59° 54.23	10° 45.47	48G07	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J26	I304	Gåsøya	59° 51.11	10° 35.51	48G04	MYTI EDU	SB															3	3	3	3	3	3	3	3	
J26	I306	Håøya	59° 42.69	10° 33.35	48G05	MYTI EDU	SB															3	3	3	3	3	3	3	3	
J26	I307	Ramtonholmen	59° 44.70	10° 31.40	48G05	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J99	I711	Steinholmen	59° 3.15	9° 40.70	47F99	MYTI EDU	SB															3	4	3	3	3	3		3	
J99	I713	Strømtangen	59° 3.22	9° 41.500	47F99	MYTI EDU	SB																						3	3
J99	I712	Gjemesholmen	59° 2.75	9° 42.47	47F99	MYTI EDU	SB															3	4	3	3	3	3	3	3	3
J99	I131	Lastad	58° 3.30	7° 42.40	45F79	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J99	131G	Lastad	58° 3.30	7° 42.40	45F79	NUCE LAP	SB																					1	1	
J99	I131	Lastad	58° 3.30	7° 42.40	45F79	NUCE LAP	SB																							1
J99	I132	Fiskåtangen	58° 7.75	7° 58.60	45F79	MYTI EDU	SB															4	4	3	3	3	3	3	3	3
J99	I133	Odderø,west	58° 7.90	8° 0.15	45F83	MYTI EDU	SB															4	4	3	3	3	3	3	3	3
J99	I201	Ekkjegrunn (G1)	59° 38.65	6° 21.38	48F66	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J99	I205	Bølsnes (G5)	59° 35.50	6° 18.30	48F63	MYTI EDU	SB															3		3	3	3	3	3	3	3
J99	I241	Nordnes	60° 24.10	5° 18.20	49F51	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J99	I242	Valheimneset	60° 23.70	5° 16.10	49F51	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J99	I243	Hegreneset	60° 24.90	5° 18.50	49F51	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J99	I911	Horvika	62° 44.10	8° 31.40	54F85	MYTI EDU	SB															3	3							
J99	I914	Flåøya, southeast	62°45.35'	08°26.70'	54F85	MYTI EDU	SB																							3
J99	I915	Flåøya, northwest	62°45.48'	08°26.39'	54F85	MYTI EDU	SB																							3

jmpco	jmpst	stnam	lat	lon	icear	speci	tissu	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
J99	I913	Fjøseid	62° 48.59	8° 16.48	54F82	MYTI EDU	SB																			3	3	3	3	3
J99	I912	Honnhammer	62° 51.20	8° 9.70	54F81	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J65	I080	Østmerknes	63° 27.50	10° 27.50	55G04	MYTI EDU	SB															3	3							
J99	I962	Koksverktomta (B2)	66° 19.57	14° 8.38	61G42	MYTI EDU	SB															3	3	2	3					
J99	I964	Toraneskaien	66° 19.30	14° 7.97	61G42	MYTI EDU	SB																						3	3
J99	I965	Moholmen (B5)	66° 18.72	14° 7.55	61G42	MYTI EDU	SB																					3	3	3
J99	I969	Bjørnbærviken (B9)	66° 16.79	14° 2.13	61G42	MYTI EDU	SB															3	3	3	3	3	3	3	3	3
J99	R096	Breiviken, Tomma	66° 17.60	12° 50.50	61G28	MYTI EDU	SB															3	3							
J26	A3*	Svartskjær	58° 58.90	9° 49.90	46F97	MYTI EDU	SB	1																						

Appendix F
Map of stations

Station positions 1981-2003
(cf. Appendix G and Appendix J)

Appendix F (cont.) Map of stations

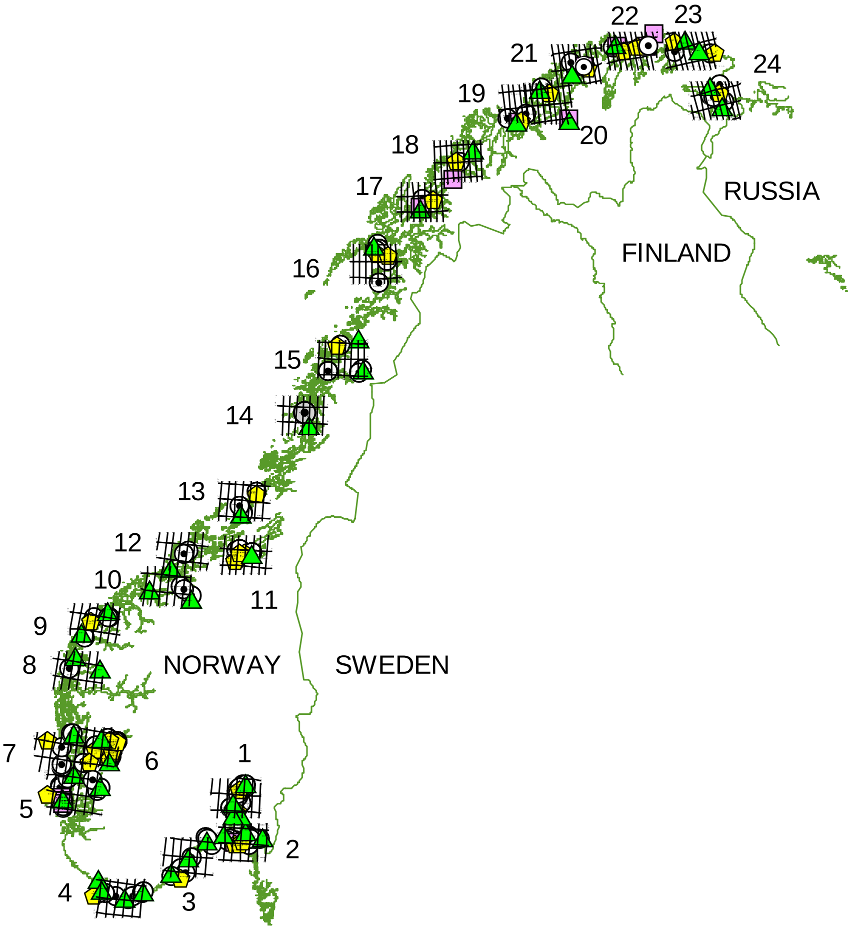
NOTES

For a few stations the geolocation has varied somewhat in order to collect sufficient material (e.g., st. 36B and 98A) or investigate local geographical variations (e.g., in the inner Oslofjord and Sørfjord). Hence, the same station name may appear more than once on a map.

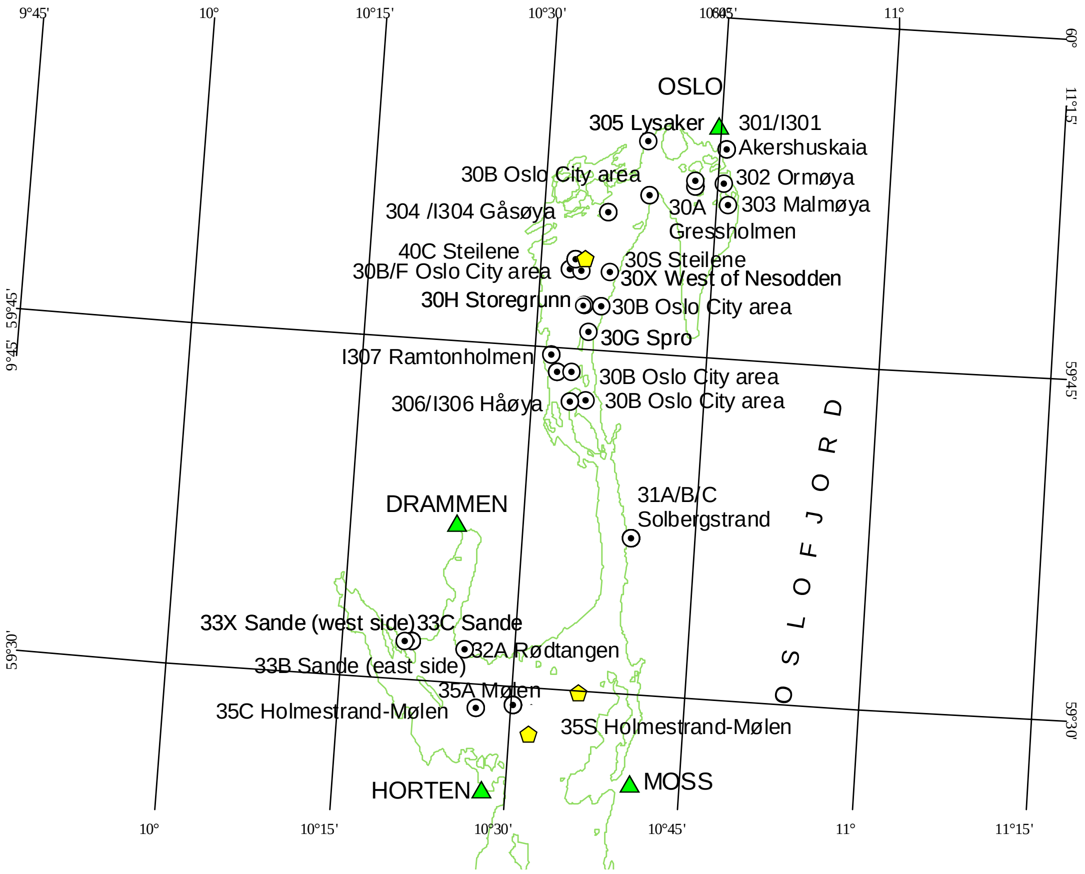
The letter A following the station identification number indicates that blue mussels were sampled. The letter B indicates sampling for cod and the letter F indicates sampling for flatfish. This system for fish is not consistent for some older stations (30, 33, 52 and 67) where only the letter B is used indicating that either cod or flatfish or both were sampled. An encircled dot indicates a mussel, shrimp or fish station. The letter G indicates sampling for dog whelks and S indicates sampling for sediment. An encircled dot indicates the position for sampling mussels, shrimp or fish. A square and pentagon symbol indicates the position for sampling dog whelks or sediment, respectively. A triangle indicates the position of a town or city.

The letter "I" preceding the station identification number indicates an INDEX station for determining a "pollution" index. The letter R indicates a station for evaluating a "reference" index. Only blue mussels are used for these indices. The indices are based on a selection of JAMP and INDEX stations (cf. Green *et al.* 2001).

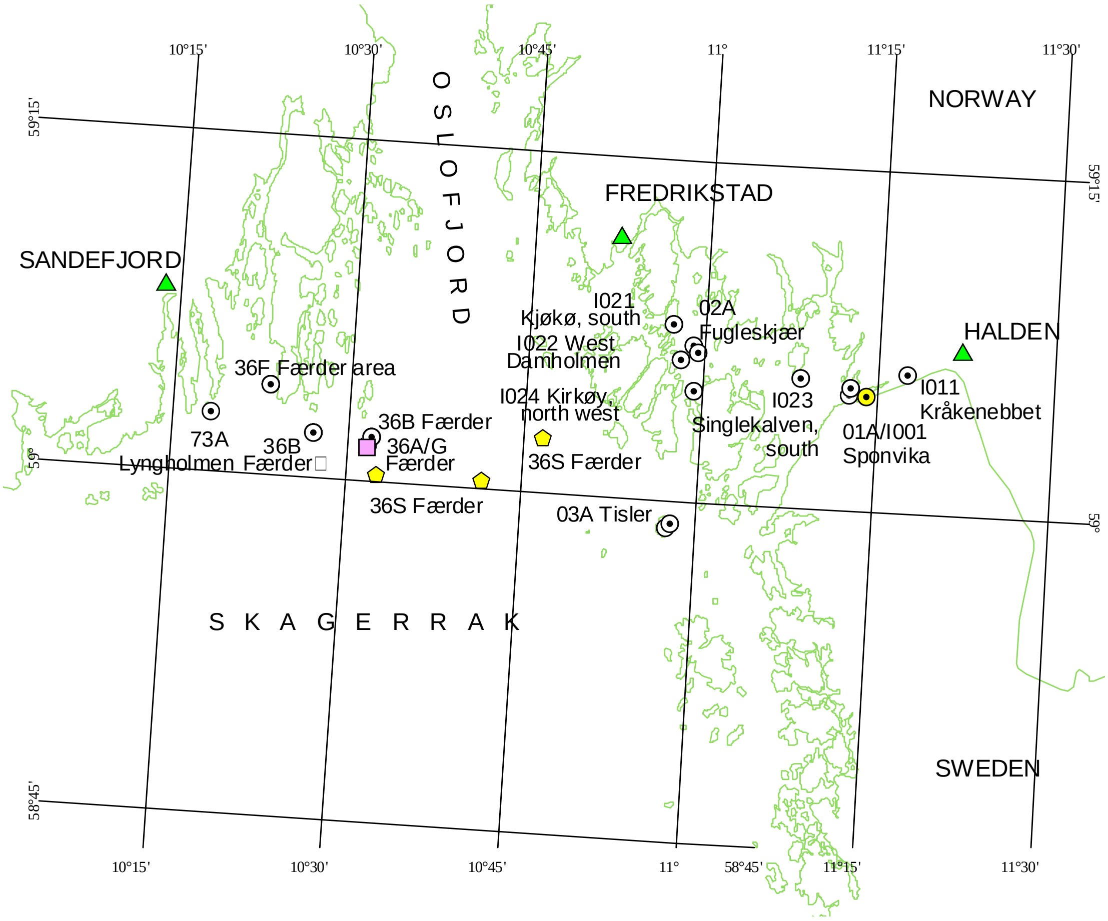
The maps are generated using ArcView GIS version 3.3.



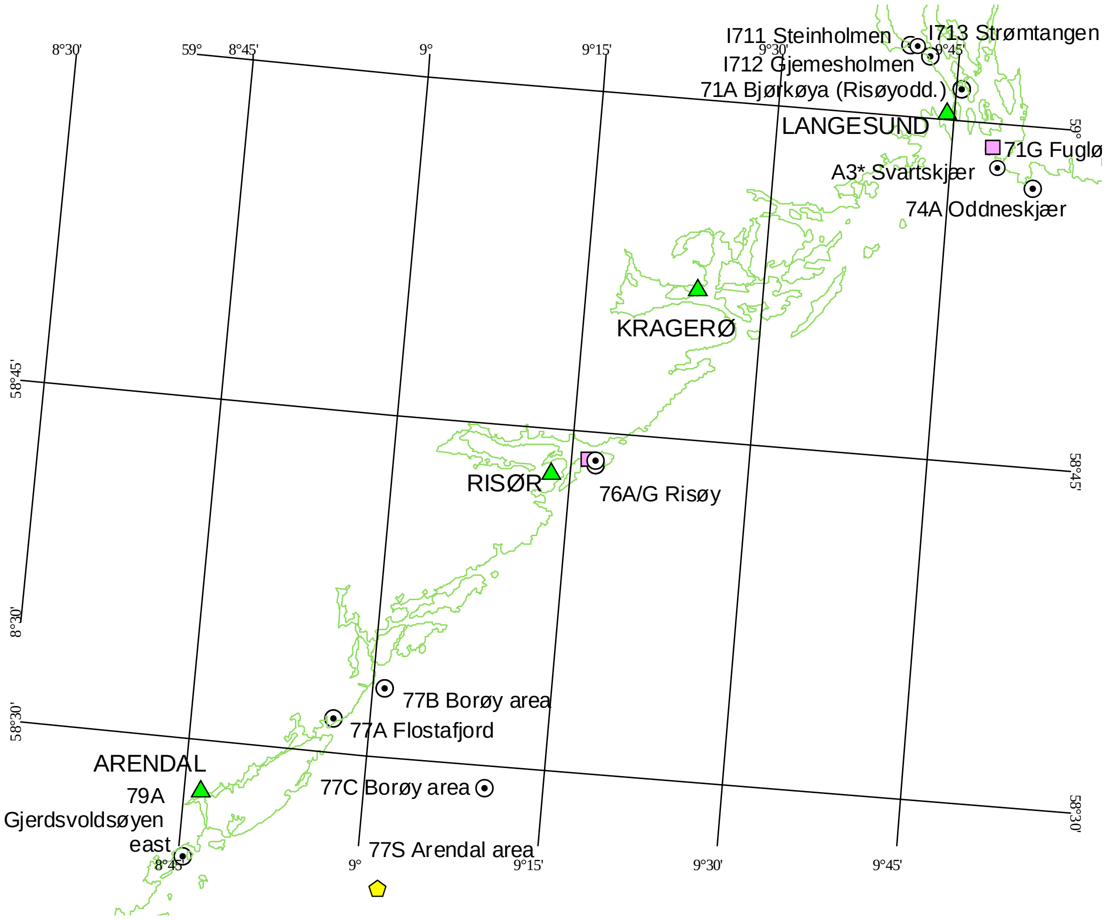
JAMP stations Norway. Numbers indicate map reference


OSLO
305 Lysaker
301/I301 Akershuskaia
30B Oslo City area
302 Ormøya
304 /I304 Gåsøya
30A Gressholmen
303 Malmøya
40C Steilene
30B/F Oslo City area
30S Steilene
30X West of Nesodden
30H Storegrunn
30B Oslo City area
30G Spro
I307 Ramtonholmen
30B Oslo City area
306/I306 Håøya
30B Oslo City area
OSLOFJORD
DRAMMEN
31A/B/C Solbergstrand
33X Sande (west side)
33C Sande
32A Rødtangen
33B Sande (east side)
35A Mølen
35C Holmestrand-Mølen
35S Holmestrand-Mølen
HORTEN
MOSS

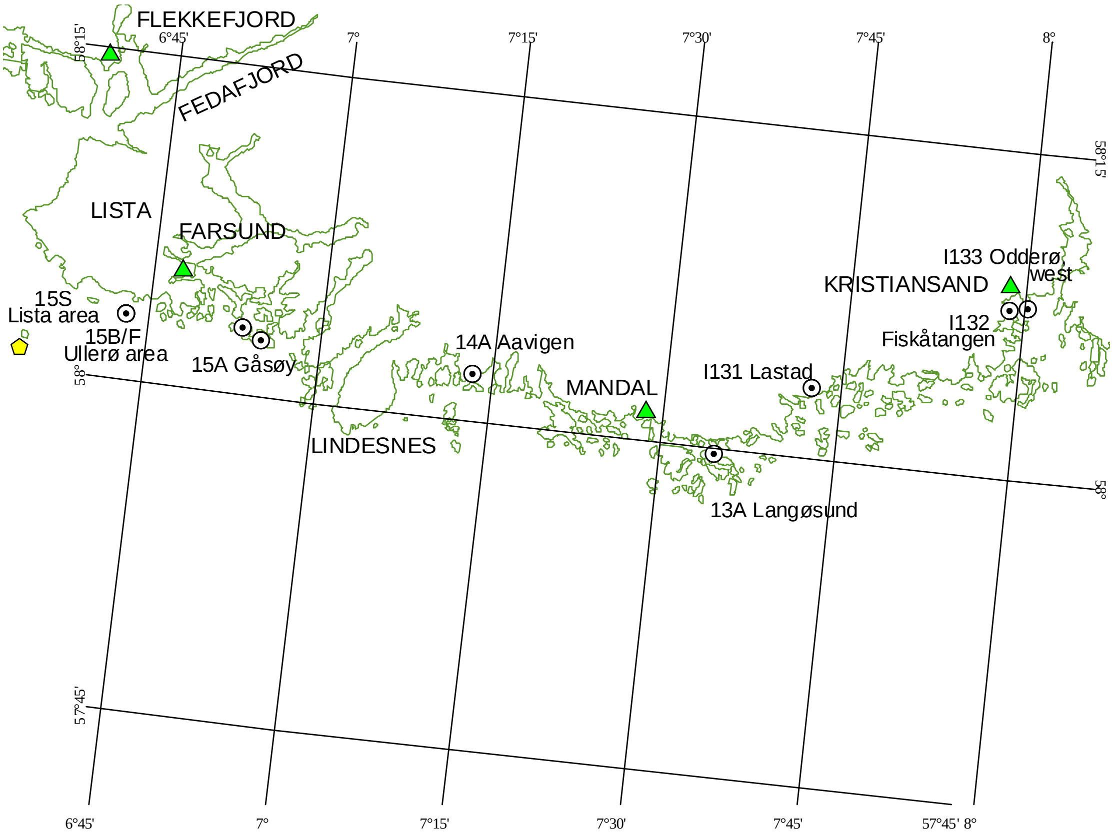
MAP 1


OSLOFJORD
NORWAY
FREDRIKSTAD
SANDEFJORD
I021 Kjøkø, south
02A Fugleskjær
HALDEN
I022 West Damholmen
36F Færder area
I024 Kirkøy, north west
I023 Singlekalven, south
I011 Kråkenebbet
01A/I001 Sponvika
73A Lyngholmen
36B Færder
36B Færder
36A/G Færder
36S Færder
36S Færder
03A Tisler
SKAGERRAK
SWEDEN

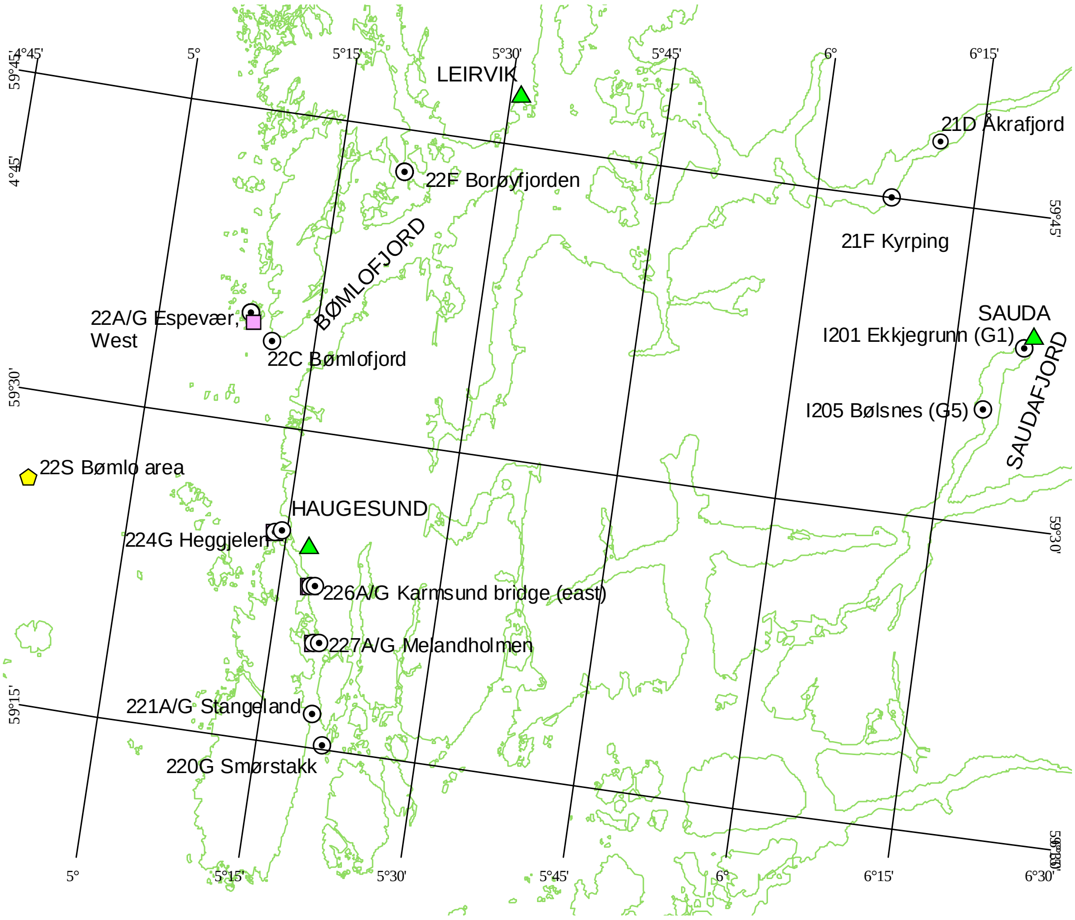
MAP 2


8°30'
59°
8°45'
9°
9°15'
9°30'
9°45'
I711 Steinholmen
I713 Strømtangen
I712 Gjemesholmen
71A Bjørkøya (Risøyodd.)
LANGESUND
59°
71G Fuglø
A3* Svartskjær
74A Oddneskjær
KRAGERØ
58°45'
RISØR
76A/G Risøy
58°45'
8°30'
77B Borøy area
77A Flostafjord
58°30'
ARENDAL
79A
Gjerdsvoldsøyen
east
77C Borøy area
77S Arendal area
58°30'
8°45'
9°
9°15'
9°30'
9°45'

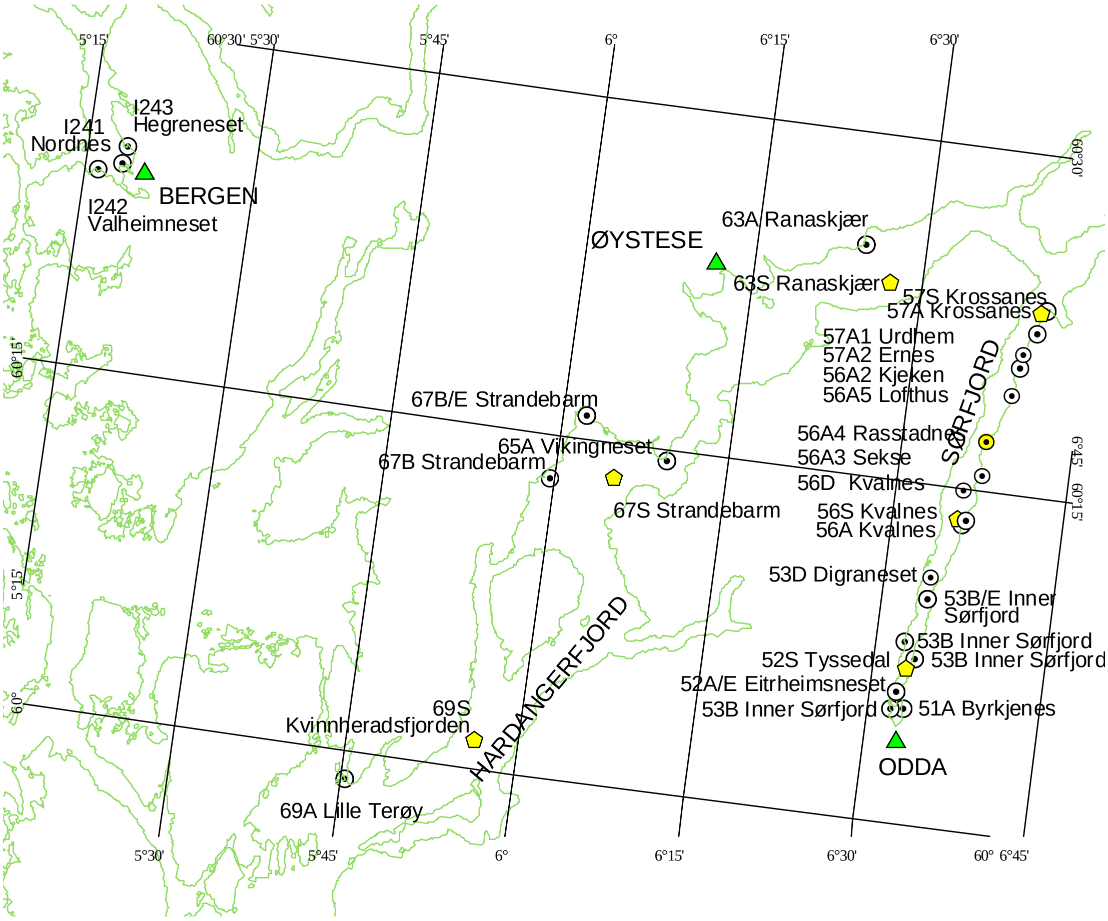
MAP 3


FLEKKEFJORD
58°15'
6°45'
7°
7°15'
7°30'
7°45'
8°
FEDAFJORD
58°15'
LISTA
FARSUND
I133 Odderø,
west
KRISTIANSAND
15S
Lista area
15B/F
Ullerø area
15A Gåsøy
14A Aavigen
I132
Fiskåtangen
I131 Lastad
MANDAL
58°
LINDESNES
13A Langøsund
58°
57°45'
6°45'
7°
7°15'
7°30'
7°45'
57°45' 8°

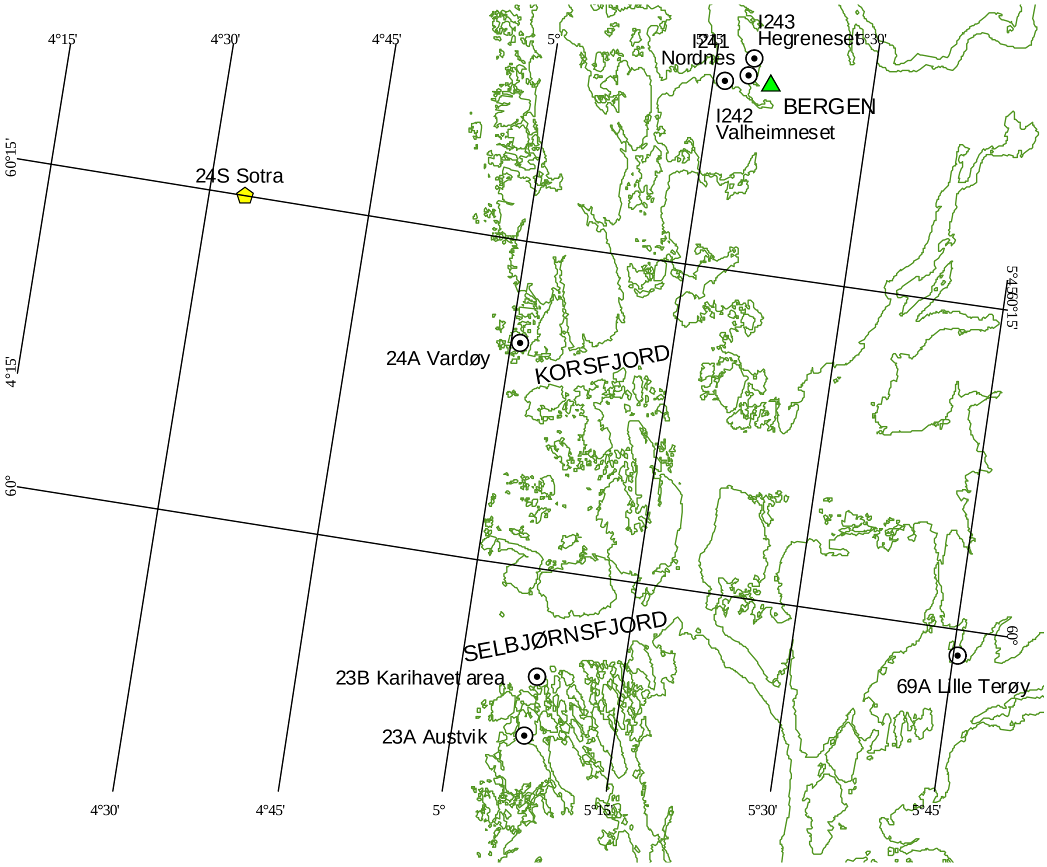
MAP 4


LEIRVIK
21D Åkrafjord
22F Borøyfjorden
21F Kyrping
BØMLOFJORD
22A/G Espevær, West
22C Bømlofjord
SAUDA
I201 Ekkjegrunn (G1)
SAUDAFJORD
I205 Bølsnes (G5)
22S Bømlo area
HAUGESUND
224G Heggjelen
226A/G Karmsund bridge (east)
227A/G Melandholmen
221A/G Stangeland
220G Smørstakk
4°45'
5°
5°15'
5°30'
5°45'
6°
6°15'
6°30'
59°45'
59°30'
59°15'
59°0'

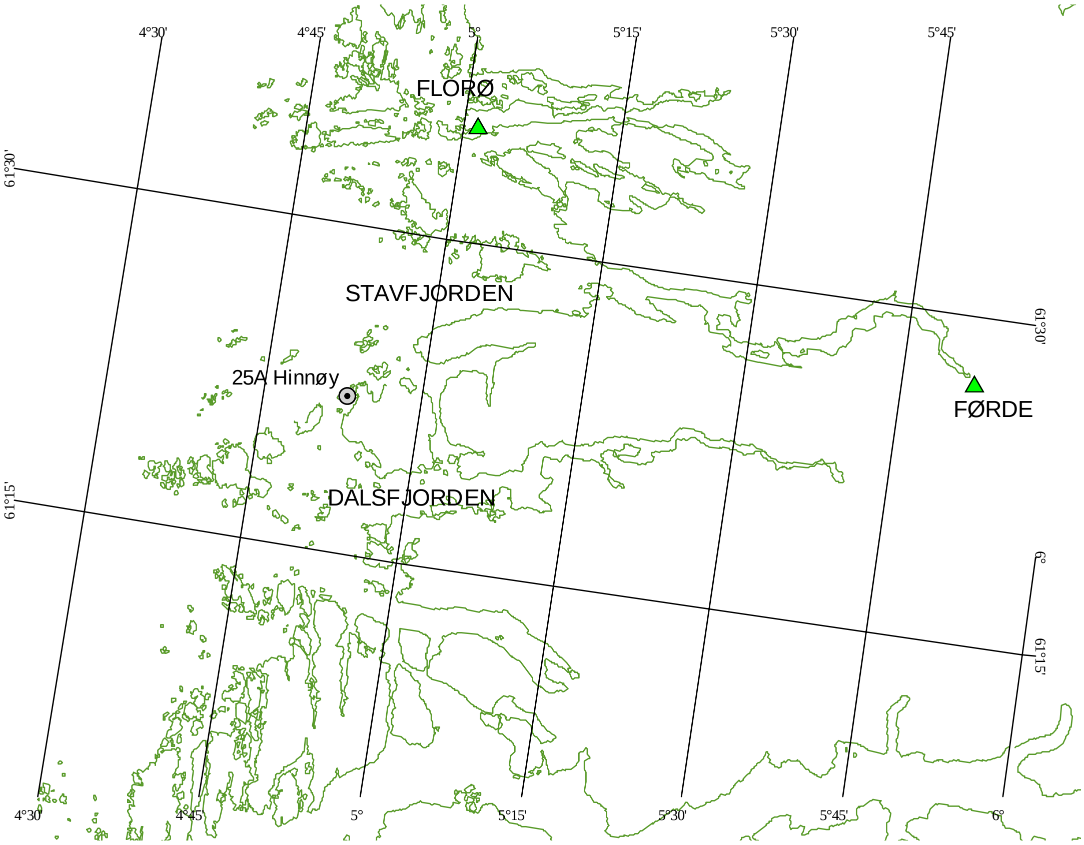
MAP 5


I243 Hegreneset
I241 Nordnes
BERGEN
I242 Valheimneset
63A Ranaskjær
ØYSTESE
63S Ranaskjær
57S Krossanes
57A Krossanes
57A1 Urdhem
57A2 Ernes
56A2 Kjeken
56A5 Lofthus
SØRFJORD
56A4 Rasstadnes
56A3 Sekse
56D Kvalnes
56S Kvalnes
56A Kvalnes
67B/E Strandebarm
65A Vikingneset
67B Strandebarm
67S Strandebarm
53D Digraneset
53B/E Inner Sørfjord
53B Inner Sørfjord
52S Tyssedal
53B Inner Sørfjord
52A/E Eitrheimsneset
53B Inner Sørfjord
51A Byrkjenes
ODDA
HARDANGERFJORD
69S Kvinnheradsfjorden
69A Lille Terøy
5°15'
5°30'
5°45'
6°
6°15'
6°30'
6°45'
60°30'
60°15'
60°

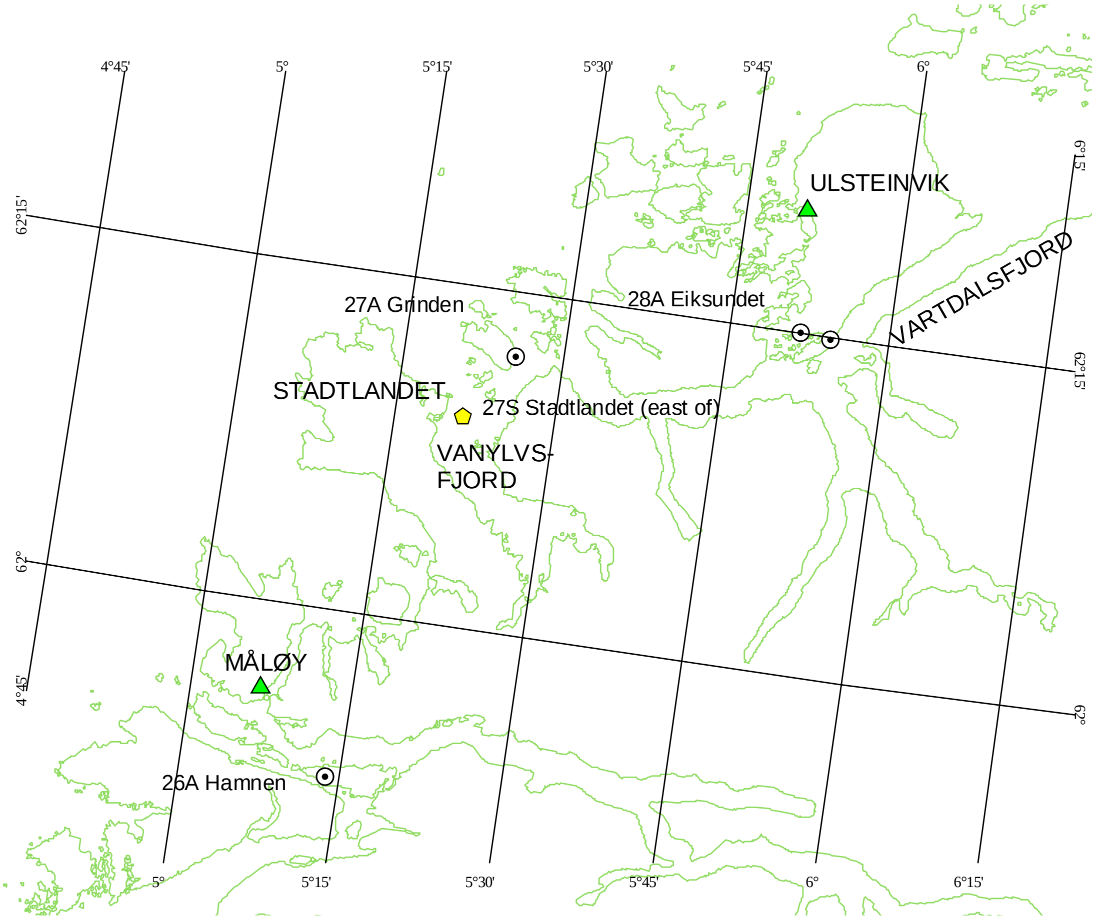
MAP 6


4°15'
4°30'
4°45'
5°
I243
Hegreneset
5°30'
I241
Nordnes
I242
Valheimneset
BERGEN
60°15'
24S Sotra
5°45'
60°15'
4°15'
24A Vardøy
KORSFJORD
60°
SELBJØRNSFJORD
60°
23B Karihavet area
69A Lille Terøy
23A Austvik
4°30'
4°45'
5°
5°15'
5°30'
5°45'

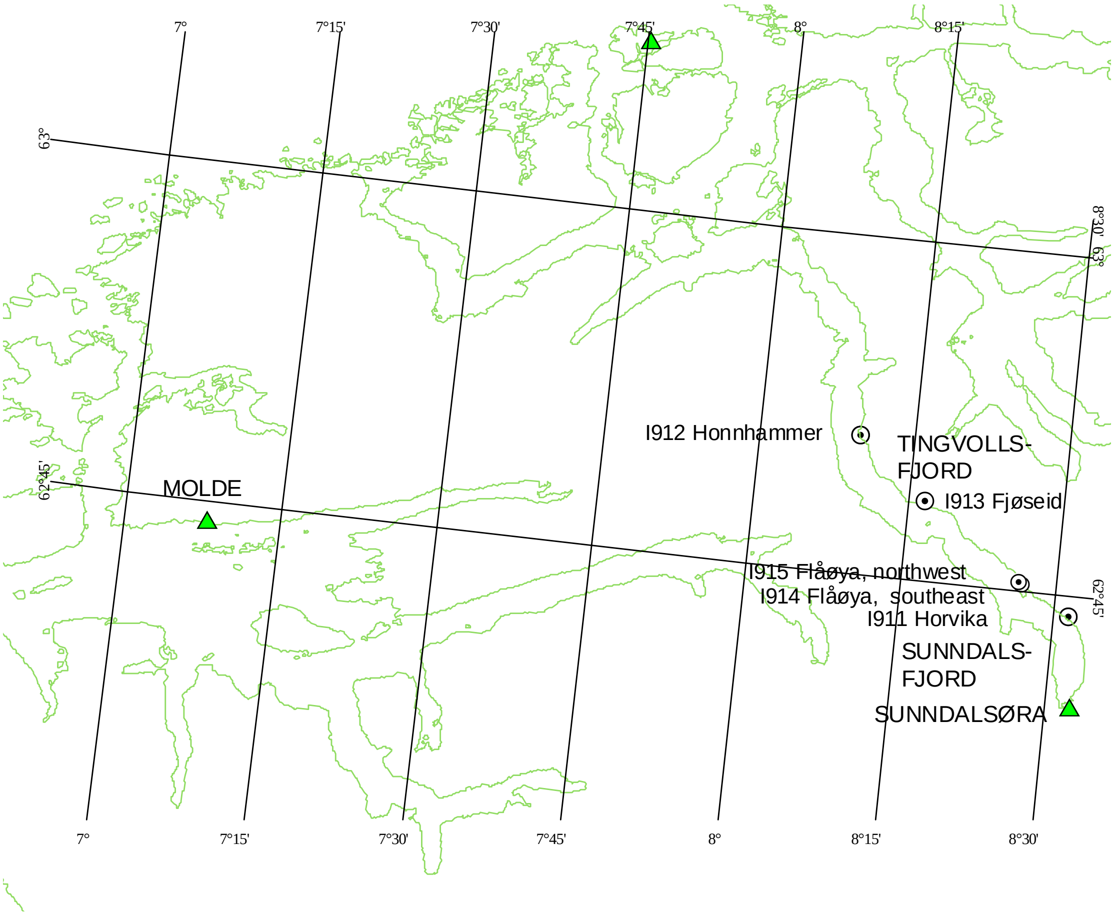
MAP 7


4°30'
4°45'
5°
5°15'
5°30'
5°45'
FLORØ
61°30'
STAVFJORDEN
61°30'
25A Hinnøy
FØRDE
61°15'
DALSFJORDEN
6°
61°15'
4°30'
4°45'
5°
5°15'
5°30'
5°45'
6°

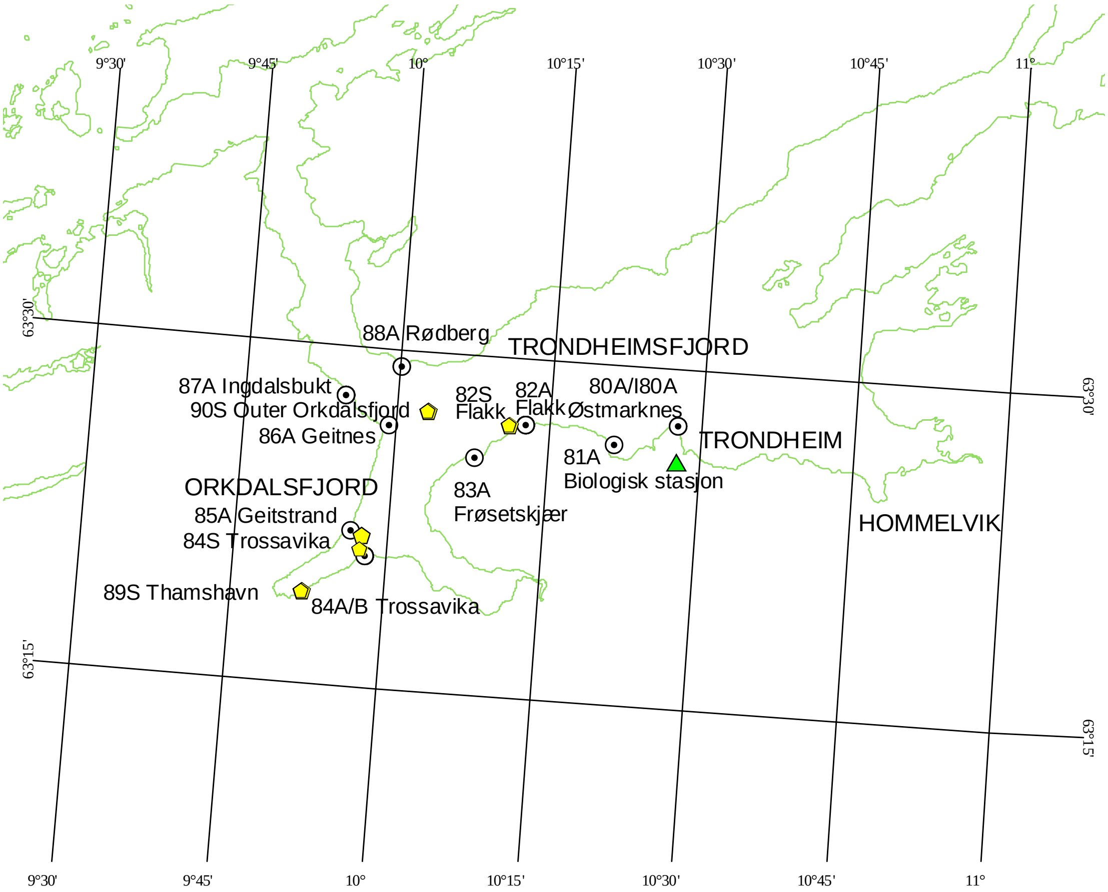
MAP 8


4°45'
5°
5°15'
5°30'
5°45'
6°
6°15'
62°15'
62°
4°45'
ULSTEINVIK
VARTDALSFJORD
27A Grinden
28A Eiksundet
STADTLANDET
27S Stadtlandet (east of)
VANYLVS-
FJORD
MÅLØY
26A Hamnen
5°
5°15'
5°30'
5°45'
6°
6°15'

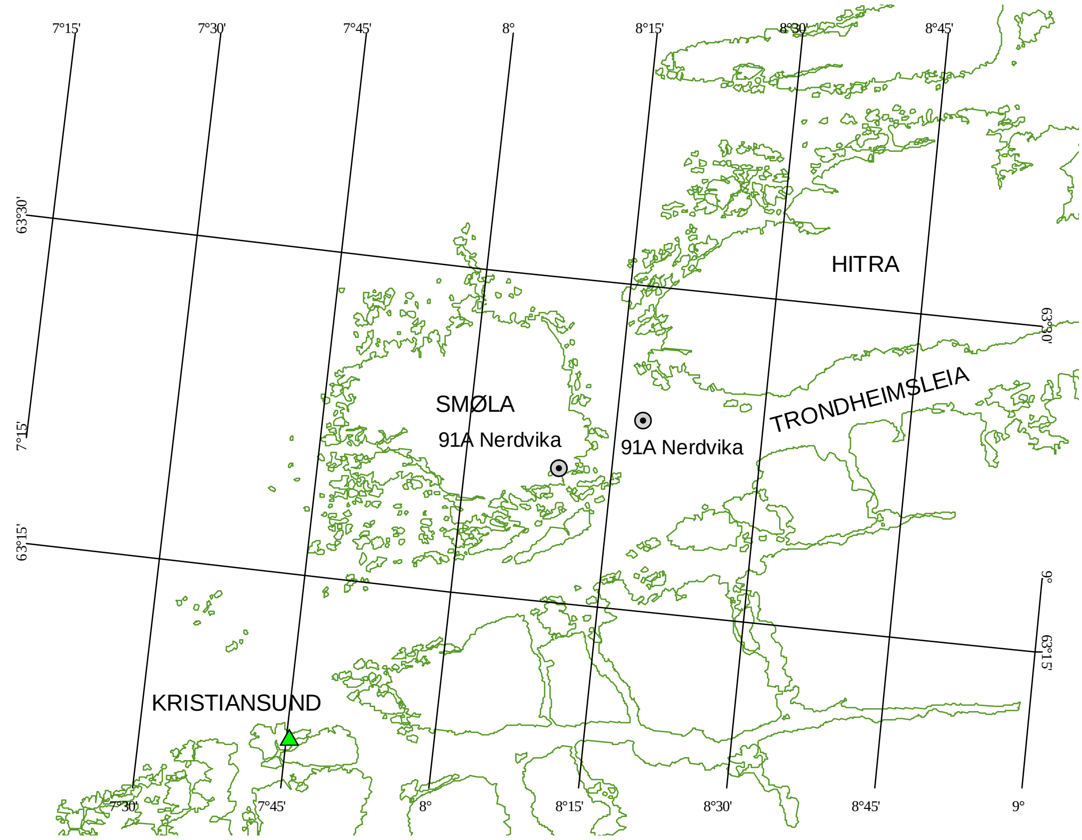
MAP 9


7°
7°15'
7°30'
7°45'
8°
8°15'
63°
8°30'
63°
62°45'
62°45'
I912 Honnhammer
TINGVOLLS-
FJORD
I913 Fjøseid
MOLDE
I915 Fløøya, northwest
I914 Fløøya, southeast
I911 Horvika
SUNNDALS-
FJORD
SUNNDALSØRA
7°
7°15'
7°30'
7°45'
8°
8°15'
8°30'

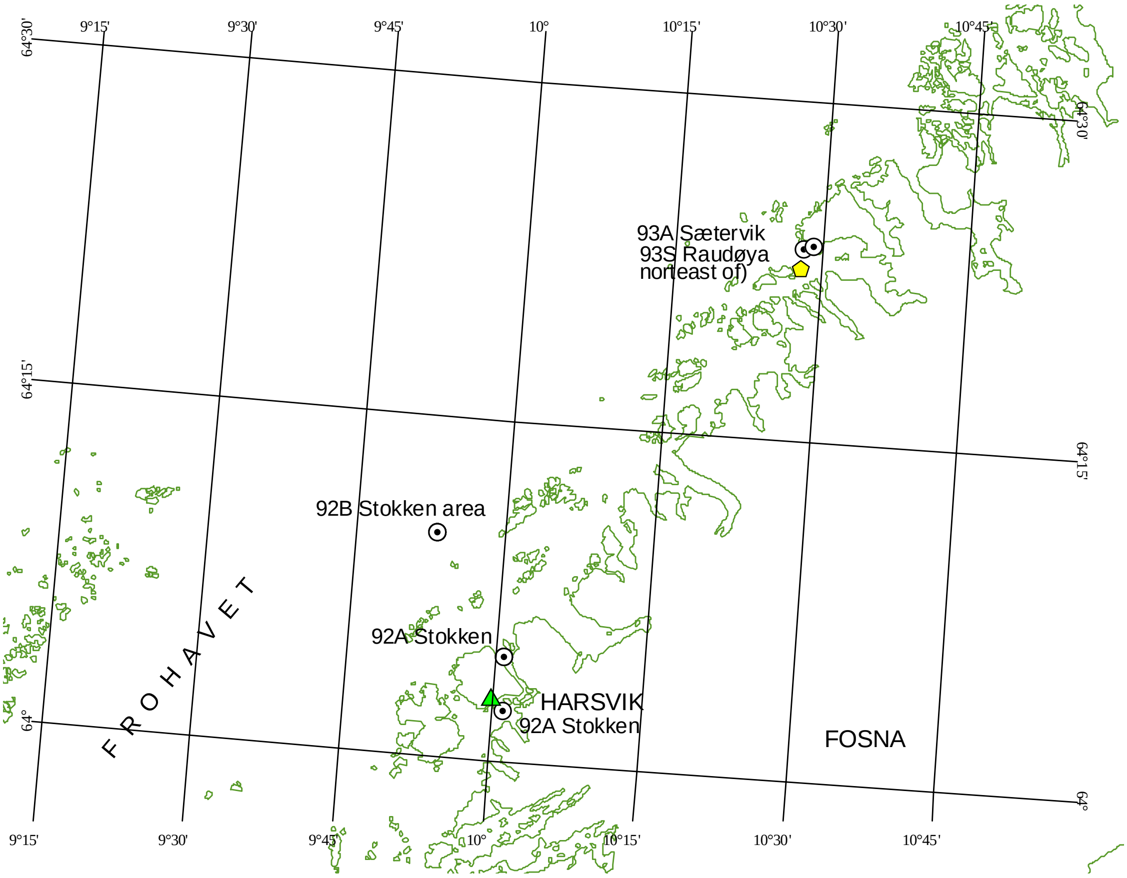
MAP 10


9°30'
9°45'
10°
10°15'
10°30'
10°45'
11°
63°30'
63°15'
88A Rødberg
TRONDHEIMSFJORD
87A Ingdalsbukt
90S Outer Orkdalsfjord
86A Geitnes
82S Flakk
82A Flakk
80A/I80A Østmarknes
TRONDHEIM
81A Biologisk stasjon
83A Frøsetskjær
ORKDALSFJORD
85A Geitstrand
84S Trossavika
89S Thamshavn
84A/B Trossavika
HOMMELVIK

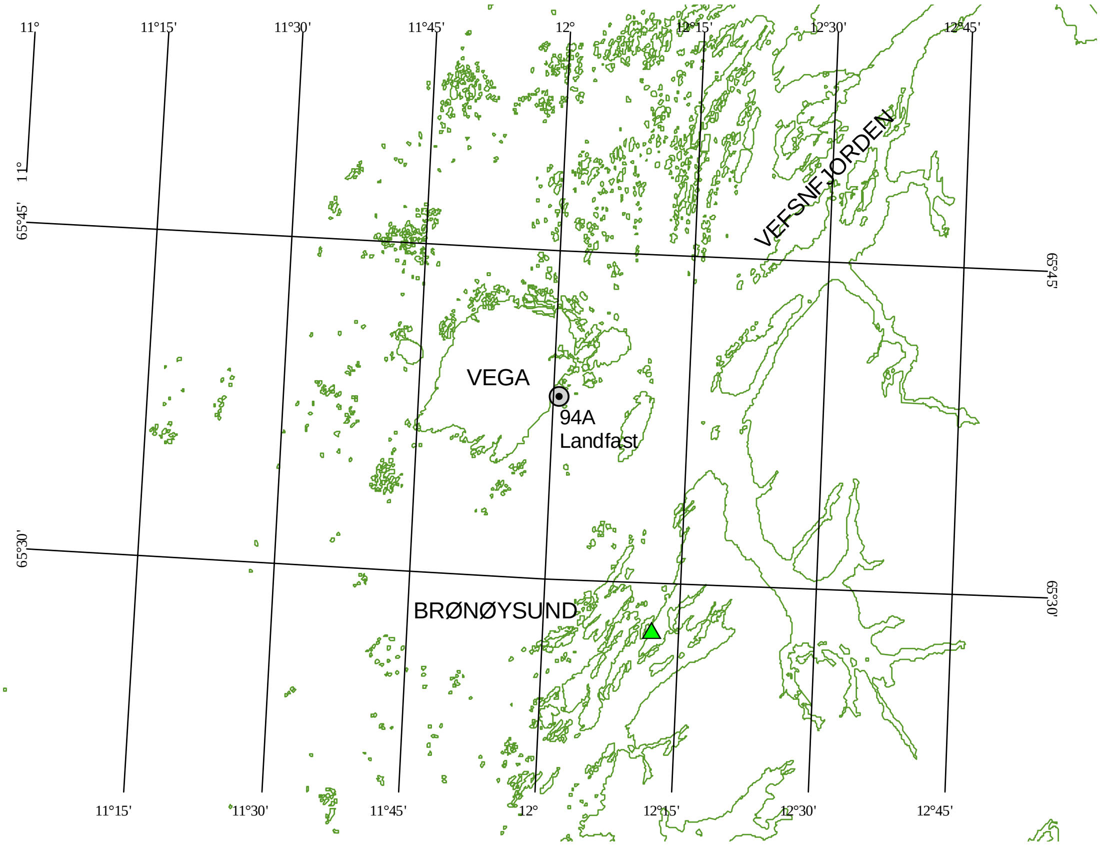
MAP 11


7°15'
7°30'
7°45'
8°
8°15'
8°30'
8°45'
9°
63°30'
63°15'
HITRA
SMØLA
91A Nerdvika
91A Nerdvika
TRONDHEIMSLEIA
KRISTIANSUND

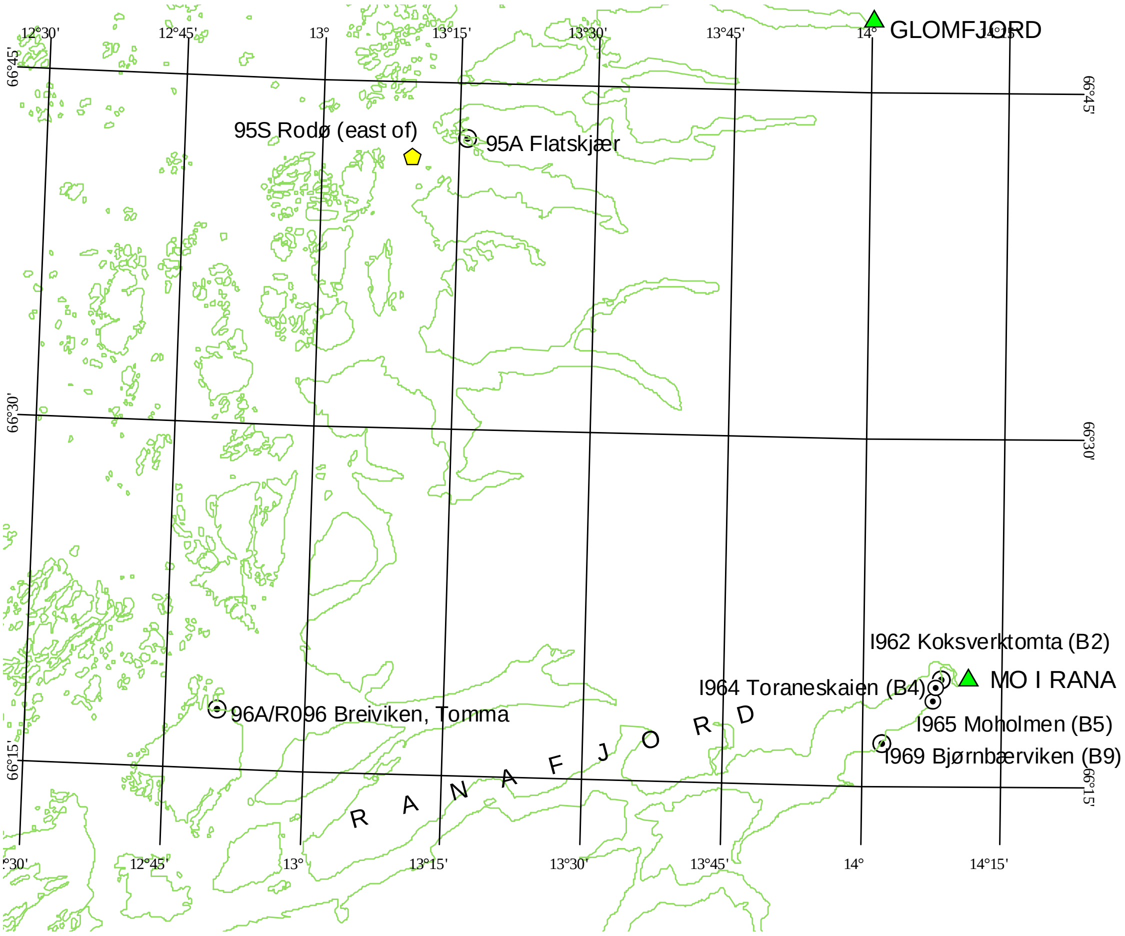
MAP 12


64°30'
9°15'
9°30'
9°45'
10°
10°15'
10°30'
10°45'
64°30'
93A Sætervik
93S Raudøya
northeast of)
64°15'
64°15'
92B Stokken area
FROHAVET
92A Stokken
HARSVIK
92A Stokken
FOSNA
64°
64°
9°15'
9°30'
9°45'
10°
10°15'
10°30'
10°45'

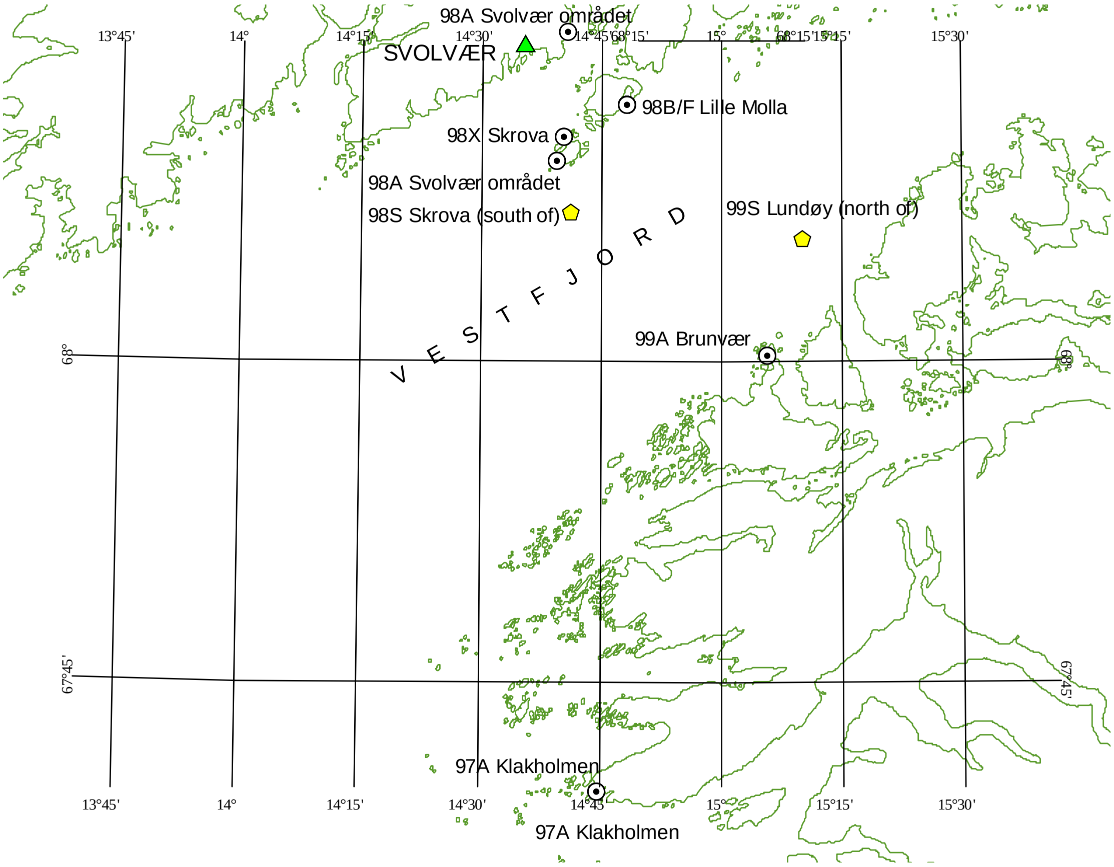
MAP 13


11°
11°15'
11°30'
11°45'
12°
12°15'
12°30'
12°45'
11°
65°45'
VEFSNFJORDEN
65°45'
VEGA
94A
Landfast
65°30'
65°30'
BRØNØYSUND
11°15'
11°30'
11°45'
12°
12°15'
12°30'
12°45'

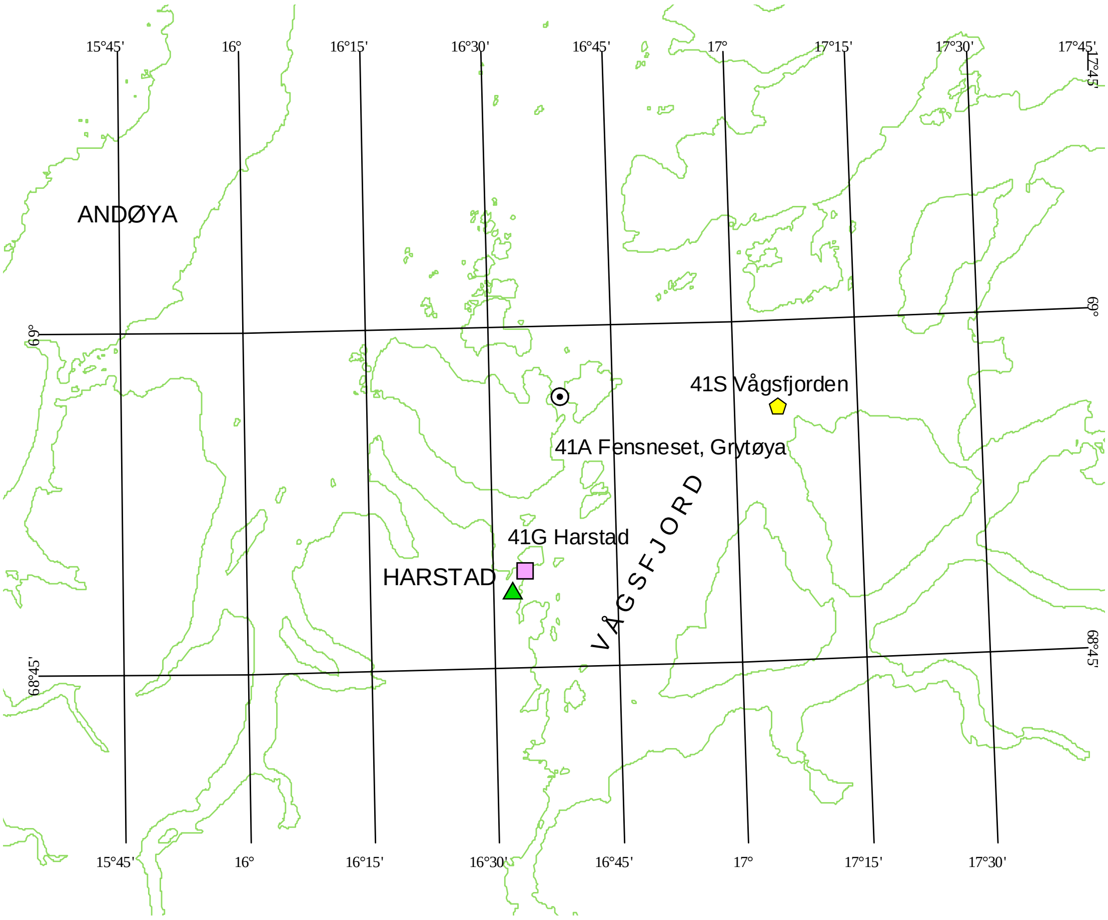
MAP 14


12°30'
12°45'
13°
13°15'
13°30'
13°45'
14°
14°15'
66°45'
66°30'
66°15'
GLOMFJORD
95S Rodø (east of)
95A Flatskjær
I962 Koksverktomta (B2)
I964 Toraneskaien (B4)
MO I RANA
I965 Moholmen (B5)
I969 Bjørnbærviken (B9)
96A/R096 Breiviken, Tomma
R A N A F J O R D

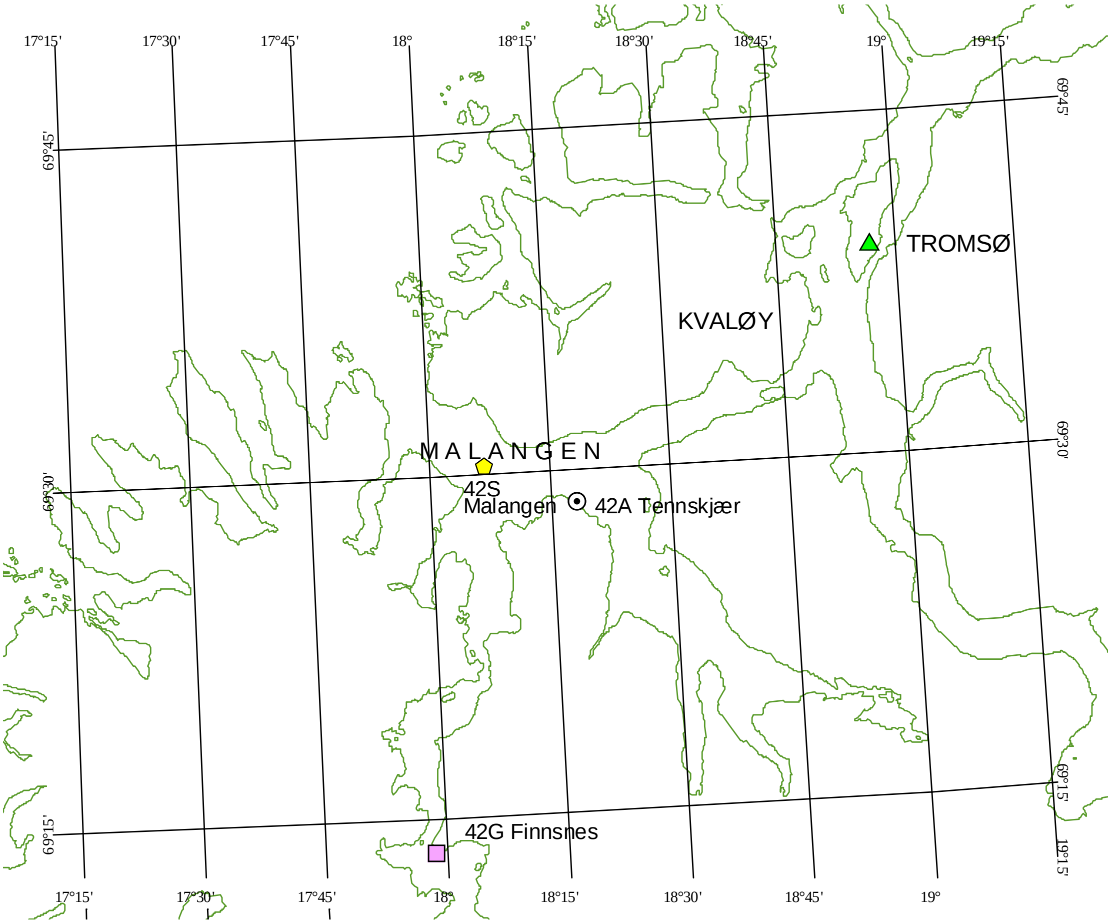
MAP 15


13°45'
14°
14°15'
14°30'
14°45'
15°
15°15'
15°30'
68°
67°45'
98A Svolvær området
SVOLVÆR
98B/F Lille Molla
98X Skrova
98A Svolvær området
98S Skrova (south of)
99S Lundøy (north of)
V E S T F J O R D
99A Brunvær
97A Klakholmen
97A Klakholmen

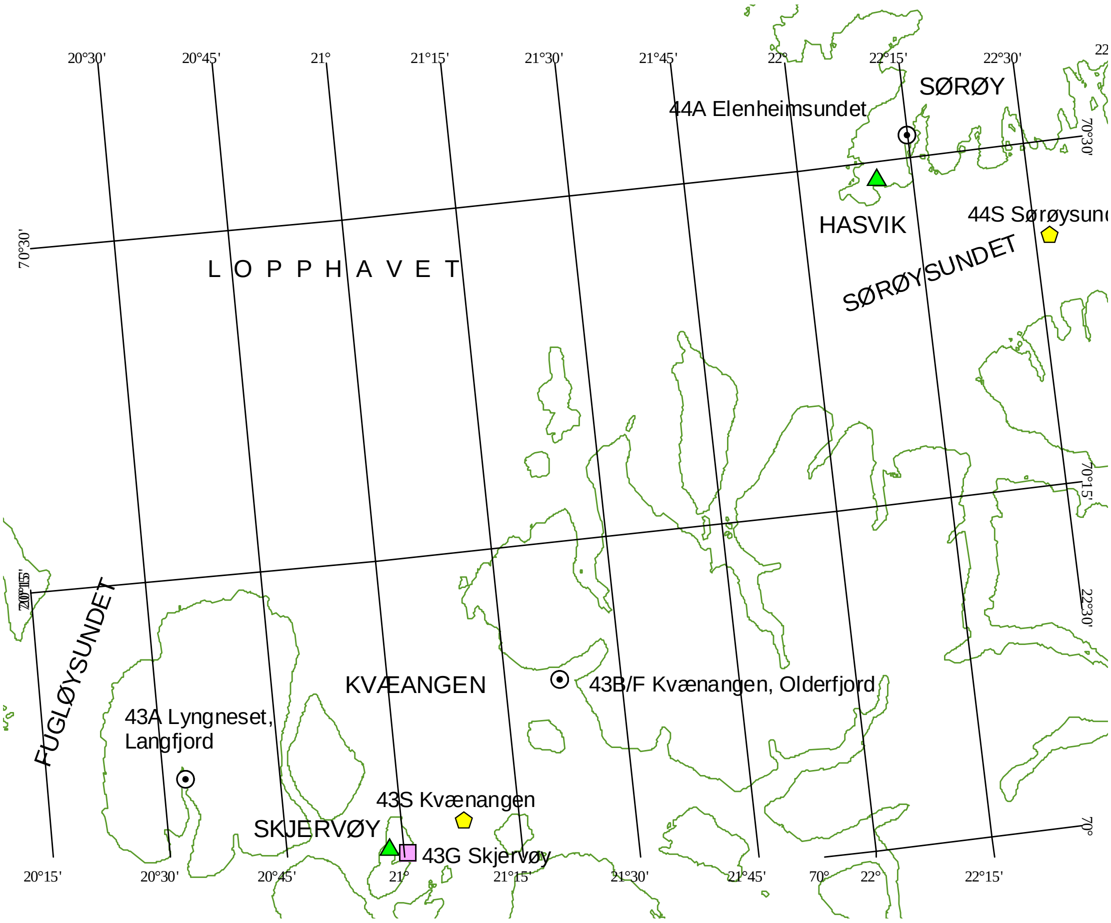
MAP 16


15°45'
16°
16°15'
16°30'
16°45'
17°
17°15'
17°30'
17°45'
17°45'
69°
69°
68°45'
68°45'
ANDØYA
41S Vågsfjorden
41A Fensneset, Grytøya
41G Harstad
HARSTAD
VÅGSFJORD
15°45'
16°
16°15'
16°30'
16°45'
17°
17°15'
17°30'

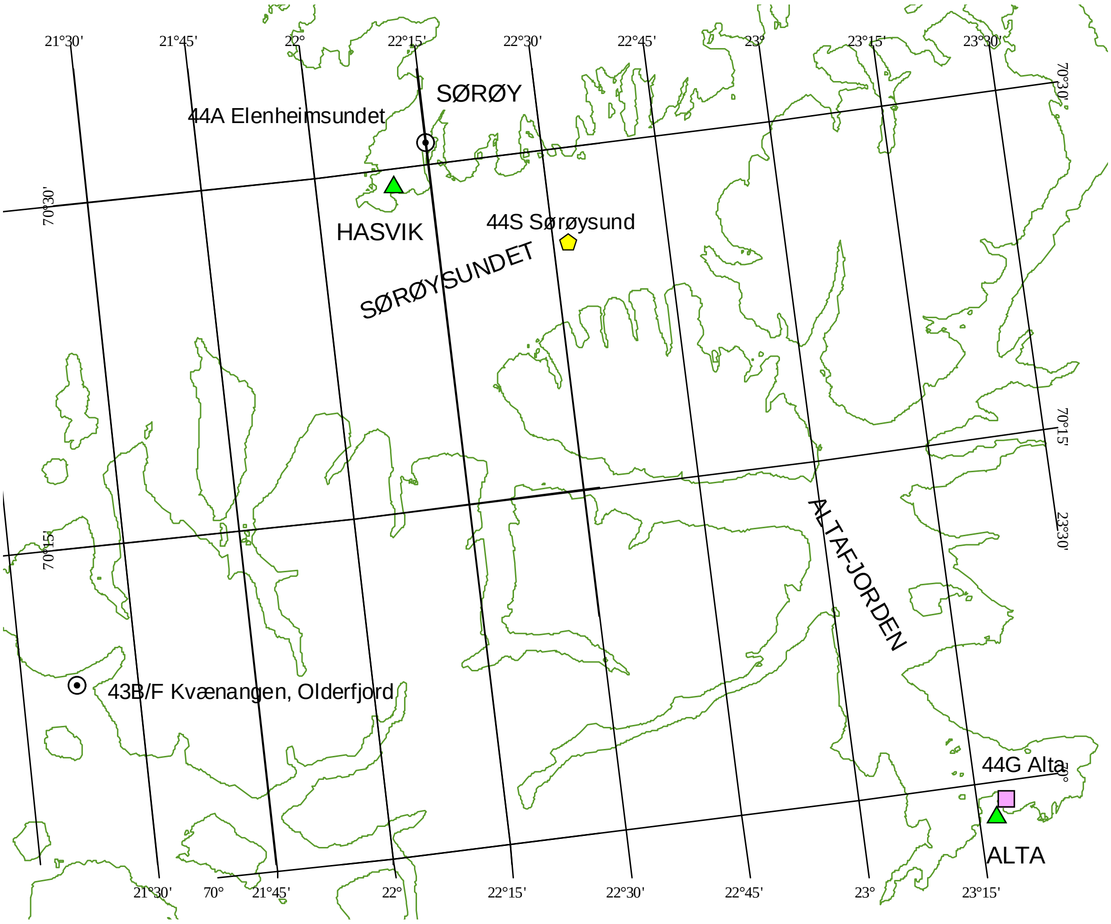
MAP 17


17°15'
17°30'
17°45'
18°
18°15'
18°30'
18°45'
19°
19°15'
69°45'
69°45'
TROMSØ
KVALØY
69°30'
69°30'
MALANGEN
42S
Malangen
42A Tennskjær
69°15'
69°15'
42G Finnsnes
19°15'
17°15'
17°30'
17°45'
18°
18°15'
18°30'
18°45'
19°

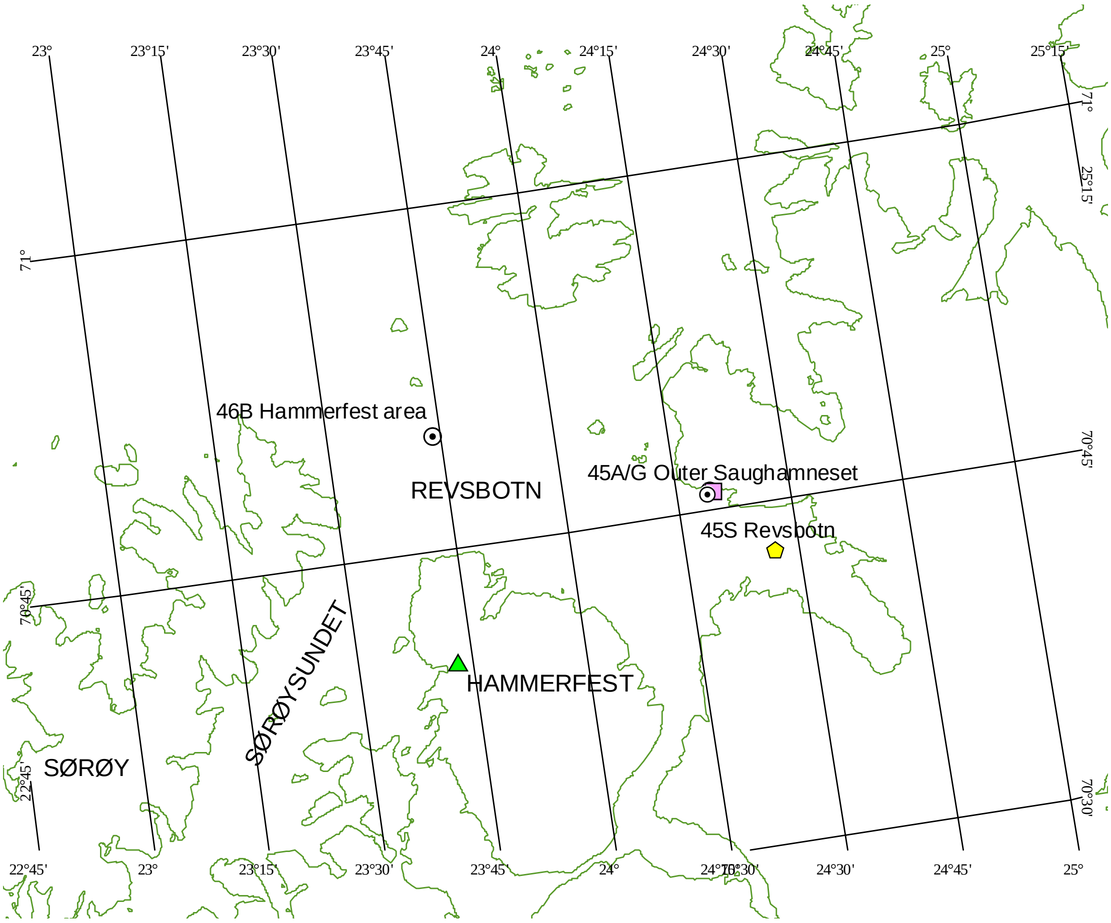
MAP 18


20°30'
20°45'
21°
21°15'
21°30'
21°45'
22°
22°15'
22°30'
22
SØRØY
44A Elenheimsundet
70°30'
HASVIK
44S Sørøysun
70°30'
L O P P H A V E T
SØRØYSUNDET
70°15'
22°30'
20°15'
FUGLØYSUNDET
KVÆANGEN
43B/F Kvænangen, Olderfjord
43A Lyngneset, Langfjord
43S Kvænangen
SKJERVØY
43G Skjervøy
70°
20°15'
20°30'
20°45'
21°
21°15'
21°30'
21°45'
70°
22°
22°15'

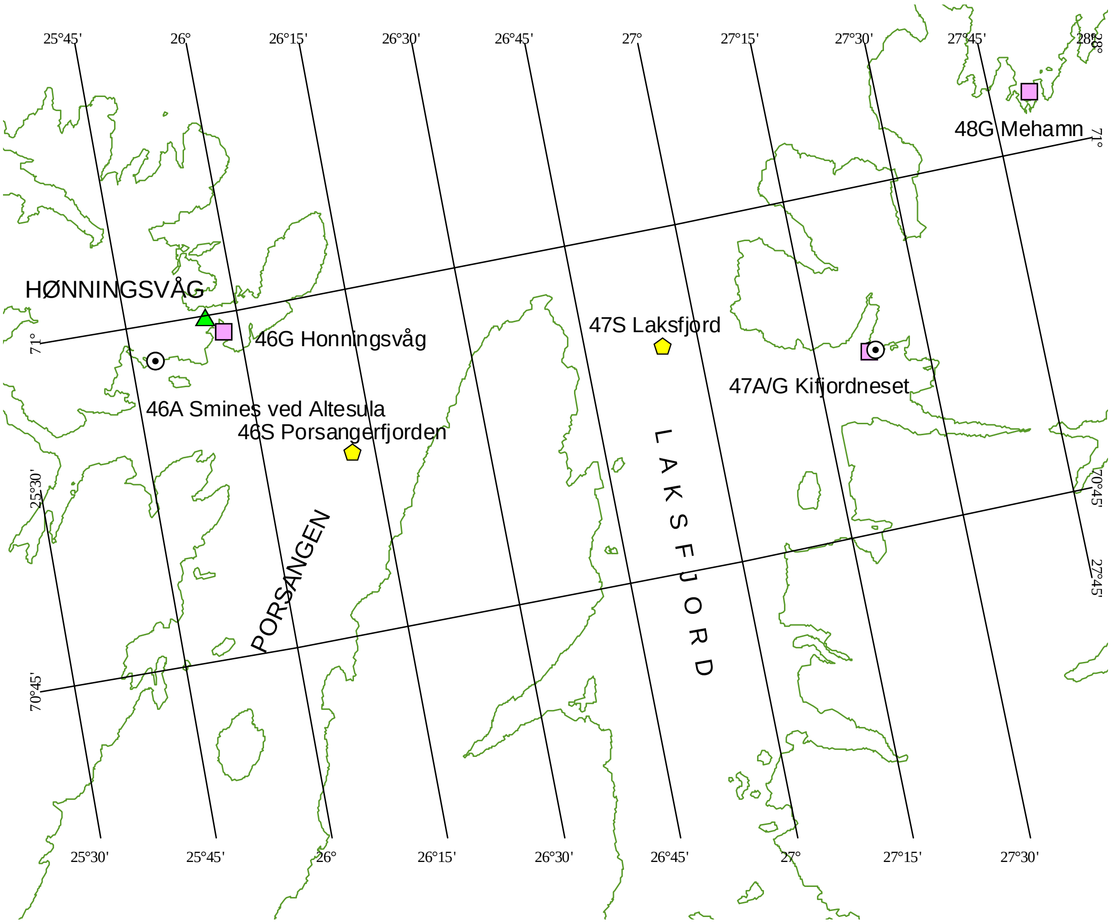
MAP 19


21°30'
21°45'
22°
22°15'
22°30'
22°45'
23°
23°15'
23°30'
70°30'
SØRØY
44A Elenheimsundet
70°30'
HASVIK
44S Sørøysund
SØRØYSUNDET
70°15'
70°15'
23°30'
ALTAFJORDEN
43B/F Kvænangen, Olderfjord
44G Alta
70°
ALTA
21°30'
70°
21°45'
22°
22°15'
22°30'
22°45'
23°
23°15'

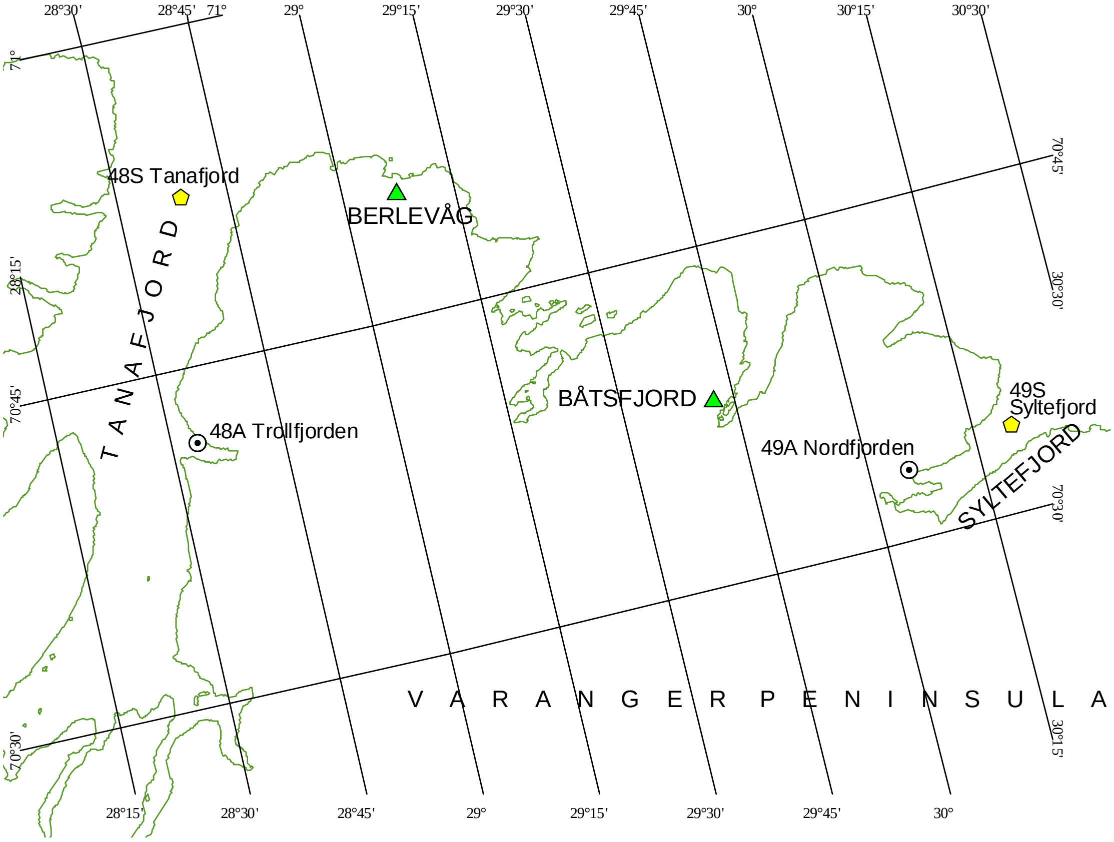
MAP 20


46B Hammerfest area
REVSBOTN
45A/G Outer Saughamneset
45S Revsbotn
SØRØYSUNDET
HAMMERFEST
SØRØY
23°
23°15'
23°30'
23°45'
24°
24°15'
24°30'
24°45'
25°
25°15'
71°
70°45'
70°30'
22°45'

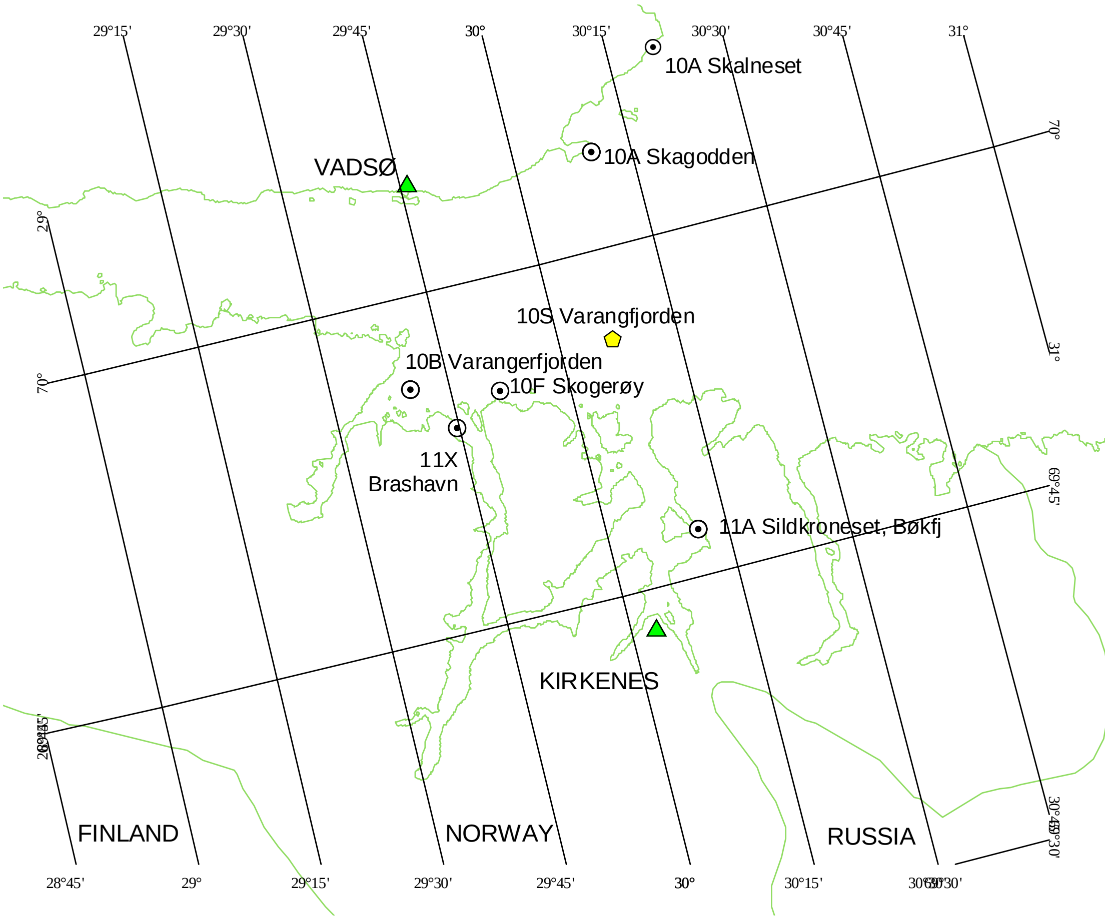
MAP 21


HØNNINGSVÅG
46G Honningsvåg
46A Smines ved Altesula
46S Porsangerfjorden
PORSANGEN
47S Laksfjord
LAKSFJORD
47A/G Kifjordneset
48G Mehamn
25°30'
25°45'
26°
26°15'
26°30'
26°45'
27°
27°15'
27°30'
27°45'
28°
71°
70°45'

MAP 22


28°30'
28°45'
71°
29°
29°15'
29°30'
29°45'
30°
30°15'
30°30'
71°
70°45'
30°30'
28°15'
70°45'
70°30'
30°15'
70°30'
48S Tanafjord
BERLEVÅG
TANAFJORD
BÅTSFJORD
49S
Syltefjord
48A Trollfjorden
49A Nordfjorden
SYLTEFJORD
V A R A N G E R P E N I N S U L A
28°15'
28°30'
28°45'
29°
29°15'
29°30'
29°45'
30°

MAP 23


29°15'
29°30'
29°45'
30°
30°15'
30°30'
30°45'
31°
10A Skalneset
70°
10A Skagodden
VADSØ
29°
10S Varangfjorden
31°
10B Varangerfjorden
70°
10F Skogerøy
11X
Brashavn
69°45'
11A Sildkroneset, Bøkfj
KIRKENES
FINLAND
NORWAY
RUSSIA
28°45'
29°
29°15'
29°30'
29°45'
30°
30°15'

MAP 24

Appendix G
Overview of materials and analyses 2003

Station positions are shown on maps in Appendix F

Appendix G1. Sampling and analyses for 2003, L-liver, F-fillet. (See Appendix G2 for descriptions of codes for analysis (M0, M1, M3, M4, M5, C2, C4, A1, G1), fish (P, F, D, L, M, C) and counts). Analytical overview for liver (-L) or fillet (-F) tissue is distinguished.

JAMP area		STATION	WATER	SEDIMENT				MUSSEL/			OTHER		FISH							
													FLAT- (P,F,D,M)				COD- (C)			
													-L	M4	C2	A1	-L	M4	C2	A1
			M0	M1	C4	A1	G1	M3	C2	A1	M3	C2	-F	M5	C2	A1	-F	M5	C2	A1
26		**OSLOFJORD AREA CENTRAL**, Oslofjord proper																		
26	30A	Gressholmen	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
26	30B	Oslo city Area / Håøya	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-L	25	25	.
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-F	25	5B	.
26	31A	Solbergstrand	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
26	33B	Sande, east side	.	.	.	.	.	.	.	.	.	.	F-L	5B	5B	.	.	.	.	.
			.	.	.	.	.	.	.	.	.	.	F-F	5B	5B	.	.	.	.	.
26	35A	Mølen	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
26	36A	Færder	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
26	36B	Færder area	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-L	25	25	.
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-F	25	5B	.
20	36F	Færder area	.	.	.	.	.	.	.	.	.	.	D-L	5B	5B	.	.	.	.	.
			.	.	.	.	.	.	.	.	.	.	D-F	5B	5B	.	.	.	.	.
26		**OSLOFJORD AREA WEST**, outer Sandefjord-Langesundsfjord																		
26	71A	Bjørkøya	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
		ARENDAL AREA																		
	76A	Risøy	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
		LISTA AREA																		
	15A	Ullerø area	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
	15B	Ullerø area	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-L	25	25	.
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-F	25	5B	.
	15F	Ullerø area	.	.	.	.	.	.	.	.	.	.	D-L	5B	5B	.	.	.	.	.
			.	.	.	.	.	.	.	.	.	.	D-F	5B	5B	.	.	.	.	.
		BØMLO-SOTRA AREA																		
	21F	Kyrping (Åkrafjord 2000)	.	.	.	.	.	.	.	.	.	.	D-L	5B	5B	.	.	.	.	.
			.	.	.	.	.	.	.	.	.	.	D-F	5B	5B	.	.	.	.	.
			.	.	.	.	.	.	.	.	.	.	F-L	5B	5B	.	.	.	.	.
			.	.	.	.	.	.	.	.	.	.	F-F	5B	5B	.	.	.	.	.
	22A	Espevær, west	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
	23B	Karihavet	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-L	25	25	.
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-F	25	5B	.
62		**HARDANGERFJORDEN**																		
62	69A	Lille Terøy	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
62	67B	Strandebarm	.	.	.	.	.	.	.	.	.	.	ML	5B	5B	.	C-L	25	25	.
			.	.	.	.	.	.	.	.	.	.	MF	5B	5B	.	C-F	25	5B	.
			.	.	.	.	.	.	.	.	.	.	F-L	5B	5B	.	.	.	.	.
			.	.	.	.	.	.	.	.	.	.	F-F	5B	5B	.	.	.	.	.
62	65A	Vikingneset	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
62	63A	Ranaskjær	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
63		**SØRFJORDEN**																		
63	52A	Eitrheimsneset	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
63	53B	Inner Sørfjord	.	.	.	.	.	.	.	.	.	.	P-L	5B	5B	.	C-L	25	25	.
			.	.	.	.	.	.	.	.	.	.	P-F	5B	5B	.	C-F	25	5B	.
63	56A	Kvalnes	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
63	57A	Krossanes	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.

Appendix G1 (cont.)

JAMP	**STATION**	WATER	SEDIMENT				MUSSEL/			OTHER					FISH				
area												FLAT- (P,F,D,M)				COD- (C)			
												-L	M4	C2	A1	-L	M4	C2	A1
		M0	M1	C4	A1	G1	M3	C2	A1			-F	M5	C2	A1	-F	M5	C2	A1
	LOFOTEN AREA																		
98A	Husvågen (1997)	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
98B	Lille Molla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-L	25	25	.
		.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-F	25	5B	.
98F	Lille Molla	.	.	.	.	.	.	.	.	.	.	P-L	5B	5B	.	.	.	.	.
		.	.	.	.	.	.	.	.	.	.	P-F	5B	5B	.	.	.	.	.
	VARANGER PENINSULA AREA																		
10A	Skalneset	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.
10B	Varangerfjorden	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-L	25	25	.
		.	.	.	.	.	.	.	.	.	.	.	.	.	.	C-F	25	5B	.
		.	.	.	.	.	.	.	.	.	.	P-L	5B	5B	.	.	.	.	.
		.	.	.	.	.	.	.	.	.	.	P-F	5B	5B	.	.	.	.	.
10F	Varangerfjorden	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
11X	Brashavn (1997)	1	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	.

Appendix G2: Key to analysis codes and sample counts used in Appendix G1.

ANALYSIS CODES:

Code	Analyses
M0	suspended matter
M1	Hg, Cd, Cu, Pb, Zn, Li (normalising element) total organic carbon (TOC)
M3	Hg, Cd, Cu, Pb, Zn
M4	Cd Cu Pb Zn (for fish liver)
M5	Hg (for fish fillet)
C1	CB-28,-52,-101,-105,-118,-138,-153,-156,-180, 209, 5-CB, OCS, a+gHCH, HCB, DDE, DDD, EPOCl (optional), dry weight percent
C2	CB-28,-52,-101,-105,-118,-138,-153,-156,-180, 209, 5-CB, OCS, a+gHCH, HCB, DDE, DDD, EPOCl (optional), fat and dry weight percent
A1	PAH
G1	Sediment core geological dating

SAMPLE COUNT CODES:

Medium	Count	Explanation
SEAWATER	1	sample for suspended matter determination
SEDIMENT	17	17 samples for metal analyses; two cores each with samples from 0-1, 1-2, 2-4, 4-6, 6-10, 10-15, 15-20 cm and deepest 5 cm slice plus one core with sample from 0-1 cm.
	4	4 samples for PCB or PAH analyses; two each cores with samples from 0-1cm and deepest 5cm slice.
	3	3 samples for metal analyses; three cores each with samples from 0-1cm.
MUSSEL	3/6	3 size groups (2-3, 3-4, 4-5 cm) each a bulk of ca.50 individuals and/or 1 size group (3-4 or 4-5 cm), 3 replicate samples each a bulk of 20 individuals.
	1/2	1 size group (2-3 or 3-4 cm), 2 replicate samples each a bulk of 50 individuals.
SHRIMP	2	2 samples of 100 individuals (edible size)
FISH		The number of individual fish or bulk samples of fish (-B) for analyses is shown. Bulk samples of fish consist of 5 fish. The five longest fish make up one bulk sample, the next five longest fish make up the another bulk sample and so on. The letter following the number indicates the fish type: D=dab, F=flounder, L=lemon sole, M=megrim, P=plaice, W=witch, C=cod, T=tusk, R=Rat fish, and N=Ling.

Appendix H

Temporal trend analyses of contaminants and biomarkers in biota 1981-2003

Sorted by contaminant, species and area/station:

Cadmium (Cd)
Mercury (Hg)
Lead (Pb)
Sum PCB-7 or CB_S7 (CB: 28+52+101+118+138+153+180)
DDEPP (ppDDE)
γHCH (HCHG)
HCB
BAP (benzo[*a*]pyrene)
PK-Σn or PK_S (sum carcinogen PAHs, cf. Appendix B)
P-Σn or P_S (sum of PAHs, dicyclic “PAHs” not included, cf. Appendix B)
TBT (Tributyltin)
VDSI (measurement of imposex)
OH-pyrene or PYR10 (Pyrene metabolite)
ALA-D (δ-amino levulinic acid dehydrase inhibition)
EROD (Cytochrome P4501A-activity)

MYTI EDU - Blue Mussel (*Mytilus edulis*)
JAMP-stations
"Index"-stations
GADU MOR - Atlantic cod (*Gadus morhua*)
LEPI WHI - Megrim (*Lepidorhombus whiff-iagonis*)
LIMA LIM - Dab (*Limanda limanda*)
PLAT FLE - Flounder (*Platichthys flesus*)
(s) - Small fish
(l) - Large fish
Tsu -tissue:
SB - Soft body tissue
LI - Liver tissue
MU - Muscle tissue
BL - Blood
BI - Bile

OC	**Overconcentration expressed as quotient of median of last year and “high background” ("?" missing background value)**	
TRD	**trend**	
	D-	**Significant linear trend, downward**
	U-	**Significant linear trend, upward**
	--	**No significant trend**
	-?	**No significant linear trend, systematic non-linear trend can not be tested because of insufficient data (<6 years)**
	-Y	**No significant linear trend, but a systematic non-linear trend**
	DY or UY	**Significant linear trend (downward or upward) and a significant non-linear trend. This is considered the same as "-Y"**
	SIZE length effect (mercury in fillet)	
	L	**Significant difference in concentration levels but pattern of variation same**
	D	**As "L" but pattern of variation significantly different**
	-	**No significant difference between “small” and “large” fish**
SM3	**Projected smoothed median for three years expressed as quotient of value and “high background” ("?" if missing background or if number of years is less than seven)**	
PWR	**POWER; estimated number of years to detect a hypothetical situation of 10% trend a year with a 90% power**	

Annual median concentration of CD (ppm)

																										ANALYSIS			
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.				1.07	0.81	1.41	0.6	0.61	0.736	0.769	0.769	1.12	1.26	1.17	0.776	0.8	0.857	1.27	1.16	1.13	0.914	1.75	1.56	no	--	no	11
31A	MYTI EDU	SB	d.w.			1.39	1.31	0.89	1.93	0.4	0.43	0.412	0.719	0.727	0.914	0.933	0.781	1.32	0.789	0.854	1.07	1.25	1	1.76	1.14	1.33	no	--	no	13
35A	MYTI EDU	SB	d.w.			1.35	0.952	1.17	1.3	0.52	0.66	0.647	0.926	1.05	1.35	1.11	0.958	0.894	0.766	0.965	1.14	1.53	1.33	1.53	1.16	1.06	no	UY	no	10
36A	MYTI EDU	SB	d.w.			0.845	1.19	0.84	1.38	0.59	0.56	0.502	0.407	1.22	1.06	0.899	1.22	1.17	1.6	1.84	0.965	1.01	1.65	2.59	1	0.848	no	--	no	13
71A	MYTI EDU	SB	d.w.			2.52	1.98	1.42	2	0.98	2.11	2.02	0.968	1.09	1.66	1.89	1.97	2.25	1.5	2.44	1.53	1.76	1.99	1.43	1.69	1.44	no	--	no	11
76A	MYTI EDU	SB	d.w.										0.638	0.86	0.957	1.1			1.17	1.19	1.2	1.28	0.823	1.82	1.45	1.05	no	--	no	10
15A	MYTI EDU	SB	d.w.										0.505	0.831		1.18	0.794	1.44	1.22	1.07	1.03	0.841	1.44	4.4	1.31	0.737	no	--	no	16
51A	MYTI EDU	SB	d.w.							42.8	58.2							36.8	25.3	5.45	10.3	34.6	27.3	5.35	16.6	14.7	7.3	--	4.8	21
52A	MYTI EDU	SB	d.w.									94.4	10.2	80.1	43.1	14.7	8.71	19.8	18.4	13.4	9.14	11.4	10.5	5.59	5	7.38	3.7	--	1.6	20
56A	MYTI EDU	SB	d.w.							55.9	54.2	98.4	45	69.4	51.7	59.7	11.4	30.8	20	28.8	8.71	25.9	24.4	14.5	13.4	11.4	5.7	D-	3.6	16
57A	MYTI EDU	SB	d.w.							21.1	43.2	36.7	25.7	32.8	32.1	15.4	11.8	12.2	8.48	13.6	5.02	13.6	10.3	8.19	6.96	6.32	3.2	D-	2.2	13
63A	MYTI EDU	SB	d.w.							47.2	10.3	19	30.4	35.1	18.2	7.81	4.23	8.16	5.4	6.62	4.43	6.87	5.97	6.73	5.38	5.69	2.8	D-	2.8	15
65A	MYTI EDU	SB	d.w.							15	5.96	8.29	14.6	24	5.09	7.73	3.01	5.37	3.53	4.28	1.72	3.82	3.85	4.5	3.74	3.4	1.7	D-	2.1	16
69A	MYTI EDU	SB	d.w.												4.26	2.37	2.08	2.91	3.2	3.53	1.58	3.76	2.87	3.8	2.41	2.36	1.2	--	1.2	13
22A	MYTI EDU	SB	d.w.										0.532	1.14	1.12	0.844	1.02	1.41	1.14	1.01	0.851	1.32	2.69	2.01	0.976	1.04	no	--	no	13
82A	MYTI EDU	SB	d.w.				1.41	1.15	2.31	0.99	0.4	1.26		1.2	1.21	1.15		0.981	1.22								no	--	no	15
84A	MYTI EDU	SB	d.w.				1.39	1.86	2.38	2.1	0.96	1.19		1.82	2.11	1.6		1.64	1.29								no	--	no	12
87A	MYTI EDU	SB	d.w.				0.968	1.02	1.93	0.77	0.69	0.756		0.872	0.978	0.927		1.15	1.27								no	--	no	12
91A	MYTI EDU	SB	d.w.												1.68	1.27	1.82										no	-?	?	11
92A	MYTI EDU	SB	d.w.												1.08	0.544	0.939	0.743	0.691	0.716							no	--	no	11
98A	MYTI EDU	SB	d.w.												1.08	1.09				0.854	1.58	2.17	1.68	2.38	2.13	2.27	1.1	U-	1.4	10
98X	MYTI EDU	SB	d.w.														0.712	0.688	0.781								no	-?	?	6
41A	MYTI EDU	SB	d.w.														1.89	2.95	1.63	1.88							no	-?	?	12
43A	MYTI EDU	SB	d.w.														3.47	4.32		3.85							1.9	-?	?	8
44A	MYTI EDU	SB	d.w.														1.69	2.74	1.95	1.51							no	-?	?	12
46A	MYTI EDU	SB	d.w.														2.7	2.06	2.72								1.4	-?	?	10
48A	MYTI EDU	SB	d.w.														1.35	1.31	1.38								no	-?	?	<=5
10a	MYTI EDU	SB	d.w.														1.74	1.71	2.34	1.06	2.32	1.61	1.53	1.23	1.41	1.98	no	--	no	12
11A	MYTI EDU	SB	d.w.														1.31	1.28	1.07	1.59							no	-?	?	9
11X	MYTI EDU	SB	d.w.																	1.65	0.67	1.13	1.07	1.32	1.36	1.36	no	--	no	12

Annual median concentration of CD (ppm)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
I021	MYTI EDU	SB	d.w.															1.73	2.26	2.48	3.31		1.83	2.53	2.41		1.2	--	1.1	10
I022	MYTI EDU	SB	d.w.															1.43	1.36	1.26	2.09	1.94	1.33	1.7	2.69	1.61	no	--	1.0	11
I023	MYTI EDU	SB	d.w.															1.61	1.4	1.77	2.04	1.45	0.948	0.873	1.55	1.48	no	--	no	11
I024	MYTI EDU	SB	d.w.															1.31	1.63	2.04	2.56	2.45	1.83	2.53	2.7	2.03	1.0	--	1.1	9
30A	MYTI EDU	SB	d.w.				1.07	0.81	1.41	0.6	0.61	0.736	0.769	0.769	1.12	1.26	1.17	0.776	0.8	0.857	1.27	1.16	1.13	0.914	1.75	1.56	no	--	no	11
I301	MYTI EDU	SB	d.w.															0.824	0.795	0.817	1.03	1.29	0.716	0.902	0.888	1.15	no	--	no	10
I304	MYTI EDU	SB	d.w.															1.33	0.719	0.784	1.05	0.994	0.921	1.16	1.3	1.37	no	--	no	10
I306	MYTI EDU	SB	d.w.															0.81	0.779	0.646	0.707	0.842	0.592	0.734	0.872	1.28	no	--	no	9
I307	MYTI EDU	SB	d.w.															0.94	0.815	0.687	0.72	0.826	0.719	0.899	1.46	1.44	no	UY	1.0	8
I131	MYTI EDU	SB	d.w.															1.24	0.875	1.14	1.31	1.18	1.98	2.48	1.13	0.862	no	--	no	12
I201	MYTI EDU	SB	d.w.															0.801	0.856	1.06	0.927	1.27	1.42	1.49	2.8	0.707	no	--	no	14
I205	MYTI EDU	SB	d.w.															0.819		1.37	0.858	1.49	1.99	1.42	2.43	1.25	no	--	no	12
51A	MYTI EDU	SB	d.w.							42.8	58.2							36.8	25.3	5.45	10.3	34.6	27.3	5.35	16.6	14.7	7.3	--	4.8	21
52A	MYTI EDU	SB	d.w.									94.4	10.2	80.1	43.1	14.7	8.71	19.8	18.4	13.4	9.14	11.4	10.5	5.59	5	7.38	3.7	--	1.6	20
I962	MYTI EDU	SB	d.w.															0.746	0.606	0.645	0.518						no	-?	?	6
I965	MYTI EDU	SB	d.w.																					2.02	2.15	0.813	no	-?	?	14
I969	MYTI EDU	SB	d.w.															0.502	0.599	0.318	0.611	0.588	0.827	0.76	0.8	0.557	no	--	no	11
10A	MYTI EDU	SB	d.w.														1.74	1.71	2.34	1.06	2.32	1.61	1.53	1.23	1.41	1.98	no	--	no	12

Annual median concentration of CD (ppm)

																											ANALYSIS			
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR	LI	w.w.				0.01	0.05	0.0619	0.0711	0.0218	0.0267	0.035	0.027	0.1	0.0645	0.063	0.049	0.045	0.045	0.107	0.165	0.078	0.111	0.106	0.114	1.1	U-	1.1	16
36B	GADU MOR	LI	w.w.	0.078	0.06	0.22	0.07	0.05	0.137	0.0611	0.0314	0.028	0.0235	0.01	0.021	0.034	0.021	0.042	0.033	0.0741	0.036	0.065	0.041	0.029	0.0247	0.0088	no	DY	no	16
15B	GADU MOR	LI	w.w.										0.026	0.009	0.025	0.016	0.014	0.016	0.024	0.031	0.03	0.026	0.033	0.026	0.0183	0.0374	no	--	no	13
53B	GADU MOR	LI	w.w.						0.658		0.058	0.0929	0.045	0.149	0.215	0.038		0.007	0.18	0.143	0.228	0.726	0.829	0.565	0.431	0.253	2.5	--	2.0	25
67B	GADU MOR	LI	w.w.							0.145	0.0519	0.0467	0.069	0.077	0.0514	0.115	0.0989	0.033	0.111	0.277	0.0185	0.0715	0.059	0.032	0.0203	0.01	no	--	no	20
23B	GADU MOR	LI	w.w.										0.022	0.024	0.02	0.025	0.015	0.026	0.014	0.029	0.025	0.033	0.019	0.025	0.0206	0.0163	no	--	no	11
84B	GADU MOR	LI	w.w.				0.13	0.0949	0.0688		0.0291																no	D?	?	6
92B	GADU MOR	LI	w.w.													0.036	0.029	0.022	0.066								no	-?	?	16
98B	GADU MOR	LI	w.w.												0.069	0.15	0.025	0.113	0.33	0.064	0.047	0.039	0.14	0.279	0.0291	0.0254	no	--	no	25
43B	GADU MOR	LI	w.w.														0.168	0.183	0.097								no	-?	?	12
10B	GADU MOR	LI	w.w.														0.23	0.188	0.095	0.128	0.119	0.137	0.125	0.129	0.059	0.099	no	--	no	12

Annual median concentration of CD (ppm)

																											ANALYSIS			
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
33B	PLAT FLE	LI	w.w.			0.19		0.195	0.176	0.251	0.061	0.106	0.234	0.196	0.16	0.184	0.087	0.091	0.11	0.107	0.108	0.126	0.071	0.091	0.0569	0.0627	no	--	no	13
53B	PLAT FLE	LI	w.w.								2.24	1.53	1.54	1.72	1.79	0.789		0.135	2.53	0.892	1.47	2.55	1.77	2.74	2.74	4.56	15.2	--	19.4	20
67B	PLAT FLE	LI	w.w.																2.48		0.187	0.185	0.148	0.059	0.065	0.0802	no	D-	no	20
21F	PLAT FLE	LI	w.w.																			0.052	0.0979	0.141	0.22		no	U?	?	6
36F	LIMA LIM	LI	w.w.										0.106	0.112	0.23	0.295	0.135	0.147	0.139	0.123	0.202	0.227	0.139	0.232	0.127	0.142	no	--	no	12
15F	LIMA LIM	LI	w.w.													0.0992	0.136	0.125	0.153	0.076	0.181	0.167		0.313	0.129	0.11	no	--	no	14
22F	LIMA LIM	LI	w.w.										0.095	0.091	0.128		0.169	0.125									no	-?	?	9
98F	LIMA LIM	LI	w.w.														0.98	0.182	0.225								no	-?	?	21
30F	PLEU PLA	LI	w.w.												0.11		0.101	0.222									1.1	-?	?	15
22F	PLEU PLA	LI	w.w.																0.23	0.231	0.244						1.2	-?	?	<=5
98F	PLEU PLA	LI	w.w.													0.1		0.747		0.324	0.203	0.214	0.821	0.521	0.217	0.218	1.1	--	no	21
10F	PLEU PLA	LI	w.w.																	0.571		0.141	0.248	0.302	0.204	0.316	1.6	--	1.5	16
67B	LEPI WHI	LI	w.w.			0.181				0.18	0.109	0.066	0.197	0.085	0.1	0.12	0.304	0.259	0.2	0.097	0.033	0.051	0.037	0.049	0.0342	0.0543	m	DY	m	15

Annual median concentration of HG (ppm)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.				0.118	0.073	0.147	0.05	0.13	0.0437	0.0641	0.0533	0.0508	0.0703	0.0865	0.0574	0.07	0.0604	0.0778	0.114	0.0599	0.0586	0.0952	0.071	no	--	no	13
31A	MYTI EDU	SB	d.w.			0.0757	0.164	0.086	0.12	0.05	0.09	0.0225	0.0599	0.0485	0.0508	0.0446	0.0502	0.0623	0.0435	0.0515	0.0699	0.0881	0.0464	0.051	0.0577	0.0577	no	--	no	13
35A	MYTI EDU	SB	d.w.			0.0933	0.0741	0.084	0.17	0.05	0.18	0.05	0.0617	0.0585	0.0578	0.0537	0.0607	0.0369	0.0383	0.0354	0.0667	0.101	0.028	0.0472	0.0575	0.0574	no	--	no	15
36A	MYTI EDU	SB	d.w.			0.0516	0.0427	0.084	0.14	0.05	0.14	0.034	0.0452	0.0476	0.0394	0.0321	0.0481	0.0333	0.0442	0.0743	0.0299	0.0455	0.0377	0.0245	0.0342	0.0526	no	--	no	14
71A	MYTI EDU	SB	d.w.			0.393	0.242	0.218	0.247	0.12	0.34	0.249	0.182	0.145	0.178	0.14	0.212	0.201	0.222	0.312	0.11	0.155	0.132	0.123	0.15	0.154	no	--	no	12
76A	MYTI EDU	SB	d.w.										0.0709	0.0682	0.0498	0.0205			0.057	0.0824	0.0632	0.101	0.0328	0.0634	0.0585	0.0843	no	--	no	15
15A	MYTI EDU	SB	d.w.										0.0561	0.0522		0.0244	0.0503	0.0217	0.0488	0.0558	0.0529	0.0437	0.163	0.0354	0.0452	0.0596	no	--	no	16
51A	MYTI EDU	SB	d.w.							0.24	0.25							1.51	0.901	0.175	0.577	2.89	3.86	0.774	1.45	1.47	7.3	--	6.5	24
52A	MYTI EDU	SB	d.w.									2.35	0.321	3.01	0.976	0.372	0.282	0.437	0.178	0.26	0.258	0.58	0.34	0.298	0.264	0.195	no	--	no	19
56A	MYTI EDU	SB	d.w.							0.53	0.37	1.09	0.71	1.54	0.935	1.22	0.352	0.679	0.365	0.526	0.282	0.917	0.982	0.611	0.602	0.346	1.7	--	1.4	15
57A	MYTI EDU	SB	d.w.							0.17	0.21	0.269	0.411	0.758	0.576	0.349	0.35	0.26	0.155	0.319	0.166	0.467	0.451	0.349	0.277	0.193	no	DY	no	13
63A	MYTI EDU	SB	d.w.							0.31	0.14	0.177	0.394	0.468	0.294	0.143	0.19	0.252	0.172	0.203	0.226	0.268	0.299	0.365	0.289	0.213	1.1	--	1.2	13
65A	MYTI EDU	SB	d.w.							0.1	0.15	0.104	0.312	0.328	0.124	0.119	0.134	0.148	0.118	0.136	0.0792	0.142	0.155	0.189	0.132	0.135	no	--	no	13
69A	MYTI EDU	SB	d.w.												0.106	0.0263	0.0829	0.0704	0.104	0.111	0.0773	0.161	0.107	0.146	0.106	0.0989	no	--	no	15
22A	MYTI EDU	SB	d.w.										0.0529	0.0732	0.112	0.0476	0.0673	0.0657	0.0723	0.0683	0.046	0.0736	0.0288	0.0545	0.0461	0.126	no	--	no	14
82A	MYTI EDU	SB	d.w.				0.0508	0.11	0.17	0.08	0.12	0.0668		0.0743	0.0519	0.0787		0.0493	0.0691								no	--	no	13
84A	MYTI EDU	SB	d.w.				0.0766	0.112	0.15	0.08	0.24	0.0571		0.0657	0.0902	0.0568		0.0542	0.0433								no	--	no	15
87A	MYTI EDU	SB	d.w.				0.178		0.15	0.05	0.26	0.0462		0.0564	0.0543	0.0488		0.0439	0.0623								no	--	no	17
91A	MYTI EDU	SB	d.w.												0.0539	0.0758	0.0943										no	-?	?	<=5
92A	MYTI EDU	SB	d.w.												0.0548	0.0335	0.0521	0.0407	0.0234	0.067							no	--	no	14
98A	MYTI EDU	SB	d.w.												0.0865	0.0857				0.104	0.155	0.246	0.109	0.109	0.115	0.14	no	--	no	12
98X	MYTI EDU	SB	d.w.														0.335	0.34	0.328								1.6	-?	?	<=5
41A	MYTI EDU	SB	d.w.														0.0686	0.0635	0.064	0.0848							no	-?	?	8
43A	MYTI EDU	SB	d.w.														0.0844	0.0946		0.104							no	-?	?	<=5
44A	MYTI EDU	SB	d.w.														0.0552	0.05	0.0517	0.0592							no	-?	?	6
46A	MYTI EDU	SB	d.w.														0.0387	0.0618	0.0564								no	-?	?	10
48A	MYTI EDU	SB	d.w.														0.0726	0.0599	0.0524								no	-?	?	<=5
10A	MYTI EDU	SB	d.w.														0.0526	0.0488	0.0588	0.0617	0.0581	0.0625	0.0503	0.052	0.0494	0.0549	no	--	no	6
11A	MYTI EDU	SB	d.w.														0.182	0.145	0.0859	0.146							no	-?	?	13
11X	MYTI EDU	SB	d.w.																	0.0811	0.0366	0.0564	0.0667	0.065	0.0372	0.0372	no	--	no	13

Annual median concentration of HG (ppm)

																										ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
I021	MYTI EDU	SB	d.w.															0.212	0.397	0.496	0.859		0.356	0.436	0.319		1.6	--	1.2	13
I022	MYTI EDU	SB	d.w.															0.13	0.134	0.321	0.404	0.415	0.182	0.238	0.289	0.197	no	--	no	13
I023	MYTI EDU	SB	d.w.															0.14	0.143	0.295	0.31	0.263	0.0944	0.0959	0.15	0.142	no	--	no	14
I024	MYTI EDU	SB	d.w.															0.107	0.18	0.45	0.543	0.425	0.12	0.295	0.238	0.233	1.2	--	no	17
30A	MYTI EDU	SB	d.w.				0.118	0.073	0.147	0.05	0.13	0.0437	0.0641	0.0533	0.0508	0.0703	0.0865	0.0574	0.07	0.0604	0.0778	0.114	0.0599	0.0586	0.0952	0.071	no	--	no	13
I301	MYTI EDU	SB	d.w.															0.0656	0.0682	0.0582	0.0675	0.0625	0.0408	0.0677	0.05	0.0732	no	--	no	9
I304	MYTI EDU	SB	d.w.															0.047	0.0694	0.0395	0.0541	0.0503	0.0294	0.0513	0.0462	0.0491	no	--	no	11
I306	MYTI EDU	SB	d.w.															0.0447	0.0617	0.0387	0.061	0.0508	0.0355	0.0353	0.0403	0.0507	no	--	no	10
I307	MYTI EDU	SB	d.w.															0.0383	0.0705	0.0337	0.0465	0.0542	0.0327	0.0488	0.0541	0.062	no	--	no	12
I711	MYTI EDU	SB	d.w.																		0.382	0.287	0.198		0.2		no	-?	?	9
I712	MYTI EDU	SB	d.w.																		0.181	0.257	0.214	0.218	0.211	0.145	no	--	no	9
I131	MYTI EDU	SB	d.w.															0.127	0.0691	0.0601	0.144	0.0635	0.0337	0.0784	0.0503	0.0652	no	--	no	15
51A	MYTI EDU	SB	d.w.							0.24	0.25							1.51	0.901	0.175	0.577	2.89	3.86	0.774	1.45	1.47	7.3	--	6.5	24
52A	MYTI EDU	SB	d.w.									2.35	0.321	3.01	0.976	0.372	0.282	0.437	0.178	0.26	0.258	0.58	0.34	0.298	0.264	0.195	no	--	no	19
I201	MYTI EDU	SB	d.w.																		0.101	0.132	0.157	0.169	0.313	0.0964	no	--	no	15
I205	MYTI EDU	SB	d.w.																		0.0974	0.171	0.205	0.167	0.218	0.151	no	--	no	11
10A	MYTI EDU	SB	d.w.														0.0526	0.0488	0.0588	0.0617	0.0581	0.0625	0.0503	0.052	0.0494	0.0549	no	--	no	6

Annual median concentration of HG (ppm)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR (s)	MU	w.w.				0.125	0.0894	0.0788	0.0402	0.0585	0.121	0.12	0.09	0.11	0.122	0.102	0.08	0.108	0.131	0.117	0.153	0.173	0.224	0.131	0.137	1.4	U-L	1.4	11
30B	GADU MOR (l)	MU	w.w.				0.155	0.09	0.0735	0.0379	0.147	0.166	0.13	0.108	0.15	0.155	0.129	0.119	0.142	0.19	0.232	0.351	0.252	0.34	0.207	0.194	1.9	U-L	1.5	13
36B	GADU MOR (s)	MU	w.w.	0.069	0.08	0.11	0.0748	0.08	0.0612	0.0317	0.0529	0.0685	0.06	0.06	0.0592	0.0674	0.0535	0.0759	0.0665	0.0885	0.0778	0.06	0.072	0.0515	0.0569	0.0365	no	--L	no	10
36B	GADU MOR (l)	MU	w.w.	0.079	0.16	0.18	0.195	0.12	0.112	0.0393	0.083	0.0739	0.115	0.1	0.08	0.0829	0.0599	0.0946	0.0695	0.157	0.088	0.186	0.075	0.123	0.108	0.073	no	--L	no	13
15B	GADU MOR (s)	MU	w.w.										0.0648	0.04	0.026	0.018	0.045	0.0435	0.0585	0.0761	0.0435	0.023	0.0377	0.064	0.0375	0.0325	no	--L	no	14
15B	GADU MOR (l)	MU	w.w.										0.12	0.07	0.063	0.0394	0.081	0.0455	0.0874	0.108	0.09	0.0265	0.0465	0.0865	0.048	0.037	no	--L	no	15
53B	GADU MOR (s)	MU	w.w.						0.223		0.105	0.16	0.184	0.204	0.36	0.0896		0.0535	0.229	0.128	0.151	0.175	0.209	0.257	0.196	0.0935	no	--L	no	16
53B	GADU MOR (l)	MU	w.w.						0.196		0.105	0.203	0.17	0.269	0.396	0.141		0.0904	0.277	0.243	0.298	0.285	0.395	0.715	0.375	0.168	1.7	--L	1.9	16
67B	GADU MOR (s)	MU	w.w.							0.1	0.0847	0.0902	0.0794	0.1	0.0847	0.0925	0.12	0.0712	0.073	0.117	0.0505	0.0575	0.0735	0.045	0.048	0.0325	no	D-L	no	10
67B	GADU MOR (l)	MU	w.w.							0.17	0.0847	0.102	0.255	0.13	0.141	0.0828	0.106	0.072	0.089	0.16	0.068	0.0595	0.107	0.092	0.0939	0.0555	no	--L	no	14
23B	GADU MOR (s)	MU	w.w.										0.0648	0.07	0.06	0.0415	0.0515	0.069	0.0595	0.073	0.075	0.0605	0.0833	0.0725	0.0634	0.0409	no	--L	no	9
23B	GADU MOR (l)	MU	w.w.										0.17	0.11	0.0837	0.0981	0.0735	0.109	0.057	0.105	0.116	0.113	0.107	0.097	0.102	0.0884	no	--L	no	10
84B	GADU MOR (s)	MU	w.w.				0.0346	0.04	0.0246		0.0439																no	-?-	?	12
84B	GADU MOR (l)	MU	w.w.				0.06	0.04	0.0246		0.0439																no	-?-	?	14
92B	GADU MOR (s)	MU	w.w.													0.0464	0.0785	0.0795	0.077								no	-?-	?	10
92B	GADU MOR (l)	MU	w.w.													0.058	0.091	0.074	0.117								1.2	-?-	?	10
98B	GADU MOR (s)	MU	w.w.												0.0665	0.0543	0.069	0.0685	0.0395	0.095	0.0664	0.0465	0.0953	0.047	0.047	0.0669	no	---	no	13
98B	GADU MOR (l)	MU	w.w.												0.065	0.064	0.069	0.0863	0.037	0.128	0.0895	0.043	0.09	0.0716	0.0593	0.0593	no	---	no	14
43B	GADU MOR (s)	MU	w.w.														0.065	0.054	0.047								no	-?-	?	<=5
43B	GADU MOR (l)	MU	w.w.														0.05	0.059	0.0568								no	-?-	?	6
10B	GADU MOR (s)	MU	w.w.														0.044	0.0339	0.0285	0.011	0.0135	0.0165	0.0105	0.009	0.00949	0.0155	no	D-L	no	12
10B	GADU MOR (l)	MU	w.w.														0.0555	0.0525	0.0395	0.02	0.019	0.032	0.015	0.0105	0.012	0.0165	no	D-L	no	13

Annual median concentration of HG (ppm)

																											ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
33B	PLAT FLE (s)	MU	w.w.			0.11		0.09	0.0769	0.019	0.0694		0.175	0.0877	0.116	0.0918	0.0694	0.053	0.048	0.076	0.0384	0.0455	0.0495	0.0293	0.067	0.0234	no	---	no	16
33B	PLAT FLE (l)	MU	w.w.			0.139		0.1	0.0769	0.0238	0.0694		0.195	0.135	0.196	0.103	0.088	0.049	0.06	0.087	0.0699	0.119	0.0778	0.059	0.0281	0.0615	no	---	no	16
53B	PLAT FLE (s)	MU	w.w.								0.111	0.0738	0.139	0.154	0.141	0.0712		0.0352	0.165	0.13	0.165	0.249	0.289	0.333	0.553	0.521	5.2	U--	8.9	14
53B	PLAT FLE (l)	MU	w.w.								0.111	0.128	0.09	0.124	0.1	0.116		0.0356	0.208	0.221	0.257	0.157	0.233	0.438	0.45	0.49	4.9	U--	8.1	15
67B	PLAT FLE (s)	MU	w.w.																0.1		0.0426	0.0363	0.0638	0.0442	0.0505	0.0573	no	---	no	13
67B	PLAT FLE (l)	MU	w.w.																0.246		0.0608	0.0337	0.082	0.0678	0.0712	0.0655	no	---	no	18
21F	PLAT FLE (s)	MU	w.w.																			0.075	0.0814	0.0389	0.0375		no	-?-	?	10
21F	PLAT FLE (l)	MU	w.w.																			0.119	0.0796	0.0337	0.044		no	-?-	?	13
36F	LIMA LIM (s)	MU	w.w.										0.0447	0.0707	0.066	0.0703	0.0495	0.0539	0.0487	0.0306	0.0615	0.0375	0.0563	0.041	0.0617	0.0575	no	--L	no	10
36F	LIMA LIM (l)	MU	w.w.										0.098	0.0742	0.133	0.101	0.0756	0.0997	0.0659	0.0906	0.0915	0.0676	0.102	0.0989	0.114	0.083	no	--L	1.0	10
15F	LIMA LIM (s)	MU	w.w.											0.09		0.038	0.0368	0.0245	0.0374	0.0475	0.042	0.036		0.0548	0.0559	0.0339	no	--L	no	12
15F	LIMA LIM (l)	MU	w.w.											0.15		0.034	0.036	0.0564	0.108	0.0727	0.0884	0.059		0.165	0.105	0.0807	no	--L	1.1	17
22F	LIMA LIM (s)	MU	w.w.										0.0837	0.04	0.207		0.045	0.063									no	-?-	?	20
22F	LIMA LIM (l)	MU	w.w.										0.174	0.152	0.282		0.223	0.372									3.7	-?-	?	11
30F	PLEU PLA (s)	MU	w.w.												0.058		0.0275	0.0372									no	-?-	?	13
30F	PLEU PLA (l)	MU	w.w.												0.035		0.0559	0.0476									no	-?-	?	10
22F	PLEU PLA (s)	MU	w.w.																0.0287	0.0431	0.0495						no	-?-	?	7
22F	PLEU PLA (l)	MU	w.w.																0.0506	0.0505	0.0827						no	-?-	?	9
98F	PLEU PLA (s)	MU	w.w.													0.017		0.0475		0.0384	0.0292	0.049	0.0579	0.0588	0.0334	0.018	no	---	no	14
98F	PLEU PLA (l)	MU	w.w.													0.025		0.0751		0.0259	0.0588	0.049	0.164	0.0896	0.0309	0.041	no	---	no	18
10F	PLEU PLA (s)	MU	w.w.																	0.032		0.014	0.029	0.019	0.0189	0.015	no	---	no	12
10F	PLEU PLA (l)	MU	w.w.																	0.0415		0.0339	0.031	0.024	0.0349	0.0194	no	---	no	9
67B	LEPI WHI (s)	MU	w.w.			0.235				0.35	0.329	0.21	0.343	0.0748	0.174	0.187	0.305	0.364	0.398	0.172	0.0663	0.11	0.104	0.0936	0.208	0.0789	m	--L	m	16
67B	LEPI WHI (l)	MU	w.w.			0.499				0.35	0.329	0.32	0.589	0.147	0.327	0.336	0.422	0.341	0.372	0.331	0.275	0.392	0.33	0.237	0.0914	0.186	m	--L	m	14

Annual median concentration of PB (ppm)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.										1.86	1.36	3.95	2.27	2.54	1.58	2.12	2.69	36.7	2.13	1.74	1.76	2.24	2.58	no	--	no	23
31A	MYTI EDU	SB	d.w.										1.38	1.21	1.26	1.03	1.37	1.68	1.79	0.732	1.54	0.629	0.629	0.51	1.43	0.805	no	--	no	14
35A	MYTI EDU	SB	d.w.										1.44	1.07	1.68	1.2	1.28	0.507	0.628	0.664	0.759	0.714	0.522	0.866	0.571	0.574	no	D-	no	11
36A	MYTI EDU	SB	d.w.										1.01	0.847	0.787	1.12	1.39	1.24	2.04	2.17	1.57	0.995	0.943	0.618	0.449	0.585	no	DY	no	10
71A	MYTI EDU	SB	d.w.										1.16	0.745	1.72	1.42	1.92	1.49	2.21	2.83	0.867	0.903	0.774	1.45	0.919	0.915	no	--	no	13
76A	MYTI EDU	SB	d.w.										1.77	0.968	1.5	0.913			0.796	1.84	1.23	1.99	0.602	0.829	0.766	0.938	no	--	no	14
15A	MYTI EDU	SB	d.w.										1.46	0.777		0.976	1.05	0.522	0.671	1.12	1.28	1.66	2.2	0.96	0.714	0.76	no	--	no	12
51A	MYTI EDU	SB	d.w.							76.4	27.3							149	60.3	17.2	29.6	37.1	91.7	32.4	98.4	108	36.2	--	54.0	19
52A	MYTI EDU	SB	d.w.									71.9	12.1	313	189	65.5	16.4	17.5	9.84	20.6	14.7	11.6	11	21.8	21.8	16.9	5.6	--	8.5	24
56A	MYTI EDU	SB	d.w.										20.7	23.4	121	109	24.7	46.4	27.8	37.5	15.7	30.3	28.5	30.5	42.9	27.8	9.3	--	13.6	17
57A	MYTI EDU	SB	d.w.										10.5	12.1	33.3	19.2	15.1	13.2	5.6	13.7	6.15	10.4	10.3	11.9	9.59	7.02	2.3	--	2.5	14
63A	MYTI EDU	SB	d.w.										12.1	10.1	15.4	10.9	7.22	12.1	7.6	6.1	6.39	4.84	4.52	7.05	6.57	6.3	2.1	D-	2.5	10
65A	MYTI EDU	SB	d.w.										5.61	3.78	5.19	6.53	3.28	4.73	2.41	3	1.77	1.63	2.45	2.84	3.05	2.82	no	D-	1.3	11
69A	MYTI EDU	SB	d.w.												4.62	3.42	2.8	3.17	4.02	3.66	1.98	3.4	2.27	3.91	2.76	2.53	no	--	no	11
22A	MYTI EDU	SB	d.w.										1.37	1.46	2.78	1.87	1.39	1.18	1.51	1.37	1.21	1.7	1.3	1.21	0.884	1.46	no	--	no	11
82A	MYTI EDU	SB	d.w.											1.28	0.933	0.916		0.622	0.674								no	D?	?	7
84A	MYTI EDU	SB	d.w.											1.01	1.15	1.38		1.38	0.833								no	-?	?	11
87A	MYTI EDU	SB	d.w.											0.974	0.87	0.634		1.4	2.47								no	-?	?	14
91A	MYTI EDU	SB	d.w.												0.898	1.46	2.01										no	-?	?	6
92A	MYTI EDU	SB	d.w.												0.933	0.628	1.09	0.664	0.654	2.18							no	--	1.4	16
98A	MYTI EDU	SB	d.w.												1.87	1.85				1.54	2.36	1.59	1.49	1.34	0.892	1.16	no	D-	no	9
98X	MYTI EDU	SB	d.w.														4.34	3.12	4.11								1.4	-?	?	11
41A	MYTI EDU	SB	d.w.														1.29	0.9	0.793	0.651							no	D?	?	6
43A	MYTI EDU	SB	d.w.														1.56	1.51		0.855							no	-?	?	8
44A	MYTI EDU	SB	d.w.														2.81	2.57	1.66	1.15							no	D?	?	7
46A	MYTI EDU	SB	d.w.														1.26	1.57	1.38								no	-?	?	8
48A	MYTI EDU	SB	d.w.														0.682	1.08	0.333								no	-?	?	19
10A	MYTI EDU	SB	d.w.														1.94	2.78	0.735	0.807	2.34	1.57	1.44	1.39	1.8	1.65	no	--	no	16
11A	MYTI EDU	SB	d.w.														1.54	1.48	0.336	0.367							no	-?	?	16
11X	MYTI EDU	SB	d.w.																	0.743	0.521	0.314	1.09	2.32	0.74	0.279	no	--	no	22

Annual median concentration of PB (ppm)

																										ANALYSIS	
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
I021	MYTI EDU	SB	d.w.															1.06	2.29	1.65	2.12		0.99	1.65	1.19		no	--	no	13
I022	MYTI EDU	SB	d.w.															1	0.599	1.18	1.31	1.94	1.05	0.952	1.27	1.36	no	--	no	12
I023	MYTI EDU	SB	d.w.															0.774	1.27	1.38	1.7	1.38	0.636	0.616	0.754	1.28	no	--	no	13
I024	MYTI EDU	SB	d.w.															0.971	1.1	1.16	1.7	1.79	0.617	1.33	1.1	1.73	no	--	no	13
30A	MYTI EDU	SB	d.w.										1.86	1.36	3.95	2.27	2.54	1.58	2.12	2.69	36.7	2.13	1.74	1.76	2.24	2.58	no	--	no	23
I301	MYTI EDU	SB	d.w.																		2.47	2.11	1.32	3.16	1.98	1.77	no	--	no	12
I304	MYTI EDU	SB	d.w.																		2.23	1.19	0.765	1.88	1.3	1.16	no	--	no	14
I306	MYTI EDU	SB	d.w.																		1.34	0.678	0.542	1.03	0.658	0.704	no	--	no	13
I307	MYTI EDU	SB	d.w.																		1.05	0.798	0.513	1.01	1.26	1.01	no	--	no	13
I201	MYTI EDU	SB	d.w.															3.54	4.39	4.77	4.67	4.43	6.41	3.78	8.21	1.87	no	--	no	14
I205	MYTI EDU	SB	d.w.															4.77		6.96	4	5.97	7.09	6.15	9.27	3.4	1.1	--	1.5	13
51A	MYTI EDU	SB	d.w.							76.4	27.3							149	60.3	17.2	29.6	37.1	91.7	32.4	98.4	108	36.2	--	54.0	19
52A	MYTI EDU	SB	d.w.									71.9	12.1	313	189	65.5	16.4	17.5	9.84	20.6	14.7	11.6	11	21.8	21.8	16.9	5.6	--	8.5	24
I962	MYTI EDU	SB	d.w.															4.44	5.34	3.55	2.99						no	-?	?	9
I965	MYTI EDU	SB	d.w.																					20	12.7	6.45	2.1	-?	?	6
I969	MYTI EDU	SB	d.w.															2.47	2.08	1.62	2.91	5.13	3	2.57	2.58	1.85	no	--	no	12
10A	MYTI EDU	SB	d.w.														1.94	2.78	0.735	0.807	2.34	1.57	1.44	1.39	1.8	1.65	no	--	no	16

Annual median concentration of PB (ppm)

																										ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR	LI	w.w.										0.2	0.115	0.249	0.105	0.12	0.11	0.06	0.1	0.163	0.85	0.24	0.22	0.513	0.24	2.4	--	2.8	17
36B	GADU MOR	LI	w.w.										0.115	0.05	0.03	0.02	0.03	0.02	0.03	0.04	0.03	0.04	0.04	0.03	0.0061	0.02	no	--	no	16
15B	GADU MOR	LI	w.w.										0.17	0.06	0.03	0.03	0.03	0.02	0.03	0.04	0.03	0.03	0.04	0.03	0.01	0.02	no	D-	no	14
53B	GADU MOR	LI	w.w.										0.19	0.26	0.14	0.03		0.02	0.0748	0.07	0.105	0.115	0.13	0.13	0.142	0.04	no	--	no	18
67B	GADU MOR	LI	w.w.										0.13	0.18	0.03	0.0748	0.09	0.04	0.04	0.09	0.03	0.04	0.04	0.03	0.0149	0.02	no	--	no	17
23B	GADU MOR	LI	w.w.										0.06	0.08	0.03	0.03	0.03	0.02	0.03	0.04	0.03	0.04	0.03	0.03	0.0061	0.02	no	--	no	15
92B	GADU MOR	LI	w.w.													0.02	0.03	0.03	0.04								no	-?	?	7
98B	GADU MOR	LI	w.w.												0.03	0.03	0.03	0.04	0.04	0.05	0.03	0.03	0.04	0.03	0.01	0.02	no	--	no	13
43B	GADU MOR	LI	w.w.														0.03	0.03	0.03								no	-?	?	<=5
10B	GADU MOR	LI	w.w.														0.03	0.02	0.04	0.04	0.04	0.03	0.04	0.03	0.02	0.02	no	--	no	10

Annual median concentration of PB (ppm)

																										ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
33B	PLAT FLE	LI	w.w.										0.24	0.35	0.06	0.03	0.03	0.02	0.03	0.04	0.04	0.04	0.04	0.03	0.0295	0.03	no	DY	no	14
53B	PLAT FLE	LI	w.w.										0.71	0.81	0.41	0.23		0.0245	0.46	0.35	0.52	0.46	0.357	0.57	1.29	0.73	2.4	--	4.5	22
67B	PLAT FLE	LI	w.w.																0.35		0.03	0.03	0.03	0.03	0.0078	0.02	no	--	no	22
21F	PLAT FLE	LI	w.w.																			0.04	0.0447	0.06	0.0461		no	-?	?	9
36F	LIMA LIM	LI	w.w.										0.6	0.07	0.04	0.07	0.03	0.02	0.03	0.05	0.05	0.05	0.06	0.04	0.0477	0.03	no	DY	no	16
15F	LIMA LIM	LI	w.w.											0.07		0.0408	0.03	0.02	0.03	0.05	0.04	0.0346		0.05	0.0212	0.02	no	--	no	13
22F	LIMA LIM	LI	w.w.										0.25	0.16	0.0424		0.06	0.07									no	-?	?	18
98F	LIMA LIM	LI	w.w.														0.02	0.04	0.03								no	-?	?	14
30F	PLEU PLA	LI	w.w.												0.739		0.54	0.57									2.9	-?	?	7
22F	PLEU PLA	LI	w.w.																0.28	0.28	0.46						2.3	-?	?	9
98F	PLEU PLA	LI	w.w.													0.03		0.31		0.05	0.04	0.22	0.104	0.04	0.0682	0.04	no	--	no	24
10F	PLEU PLA	LI	w.w.																	0.15		0.0648	0.08	0.05	0.0583	0.0447	no	D-	no	10
67B	LEPI WHI	LI	w.w.										0.19	0.07	0.06	0.07	0.04	0.07	0.03	0.04	0.04	0.03	0.03	0.04	0.0312	0.02	m	D-	m	12

Annual median concentration of CB_S7 (ppb)

																											ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.								77.5	96.5	116	89.6	97		89.3	90.4	110	128	58.5	71.1	49.9	29.6	33.9	43.4	2.9	DY	1.3	10
31A	MYTI EDU	SB	d.w.								21.7	24.9	37.1	24.7	34.6		52.2	49	63.8	24.6	12.9	18	6.49	8.87	8.97	7.58	no	DY	no	13
35A	MYTI EDU	SB	d.w.								21.5	33.6	27.5	14.2	22.1		13.4	13.6	10.7	16.5	12.5	14.6	5.52	7.32	6.97	8.2	no	D-	no	12
36A	MYTI EDU	SB	d.w.								11	17.9	19.3	7.94	11.2		5.69	10.5	12.3	12.7	8.62	12.1	5.28	5.54	6.03	5.75	no	--	no	13
71A	MYTI EDU	SB	d.w.								17	34.4	25	14.2	15.3		16.5	10.5		9.27	11.8	13.6	8.52	12.7	7.55	9.74	no	D-	no	12
76A	MYTI EDU	SB	d.w.										16.6	6.49	7.21				16.3	19.1	14.4	16.4	6.34	6.78	5.12	5.06	no	--	no	14
15A	MYTI EDU	SB	d.w.										11.8				6.29	3.06	2.41	3.88	4.72	5.28	2.56	4.19	3.15	2.73	no	--	no	13
51A	MYTI EDU	SB	d.w.															26.2	9.69	14.7	10.5	11.5	12	28	16.9	16	1.1	--	1.6	14
52A	MYTI EDU	SB	d.w.									40.2	14.9		11.3	11.3	17.1	16.9	10	19	10.6	11.2	7.19	74.2	12.5	12	no	--	1.3	19
56A	MYTI EDU	SB	d.w.								12.5	45.8	37.7	12.1	12	9.41	13.8	11.9		16.8	9.55	11.2	5.98	216	13	13.1	no	--	1.9	24
57A	MYTI EDU	SB	d.w.									28		7.63	7.55	4.74	8.38	6.54	4.18	8.41	10.3	8.16	3.89	55.9	5.89	6.16	no	--	no	21
63A	MYTI EDU	SB	d.w.									21.8		9.71	6.45	3.68	5.7	5.72		4.15	7.95	7.26	4.09	13.8	3.54	6.05	no	--	no	15
65A	MYTI EDU	SB	d.w.								6.05	11.1	33.4	9.29	5.59	3.69	5.55	3.37	5.19	3.76	7.62	6.44	3	8.31	2.73	3.73	no	--	no	17
69A	MYTI EDU	SB	d.w.												4.82		4.97	4.51	2.77	5.41	12.6	5.83	2.53	5.7	3.18	4.01	no	--	no	16
22A	MYTI EDU	SB	d.w.										18.9	8.23	8.61		7.97	6.84	5.19	4.69	11.5	6.01	5.14	4.69	3.24	8.5	no	--	no	14
84A	MYTI EDU	SB	d.w.								5.25	20.5		5.05	8.44			3.6	6.37								no	--	no	18
92A	MYTI EDU	SB	d.w.												4.46	2.49	5.83	4.05	2.89	7.74							no	--	no	15
98A	MYTI EDU	SB	d.w.												20.5	5.68				10.7	8.4	4.14	3.54	4.56	3.23	3.62	no	D-	no	14
98X	MYTI EDU	SB	d.w.														87.3	78.4	46.4								3.1	-?	?	9
41A	MYTI EDU	SB	d.w.														3.49	4.26	2.39	2.58							no	-?	?	10
43A	MYTI EDU	SB	d.w.														2.92	3.1		3.02							no	-?	?	<=5
44A	MYTI EDU	SB	d.w.															7.31	8.46	29.4							2.0	-?	?	15
46A	MYTI EDU	SB	d.w.														5.74	4.16	3.11								no	D?	?	<=5
48A	MYTI EDU	SB	d.w.														6.22	4.04	3.1								no	-?	?	6
10A	MYTI EDU	SB	d.w.														6.03	4.29	4.66	6.29		5.11	4.33	3.03	2.13	2.58	no	D-	no	9
11A	MYTI EDU	SB	d.w.														7.48	6.92	4.32	5.75							no	-?	?	10
11X	MYTI EDU	SB	d.w.																	3.34	3.56	4.48	2.79	3.1	1.93	1.93	no	--	no	9

Annual median concentration of CB_S7 (ppb)

																										ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
I021	MYTI EDU	SB	d.w.															43.1	31.8	32.2	24.1		22.2	20	25.1		1.7	D-	1.1	8
I022	MYTI EDU	SB	d.w.															32.1	25.9	41.2	22.4	28.9	19.2	22.4	20.8	15.2	1.0	--	no	10
I023	MYTI EDU	SB	d.w.															19.6	20.9	26	15	22.2	10.8	17.4	15.9	12.3	no	--	no	11
I024	MYTI EDU	SB	d.w.															31.8	36.1	45.6	36.6	28.7	16.8	17.7	26	15	no	--	no	11
30A	MYTI EDU	SB	d.w.								77.5	96.5	116	89.6	97		89.3	90.4	110	128	58.5	71.1	49.9	29.6	33.9	43.4	2.9	DY	1.3	10
I301	MYTI EDU	SB	d.w.															118	113	182	86.5	125	58.7	64.6	62.6	70.4	4.7	--	2.9	12
I304	MYTI EDU	SB	d.w.															35.2	23.8	44.4	35.9		19.9	25	24.4		1.6	--	1.1	12
I306	MYTI EDU	SB	d.w.															16.4	15.7	54.2	26.1		21.8	17.2	15.7		1.0	--	no	15
I307	MYTI EDU	SB	d.w.															20.6	28.5	40.2	17.3		20.3	16.9	17.5	15.4	1.0	--	no	12
I711	MYTI EDU	SB	d.w.															24.8	13.3	13.3	20.6	21.6	18.4		13.4		no	--	1.1	12
I712	MYTI EDU	SB	d.w.															33.3	31.2	25.3	22.4	24.9	13.9	12.5	10.9	16.9	1.1	D-	no	10
I131	MYTI EDU	SB	d.w.															7.94	11.7	13.1	22.4	12.7	10.1	14	29.4	8.13	no	--	no	15
I132	MYTI EDU	SB	d.w.															27.5	33.7	32	31.1	22.5	10.2	15.8	11.8	13.3	no	D-	no	11
I133	MYTI EDU	SB	d.w.															22.8	22.3	21.5	24.7	23	10.4	11.7	9.24	9.23	no	D-	no	10
51A	MYTI EDU	SB	d.w.															26.2	9.69	14.7	10.5	11.5	12	28	16.9	16	1.1	--	1.6	14
52A	MYTI EDU	SB	d.w.									40.2	14.9		11.3	11.3	17.1	16.9	10	19	10.6	11.2	7.19	74.2	12.5	12	no	--	1.3	19
I242	MYTI EDU	SB	d.w.															63	81.6	29.6	45.6	59.5	36.6	26.2	44.6	81.9	5.5	--	4.7	15
I243	MYTI EDU	SB	d.w.															115	169	122	78.2	92.4	47.9	29.3	52.5	326	21.7	--	12.4	19
10A	MYTI EDU	SB	d.w.														6.03	4.29	4.66	6.29		5.11	4.33	3.03	2.13	2.58	no	D-	no	9

Annual median concentration of CB_S7 (ppb)

																											ANALYSIS			
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR	LI	w.w.										1240	3430	2800	2500	2910	2350	2790	3240	3660	3520	2080	2440	2230	2140	4.3	--	2.9	11
36B	GADU MOR	LI	w.w.										441	344	396	636	376	1650	974	720	736	766	482	288	269	425	no	--	no	14
15B	GADU MOR	LI	w.w.										182	349	266	182	295	307	274	399	279	257	153	377	244	213	no	--	no	12
53B	GADU MOR	LI	w.w.										435	524	1760	166		162	701	576	2370	487	1520	842	956	317	no	--	no	22
67B	GADU MOR	LI	w.w.										316	293	268	226	329	210	269	627	206	273	148	225	145	92.6	no	--	no	13
23B	GADU MOR	LI	w.w.										222	244	228	208	128	193	196	125	179	229	207	167	111	114	no	--	no	10
92B	GADU MOR	LI	w.w.													135	152	311	369								no	U?	?	9
98B	GADU MOR	LI	w.w.												239	183	114	197	278	372	165	147	131	114	62.6	110	no	--	no	13
43B	GADU MOR	LI	w.w.														325	329	140								no	-?	?	13
10B	GADU MOR	LI	w.w.														645	485	210	189	168	255	99.4	109	151	146	no	D-	no	13
30B	GADU MOR	MU	w.w.										3.58	11.1	24.7	9.65	3.94	3.12	8.46	11.8	21.7	21.4	6.06	9.4	10.3	9.31	3.1	--	1.8	19
36B	GADU MOR	MU	w.w.										1.62	1.29	2	3.65	0.525	15.6	4.14	4.54	3.78	2.86	2.26	2.19	1.9	2.52	no	--	no	21
15B	GADU MOR	MU	w.w.										1.35	1.22	1.38	0.65	0.38	1.03	1.14	1.44	1.41	0.81	1.42	1.88	0.655	1.23	no	--	no	15
53B	GADU MOR	MU	w.w.										8.2	2.23	15	1.1		0.37	21.9	3.76	138	6.61	36.3	1.08	23.6	4.84	1.6	--	no	>25
67B	GADU MOR	MU	w.w.										0.835	1.43	1.1	0.624	1.15	0.605	3.5	7.07	0.73	1.72	1.18	9.98	0.61	0.35	no	--	no	25
23B	GADU MOR	MU	w.w.										0.64	2.26	0.75	0.85	0.18	0.625	0.46	0.81	1.49	0.95	0.45	0.62	0.38	0.495	no	--	no	18
92B	GADU MOR	MU	w.w.													0.55	0.225	0.36	0.905								no	-?	?	19
98B	GADU MOR	MU	w.w.												0.9	0.9	0.135	0.34	0.475	1.4	0.44	0.585	2.02	1.48	0.24	0.385	no	--	no	22
43B	GADU MOR	MU	w.w.														0.515	0.815	0.39								no	-?	?	16
10B	GADU MOR	MU	w.w.														1.77	2.49	0.367	0.9	0.79	1.39	0.5	0.55	0.635	0.555	no	--	no	18

Annual median concentration of CB_S7 (ppb)

																											ANALYSIS			
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
33B	PLAT FLE	LI	w.w.										36	31.1	97.5	69	57	86	38.3	40.5	30.5	47.2	90.7	158	53	60.1	no	--	no	15
53B	PLAT FLE	LI	w.w.										509	517	309	36		22.8	115	113	111	156	95.8	95.1	158	165	1.6	--	1.8	19
67B	PLAT FLE	LI	w.w.																70		96.9	45.8	44	36.3	32	27.6	no	D-	no	10
21F	PLAT FLE	LI	w.w.																			22.9	6.97	33.6	48.9		no	-?	?	22
33B	PLAT FLE	MU	w.w.										2.04	3.96	1.8	0.95	0.51	1.37	1.37	0.995	0.85	5.32	1.14	1.76	1.53	1.25	no	--	no	18
53B	PLAT FLE	MU	w.w.										27.4	33.2	14.2	1.45		0.757	3.19	2.74	2.19	2.73	3	2.67	2.02	1.13	no	D-	no	19
67B	PLAT FLE	MU	w.w.																0.775		1.8	1.66	1.48	0.95	0.845	0.82	no	--	no	13
21F	PLAT FLE	MU	w.w.																			0.76	0.2	0.61	1.33		no	-?	?	22
36F	LIMA LIM	LI	w.w.										301	217	339	418	404	433	386	387	236	412	838	527	297	272	no	--	no	13
15F	LIMA LIM	LI	w.w.											124		58.2	77	74	62.5	64.5	51.1	69.6		106	50.2	49.8	no	--	no	12
22F	LIMA LIM	LI	w.w.										170	127	140		60	88.7									no	-?	?	11
36F	LIMA LIM	MU	w.w.										2.76	7.05	5.6	7.8	5.9	8.18	9.62	5.19	9.41	3.88	8.38	7.73	6.56	3.73	no	--	no	13
15F	LIMA LIM	MU	w.w.											3.72		0.806	0.369	1.14	1.81	1.28	1.42	0.959		1.21	0.665	0.94	no	--	no	18
22F	LIMA LIM	MU	w.w.										1.97	5	3.82		1.24	5.14									1.0	-?	?	20
98F	LIMA LIM	MU	w.w.														0.845	1.34	3.3								no	-?	?	9
30F	PLEU PLA	LI	w.w.												313		207	216									4.3	-?	?	8
22F	PLEU PLA	LI	w.w.																21	20.1	14.5						no	-?	?	7
98F	PLEU PLA	LI	w.w.													9.38		37.5		27.8	24.1	24.7	40.8	25.5	10.3	10.5	no	--	no	16
10F	PLEU PLA	LI	w.w.																	42.1		62.8	45	24.9	86.2	16.6	no	--	no	18
30F	PLEU PLA	MU	w.w.												6.82		3.01	1.46									no	-?	?	9
22F	PLEU PLA	MU	w.w.																1.39	0.95	3.33						1.7	-?	?	19
98F	PLEU PLA	MU	w.w.													0.45		2.51		0.581	0.83	0.435	1.54	0.6	0.291	0.25	no	--	no	20
10F	PLEU PLA	MU	w.w.																	0.97		2.58	1.78	1.12	1	0.457	no	--	no	17
67B	LEPI WHI	LI	w.w.										111	100	143	101	172	166	97.2	91.5	118	82.3	83.9	63.8	105	85.2	m	--	m	10
67B	LEPI WHI	MU	w.w.										0.84	0.935	1.4	0.55	0.48	1.46	0.445	0.68	0.42	1.03	0.82	0.673	0.37	0.43	m	--	m	15

Annual median concentration of DDEPP (ppb)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.												5.24	3.86	7.08	5.7	2.56	5.88	3.87	5.91	3.47	1.99	1.97	2.08	no	--	no	13
31A	MYTI EDU	SB	d.w.												3.3	1.89	3.45	1.84	0.505	3.37	3.49	5.47	1.19	2.1	1.79	1.01	no	--	no	19
35A	MYTI EDU	SB	d.w.												4.91	2.08	3.13	2.84	0.57	3.91	3.73	5.93	1.61	3.29	2.17	1.8	no	--	no	19
36A	MYTI EDU	SB	d.w.												2.76	1.06	1.03	1.76	0.442	2.11	1.79	2.98	1.48	1.51	1.34	0.76	no	--	no	16
71A	MYTI EDU	SB	d.w.												2.61	1.58	3.21	1.29	0.736	1.02	2.2	2.41	2.26	3.58	1.1	1.67	no	--	no	15
76A	MYTI EDU	SB	d.w.												1.4	0.794			0.355	1.21	2.29	2.49	0.779	0.829	0.746	0.621	no	--	no	18
15A	MYTI EDU	SB	d.w.													0.976	1.72	0.735	0.294	1.02	1.41	2.05	0.536	0.622	0.854	0.667	no	--	no	18
51A	MYTI EDU	SB	d.w.															33.9	6.67	14.7	17.1	13.2	16.9	5.48	9.52	10	1.0	--	no	17
52A	MYTI EDU	SB	d.w.												12.3	25.5	19.4	18.5	9.53	13.1	16.7	13.7	11.9	6.47	6.82	8.86	no	--	no	12
56A	MYTI EDU	SB	d.w.												50	47.5	115	40.8	33.9	72.3	52.6	39.8	26.2	60.6	40	55.1	5.5	--	5.8	15
57A	MYTI EDU	SB	d.w.												25.9	18.3	35	25.3	15.8	50	82.9	35.2	27.5	24.7	14.7	27.8	2.8	--	no	16
63A	MYTI EDU	SB	d.w.												12.9	9.29	9.68	8.36	5.53	13	15.5	11.4	10.2	7.09	4.76	11.3	1.1	--	no	13
65A	MYTI EDU	SB	d.w.												7.6	5.19	7.79	4.12	5	6.9	11.9	7.38	6.76	5.43	3.61	6.47	no	--	no	12
69A	MYTI EDU	SB	d.w.												3.55	3.16	3.54	2.91	0.4	3.69	6.52	2.61	2.7	2.25	1.61	2.62	no	--	no	21
22A	MYTI EDU	SB	d.w.												2.22	1.31	1.88	1.45	0.387	1.37	5.11	1.96	1.49	0.909	0.725	1.46	no	--	no	19
84A	MYTI EDU	SB	d.w.												3.13	2.23		0.985	0.736								no	D?	?	<=5
92A	MYTI EDU	SB	d.w.												0.68	2.09	1.41	0.766	0.275	1.93							no	--	no	22
98A	MYTI EDU	SB	d.w.												5.81	2.29				1.59	1.87	0.87	0.575	1.31	0.625	0.725	no	D-	no	14
98X	MYTI EDU	SB	d.w.														31.6	22.9	5.16								no	-?	?	15
41A	MYTI EDU	SB	d.w.														0.621	0.423	0.291	0.61							no	-?	?	15
44A	MYTI EDU	SB	d.w.															0.486	0.343	1.41							no	-?	?	20
46A	MYTI EDU	SB	d.w.														1.05	0.756	0.273								no	-?	?	11
48A	MYTI EDU	SB	d.w.														1.71	1.13	0.286								no	-?	?	14
10A	MYTI EDU	SB	d.w.														0.848	0.78	0.439	1.49		1.45	0.611	0.867	0.61	0.576	no	--	no	15
11A	MYTI EDU	SB	d.w.														1.3	1.88	0.408	1.23							no	-?	?	21
11X	MYTI EDU	SB	d.w.																	0.811	1.04	1.04	0.769	0.758	0.472	0.465	no	D-	no	9

Annual median concentration of DDEPP (ppb)

																											ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
I021	MYTI EDU	SB	d.w.															4.6	1.45	4.8	3.25		5.19	2.73	4.73		no	--	no	17
I022	MYTI EDU	SB	d.w.															3.95	1.38	7.13	4.58	7.96	4.92	3.73	4.51	2.54	no	--	no	16
I023	MYTI EDU	SB	d.w.															1.81	1.32	3.79	2.32	6.1	2.39	2.91	3.31	1.42	no	--	no	15
I024	MYTI EDU	SB	d.w.															3.5	3.52	8.91	7.17	8.96	4.94	2.52	5.15	2.4	no	--	no	14
30A	MYTI EDU	SB	d.w.												5.24	3.86	7.08	5.7	2.56	5.88	3.87	5.91	3.47	1.99	1.97	2.08	no	--	no	13
I301	MYTI EDU	SB	d.w.															2.59	3.75	17.8	5.96	7.45	5.58	4.51	5.06	3.54	no	--	no	16
I304	MYTI EDU	SB	d.w.															2.14	0.751	3.42	3.89		1.95	2.71	2.62		no	--	no	18
I306	MYTI EDU	SB	d.w.															1.84	0.455	4.25	3.31		2.37	1.88	1.92		no	--	no	21
I307	MYTI EDU	SB	d.w.															2.18	1.03	3.42	2.74		2.12	4.13	2.28	1.09	no	--	no	16
I711	MYTI EDU	SB	d.w.															3.46	0.719	1.49	2.19	2.18	3.85		1.26		no	--	no	19
I712	MYTI EDU	SB	d.w.															2.43	1.34	3.14	3.09	3.49	3.46	2.48	1.6	2.65	no	--	no	12
I131	MYTI EDU	SB	d.w.															1.46	0.691	1.89	2.06	1.67	1.11	0.915	1.11	0.942	no	--	no	13
I132	MYTI EDU	SB	d.w.															1.88	1.36	2.15	2.02	2.06	1.19	1.15	1.26	1.17	no	--	no	10
I133	MYTI EDU	SB	d.w.															2.16	0.879	1.62	1.93	2.73	1.16	1.11	1.03	0.925	no	--	no	14
51A	MYTI EDU	SB	d.w.															33.9	6.67	14.7	17.1	13.2	16.9	5.48	9.52	10	1.0	--	no	17
52A	MYTI EDU	SB	d.w.												12.3	25.5	19.4	18.5	9.53	13.1	16.7	13.7	11.9	6.47	6.82	8.86	no	--	no	12
I242	MYTI EDU	SB	d.w.															6.52	9.74	1.58	3.53	9.47	3.52	2.22	2.88	3.38	no	--	no	19
I243	MYTI EDU	SB	d.w.															7.47	6.12	1.72	5.43	5.11	4.01	1.99	3.32	3.88	no	--	no	17
10A	MYTI EDU	SB	d.w.														0.848	0.78	0.439	1.49		1.45	0.611	0.867	0.61	0.576	no	--	no	15

Annual median concentration of DDEPP (ppb)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR	LI	w.w.										163	440	182	159	191	194	312	383	260	230	160	180	180	240	1.2	--	no	13
36B	GADU MOR	LI	w.w.										91.9	51	50	75	55	105	141	129	45	86	47	46	39	32	no	--	no	13
15B	GADU MOR	LI	w.w.										50	136	48	57	86	33.5	75	140	72.5	76	46	60	78	74	no	--	no	15
53B	GADU MOR	LI	w.w.										637	806	939	85		42	491	936	490	160	380	260	200	145	no	--	no	24
67B	GADU MOR	LI	w.w.										776	554	347	392	471	109	460	2060	270	200	177	140	110	89	no	--	no	20
23B	GADU MOR	LI	w.w.										68	85.4	42	41	35	31	49	33	49	48	59	52.9	24	37	no	--	no	11
92B	GADU MOR	LI	w.w.													53	50.5	50	196								no	-?	?	17
98B	GADU MOR	LI	w.w.												73	83.4	43	49	138	198	78	41	58	28	29	64	no	--	no	17
43B	GADU MOR	LI	w.w.														126	69	60								no	-?	?	9
10B	GADU MOR	LI	w.w.														211	71	75	99	65	90	32	38.5	54	51.5	no	--	no	14
30B	GADU MOR	MU	w.w.										0.45	1.21	2	1	0.32	0.29	0.97	1.04	1.5	1.5	0.44	0.67	0.73	0.7	no	--	no	19
36B	GADU MOR	MU	w.w.										0.34	0.29	0.2	0.5	0.09	0.93	0.58	0.88	0.31	0.32	0.171	0.24	0.22	0.21	no	--	no	18
15B	GADU MOR	MU	w.w.										0.47	0.36	0.346	0.2	0.12	0.26	0.35	0.514	0.23	0.32	0.31	0.19	0.22	0.39	no	--	no	13
53B	GADU MOR	MU	w.w.										2.36	2.16	6.75	1.8		0.08	4.09	4.59	4.64	3.2	2.5	0.6	1.79	2.4	2.4	--	no	>25
67B	GADU MOR	MU	w.w.										2.25	3.03	1.4	1	2.46	1.08	6.96	19	1	1.1	1.1	1.8	0.44	0.24	no	--	no	23
23B	GADU MOR	MU	w.w.										0.21	0.59	0.1	0.2	0.04	0.16	0.14	0.18	0.14	0.18	0.12	0.16	0.1	0.13	no	--	no	17
92B	GADU MOR	MU	w.w.													0.1	0.09	0.17	0.49								no	-?	?	14
98B	GADU MOR	MU	w.w.												0.4	0.4	0.06	0.05	0.24	0.6	0.18	0.15	0.4	0.38	0.09	0.12	no	--	no	23
43B	GADU MOR	MU	w.w.														0.23	0.23	0.14								no	-?	?	9
10B	GADU MOR	MU	w.w.														0.74	0.68	0.12	0.4	0.26	0.41	0.15	0.18	0.23	0.18	no	--	no	17

Annual median concentration of DDEPP (ppb)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
33B	PLAT FLE	LI	w.w.										13	9.1	24	14	13	7	10.2	9.7	8.6	6.8	27	27	17	22	no	--	1.2	15
53B	PLAT FLE	LI	w.w.										94	70.1	32	41		8	25	45	38	44	17.5	39	42	40	1.3	--	1.5	17
67B	PLAT FLE	LI	w.w.																27		84.5	40	35	25	24	20	no	--	no	15
21F	PLAT FLE	LI	w.w.																			11	2.6	16	7.4		no	-?	?	24
33B	PLAT FLE	MU	w.w.										0.9	1.93	0.6	0.2	0.15	0.25	0.43	0.28	0.24	1.5	0.3	0.56	0.43	0.53	no	--	no	19
53B	PLAT FLE	MU	w.w.										4.67	5.3	3.8	1.3		0.373	1.79	1.36	0.96	0.93	0.61	0.88	0.66	0.81	no	D-	no	17
67B	PLAT FLE	MU	w.w.																0.85		1.31	1.4	1.2	0.54	0.63	0.68	no	--	no	13
21F	PLAT FLE	MU	w.w.																			0.32	0.1	0.43	0.16		no	-?	?	21
36F	LIMA LIM	LI	w.w.										28	34.4	28	21	50	40	40	22	18	52	45	27	31	36	no	--	no	14
15F	LIMA LIM	LI	w.w.											39		13.4	23.5	9	20.7	20	13	32		41	15	17	no	--	no	16
22F	LIMA LIM	LI	w.w.										68.9	48	39.9		21	9.17									no	D?	?	10
36F	LIMA LIM	MU	w.w.										0.41	1.15	0.7	0.5	0.96	0.91	0.91	0.46	0.67	0.49	0.52	0.51	0.61	0.53	no	--	no	12
15F	LIMA LIM	MU	w.w.											1.21		0.173	0.143	0.3	0.55	0.42	0.38	0.324		0.55	0.18	0.28	no	--	no	19
22F	LIMA LIM	MU	w.w.										1.1	2	1.18		0.56	0.83									no	-?	?	14
98F	LIMA LIM	MU	w.w.														0.57	0.31	1.63								no	-?	?	23
30F	PLEU PLA	LI	w.w.												21.2		13	12									1.2	-?	?	6
22F	PLEU PLA	LI	w.w.																7.8	12	2.8						no	-?	?	21
98F	PLEU PLA	LI	w.w.													3		8		15.5	6.2	7.8	10.8	8	5.1	3.6	no	--	no	15
10F	PLEU PLA	LI	w.w.																	15		34.7	28	8.9	19	4.74	no	--	no	20
30F	PLEU PLA	MU	w.w.												0.693		0.32	0.17									no	-?	?	8
22F	PLEU PLA	MU	w.w.																0.47	0.34	0.76						no	-?	?	15
98F	PLEU PLA	MU	w.w.													0.1		0.46		0.302	0.21	0.14	0.465	0.24	0.135	0.09	no	--	no	18
10F	PLEU PLA	MU	w.w.																	0.4		0.859	1.1	0.3	0.4	0.134	no	--	no	20
67B	LEPI WHI	LI	w.w.										294	240	183	163	250	145	143	167	160	160	130	58	64	73	m	D-	m	11
67B	LEPI WHI	MU	w.w.										2.56	1.51	2.5	0.8	0.8	3.04	0.78	1.27	0.56	1.4	1.1	0.54	0.39	0.59	m	--	m	17

Annual median concentration of HCB (ppb)

																									ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.				1.18	0.877	2.06	0.917	1.15	0.866	0.35	0.592	0.952	0.541	0.27	0.239	0.251	0.275	0.298		0.361	0.225	0.34	0.323	no	D-	no	13
31A	MYTI EDU	SB	d.w.			13.4	1.38	3.83	1.89	0.93	0.893	0.361	0.317	0.606	0.549	0.446	0.243	0.312	0.219	0.258	0.21		0.226	0.265	0.321	0.327	no	DY	no	15
35A	MYTI EDU	SB	d.w.			12.8	0.952	3.33	0.793	0.976	1.12	0.474	0.42	0.585	0.578	0.505	0.234	0.276	0.219	0.522	0.2	0.336	0.36	0.3	0.287	0.273	no	D-	no	17
36A	MYTI EDU	SB	d.w.			15	0.948	3.83	2.9	2.37	0.957	0.426	0.33	0.546	0.394	0.529	0.24	0.333	0.276	0.311	0.149		0.252	0.197	0.214	0.292	no	D-	no	18
71A	MYTI EDU	SB	d.w.			15.3	10.4	91.4	11.1	207	1.83	149	8.48	6.91	4.14	3.91	1.47	2.13	4.48	2.04	1.78	3.1	1.85	2.42	0.809	0.327	no	D-	no	>25
71A	MYTI EDU	SB	d.w.										*8.48*	*6.91*	*4.14*	*3.91*	*1.47*	*2.13*	*4.48*	*2.04*	*1.78*	*3.1*	*1.85*	*2.42*	*0.809*	*0.327*	no	D-	no	15
76A	MYTI EDU	SB	d.w.										0.378	0.568	0.498	0.794			0.254	0.289	0.4	0.256	0.216	0.244	0.299	0.311	no	--	no	13
15A	MYTI EDU	SB	d.w.										0.203			0.488	0.253	0.217	0.294	0.254	0.159	0.224	0.179	0.253	0.296	0.331	no	--	no	12
51A	MYTI EDU	SB	d.w.															0.612	0.333	0.313	0.4	0.4	0.385	0.196	0.476	0.403	no	--	no	13
52A	MYTI EDU	SB	d.w.									0.855	0.378		0.813	0.811	0.276	0.316	0.262	0.333	0.214	0.334	0.199	0.376	0.318		no	--	no	14
56A	MYTI EDU	SB	d.w.								0.2	0.787	0.413	0.794	0.935	1.04	0.309	0.382	0.309	0.442	0.348	0.704	0.183	0.336	0.301	0.451	no	--	no	16
57A	MYTI EDU	SB	d.w.									0.769		0.763	0.719	0.794	0.357	0.301	0.262	0.431	0.576	0.625	0.262	0.361	0.254	0.397	no	--	no	12
63A	MYTI EDU	SB	d.w.									1.05		0.971	0.74	0.625	0.316	0.329	0.333	0.407	0.452	0.51	0.23	0.321	0.329	0.352	no	D-	no	10
65A	MYTI EDU	SB	d.w.								0.2	0.427	0.516	0.862	0.621	0.667	0.284	0.296	0.294	0.345	0.377	0.524	0.15	0.272	0.258	0.294	no	--	no	13
69A	MYTI EDU	SB	d.w.												0.532	0.526	0.286	0.251	0.286	0.5	0.483	0.361	0.207	0.331	0.311	0.266	no	--	no	12
22A	MYTI EDU	SB	d.w.										0.265	0.61	0.559	0.444	0.248	0.253	0.301	0.311	0.172	0.316	0.202	0.298	0.242	0.329	no	--	no	12
82A	MYTI EDU	SB	d.w.				2.26	10.7	0.656	0.617	0.8	0.535															1.1	--	no	24
84A	MYTI EDU	SB	d.w.				3.41	8.79	3.33	2.04	1.23	0.476		0.505	0.625	0.532		0.246	0.215								no	D-	no	15
92A	MYTI EDU	SB	d.w.												0.68	0.418	0.244	0.225	0.23	0.254							no	D-	no	12
98A	MYTI EDU	SB	d.w.												0.619	0.571				0.336	0.311	0.435	0.286	0.291	0.313	0.362	no	--	no	9
98X	MYTI EDU	SB	d.w.														0.559	0.318	0.26								no	-?	?	8
41A	MYTI EDU	SB	d.w.														0.292	0.263	0.291	0.303							no	-?	?	6
43A	MYTI EDU	SB	d.w.														0.325	0.338		0.45							no	-?	?	<=5
44A	MYTI EDU	SB	d.w.															0.273	0.286	0.329							no	-?	?	<=5
46A	MYTI EDU	SB	d.w.														0.263	0.291	0.273								no	-?	?	6
48A	MYTI EDU	SB	d.w.														0.279	0.294	0.238								no	-?	?	7
10A	MYTI EDU	SB	d.w.														0.292	0.266	0.245	0.309		0.284	0.278	0.289	0.305	0.275	no	--	no	6
11A	MYTI EDU	SB	d.w.														0.35	0.427	0.336	0.459							no	-?	?	8
11X	MYTI EDU	SB	d.w.																	0.34	0.208	0.249	0.242	0.253	0.236		no	--	no	8

Annual median concentration of HCB (ppb)

																										ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
I021	MYTI EDU	SB	d.w.															0.833	0.916	0.48	0.375		0.481	0.636	0.549		1.1	--	1.1	11
I022	MYTI EDU	SB	d.w.															0.421	0.479	0.97	0.312	0.783	0.455	0.543	0.549	0.379	no	--	no	14
I023	MYTI EDU	SB	d.w.															0.482	0.424	0.431	0.259	0.615	0.347	0.342	0.417	0.394	no	--	no	11
I024	MYTI EDU	SB	d.w.															0.488	0.602	1.16	0.426	0.66	0.556	0.536	0.495	0.388	no	--	no	12
30A	MYTI EDU	SB	d.w.				1.18	0.877	2.06	0.917	1.15	0.866	0.35	0.592	0.952	0.541	0.27	0.239	0.251	0.275	0.298		0.361	0.225	0.34	0.323	no	--	no	13
I301	MYTI EDU	SB	d.w.															0.294	0.284	0.695	0.818	1.55	0.508	0.677	0.423	0.318	no	--	no	14
I304	MYTI EDU	SB	d.w.															0.336	0.281	0.719	0.486		0.294	0.526	0.385		no	--	no	14
I306	MYTI EDU	SB	d.w.															0.299	0.307	0.774	0.253		0.296	0.294	0.336		no	--	no	15
I307	MYTI EDU	SB	d.w.															0.273	0.318	0.674	0.174		0.327	0.336	0.45	0.365	no	--	no	15
I711	MYTI EDU	SB	d.w.															4.45	5.54	0.575	4.46	6.96	2.56		4		8.0	--	11.3	24
I712	MYTI EDU	SB	d.w.															3.43	16.4	7.9	4.83	5	3.31	1.78	2.75	3.27	6.5	--	3.3	17
I131	MYTI EDU	SB	d.w.															0.316	0.298	0.273	0.196	0.582	0.288	0.327	0.292	0.373	no	--	no	13
I132	MYTI EDU	SB	d.w.															52.8	89.7	40.2	44.2	1.89	4.73	3.11	2.36	1.56	3.1	D-	no	22
I133	MYTI EDU	SB	d.w.															18.1	43.5	8.12	28	1.7	6.18	2.3	1.62	2.45	4.9	--	no	23
51A	MYTI EDU	SB	d.w.															0.612	0.333	0.313	0.4	0.4	0.385	0.196	0.476	0.403	no	--	no	13
52A	MYTI EDU	SB	d.w.									0.855	0.378		0.813	0.811	0.276	0.316	0.262	0.333	0.214	0.334	0.199	0.376	0.318		no	--	no	14
I242	MYTI EDU	SB	d.w.															1.2	0.923	0.562	0.604	0.651	0.552	0.241	0.5	0.463	no	--	no	12
I243	MYTI EDU	SB	d.w.															1.03	0.663	0.516	1.24	0.662	0.67	0.262	0.444	0.34	no	--	no	14
10A	MYTI EDU	SB	d.w.														0.292	0.266	0.245	0.309		0.284	0.278	0.289	0.305	0.275	no	--	no	6

Annual median concentration of HCB (ppb)

																											ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR	LI	w.w.										10	17	7.48	16	11	11	12	7	5.3	5.1	9.1	8.9	6.7	6	no	--	no	12
36B	GADU MOR	LI	w.w.										7	9	9	10	9	5	9	6	4.4	6.5	5.4	4.6	3.1	3.3	no	D-	no	10
15B	GADU MOR	LI	w.w.										5	20.5	10	14	14	9	11	13	11.5	11	6.2	6.6	8.2	6.4	no	--	no	13
53B	GADU MOR	LI	w.w.										10	10	16.5	7		5	7	7	5	4.7	12	2.1	3	2.25	no	--	no	16
67B	GADU MOR	LI	w.w.										14	8	7.94	8	8.49	10	8	15.5	9.9	4.6	5.63	4.9	4.6	5.1	no	D-	no	11
23B	GADU MOR	LI	w.w.										6	9.49	12	9	8	6	10	6	8.4	7.8	7.6	9.25	4.7	7.9	no	--	no	11
92B	GADU MOR	LI	w.w.													17	11	14	13								no	-?	?	9
98B	GADU MOR	LI	w.w.												20	9.95	12	18	35	20.5	16	13	3.1	2.6	10	13	no	--	no	18
43B	GADU MOR	LI	w.w.														15	16.5	13								no	-?	?	8
10B	GADU MOR	LI	w.w.														13	11	16	17	17	25	9	9.9	11	9.43	no	--	no	12
30B	GADU MOR	MU	w.w.										0.09	0.09	0.1	0.1	0.04	0.03	0.05	0.05	0.06	0.06	0.06	0.05	0.06	0.05	no	--	no	11
36B	GADU MOR	MU	w.w.										0.11	0.07	0.1	0.1	0.04	0.05	0.06	0.06	0.05	0.06	0.04	0.05	0.03	0.03	no	D-	no	11
15B	GADU MOR	MU	w.w.										0.11	0.11	0.1	0.1	0.06	0.07	0.08	0.0748	0.1	0.06	0.1	0.04	0.06	0.07	no	--	no	11
53B	GADU MOR	MU	w.w.										0.1	0.03	0.1	0.1		0.03	0.0648	0.06	0.05	0.05	0.09	0.04	0.05	0.08	no	--	no	16
67B	GADU MOR	MU	w.w.										0.1	0.0849	0.1	0.1	0.0748	0.06	0.05	0.07	0.06	0.05	0.05	0.04	0.05	0.05	no	D-	no	8
23B	GADU MOR	MU	w.w.										0.08	0.08	0.1	0.1	0.04	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.04	0.05	no	--	no	10
92B	GADU MOR	MU	w.w.													0.1	0.07	0.05	0.09								no	-?	?	13
98B	GADU MOR	MU	w.w.												0.2	0.2	0.07	0.1	0.11	0.1	0.1	0.08	0.1	0.06	0.07	0.09	no	--	no	12
43B	GADU MOR	MU	w.w.														0.09	0.13	0.06								no	-?	?	15
10B	GADU MOR	MU	w.w.														0.16	0.11	0.09	0.2	0.17	0.26	0.09	0.11	0.13	0.09	no	--	no	14

Annual median concentration of HCB (ppb)

																											ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
33B	PLAT FLE	LI	w.w.										1	0.5	5	2	1	1	0.6	0.8	0.59	0.54	1.6	1.6	1.6	1.9	no	--	no	18
53B	PLAT FLE	LI	w.w.										6	4.47	5	2		1	2	3	1.8	2.5	2.39	2	2.9	1.4	no	--	no	14
67B	PLAT FLE	LI	w.w.																3		6.39	3.6	4.2	4.3	3.5	3.7	no	--	no	11
21F	PLAT FLE	LI	w.w.																			3.1	1.1	2.4	0.9		no	-?	?	17
33B	PLAT FLE	MU	w.w.										0.06	0.07	0.1	0.1	0.03	0.03	0.03	0.05	0.03	0.06	0.04	0.04	0.05	0.06	no	--	no	13
53B	PLAT FLE	MU	w.w.										0.45	0.3	0.2	0.1		0.0837	0.05	0.1	0.06	0.06	0.09	0.06	0.05	0.13	1.3	DY	1.1	13
67B	PLAT FLE	MU	w.w.																0.05		0.098	0.19	0.16	0.12	0.14	0.12	1.2	--	1.2	13
21F	PLAT FLE	MU	w.w.																			0.1	0.03	0.06	0.04		no	-?	?	17
36F	LIMA LIM	LI	w.w.										5.48	3	5	2	3	2	2.3	3	1.1	2.5	3	2.6	2	2.5	no	--	no	13
15F	LIMA LIM	LI	w.w.											4		4	4	2	3	3.2	3	3.64		5.9	2.5	4.3	no	--	no	12
22F	LIMA LIM	LI	w.w.										6	3	5		1	1.41									no	-?	?	15
36F	LIMA LIM	MU	w.w.										0.1	0.09	0.1	0.1	0.06	0.06	0.07	0.05	0.05	0.05	0.05	0.06	0.06	0.05	no	D-	no	8
15F	LIMA LIM	MU	w.w.											0.2		0.1	0.0447	0.07	0.09	0.07	0.09	0.08		0.15	0.04	0.09	no	--	no	16
22F	LIMA LIM	MU	w.w.										0.12	0.2	0.1		0.05	0.0742									no	-?	?	14
98F	LIMA LIM	MU	w.w.														0.07	0.13	0.16								no	-?	?	9
30F	PLEU PLA	LI	w.w.												5		2	2									no	-?	?	11
22F	PLEU PLA	LI	w.w.																0.5	0.9	0.3						no	-?	?	19
98F	PLEU PLA	LI	w.w.													1		1		1.74	1	2.5	1.3	1.8	0.955	0.68	no	--	no	13
10F	PLEU PLA	LI	w.w.																	6.1		8.77	6.4	2.4	1.6	2.15	no	--	no	15
30F	PLEU PLA	MU	w.w.												0.141		0.05	0.03									no	D?	?	<=5
22F	PLEU PLA	MU	w.w.																0.03	0.03	0.04						no	-?	?	7
98F	PLEU PLA	MU	w.w.													0.1		0.13		0.0548	0.04	0.07	0.07	0.04	0.0447	0.04	no	--	no	13
10F	PLEU PLA	MU	w.w.																	0.22		0.303	0.49	0.15	0.43	0.0648	no	--	no	21
67B	LEPI WHI	LI	w.w.										9	4	5	4	5	2	4.6	4	5	2.8	4.8	3.4	3.8	3.9	m	--	m	12
67B	LEPI WHI	MU	w.w.										0.09	0.07	0.1	0.1	0.03	0.04	0.03	0.07	0.03	0.04	0.05	0.03	0.04	0.04	m	--	m	14

Annual median concentration of BAP (ppb)

																											ANALYSIS			
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.												2.53			3.35	3.52	4.95	3.57	2.99	2.99	3.29	3.4	3.23	no	--	no	8
I301	MYTI EDU	SB	d.w.															4.44	19.3	18.8	6.02	13.1	2.55	9.77	3.13	3.18	no	--	no	21
I304	MYTI EDU	SB	d.w.															3.36	2.81	3.29	3.38	2.76	2.94	3.76	3.85	3.07	no	--	no	8
I306	MYTI EDU	SB	d.w.															2.99	3.07	2.87	3.05	3.07	2.96	2.94	3.36	3.52	no	U-	no	<=5
I307	MYTI EDU	SB	d.w.															2.73	3.21	2.75	2.91	3.01	3.27	3.36	4.5	3.65	no	U-	no	7
I131	MYTI EDU	SB	d.w.															3.25	2.66	2.73	3.6	5.02	2.4	3.27	2.79	3.73	no	--	no	11
I132	MYTI EDU	SB	d.w.															71.8	89	18.6	22.6	300	10.8	32.7	49.6	89.7	17.9	--	15.2	>25
I133	MYTI EDU	SB	d.w.															80.6	13.7	51.7	18.6		8.47	19	23.7	39.3	7.9	--	7.8	20
I201	MYTI EDU	SB	d.w.															93.2	207	679	10.5	83.8	47.4	31.7	188	7.23	1.4	--	no	>25
I205	MYTI EDU	SB	d.w.															7.39		23.1	64.5	7.51	5.59	7.55	33	3.16	no	--	no	>25
I913	MYTI EDU	SB	d.w.																			5.85	15.6	2.96	13.3	3.65	no	-?	?	22
I912	MYTI EDU	SB	d.w.															7.02		9.46	5.35	16.4	135	4.17	20	3.97	no	--	no	>25
I962	MYTI EDU	SB	d.w.															246	33.5		87						17.4	-?	?	>25
I965	MYTI EDU	SB	d.w.																					233	30.8	43.6	8.7	-?	?	24
I969	MYTI EDU	SB	d.w.															14.2	10.7	17.6	8.42	10.3	17.1	23.5	3.68	46.7	9.3	--	5.5	22

Annual median concentration of PK_S (ppb)

																											ANALYSIS			
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.												38.1			27.5	132	46	40	21.9	19.5	39.4	13.3	29.2	no	--	no	18
I301	MYTI EDU	SB	d.w.															125	959	197	106	183	43.4	114	50	39.9	no	--	no	22
I304	MYTI EDU	SB	d.w.															21.1	77.4	13.7	38.4	38.4	9.15	23.3	11.5	9.62	no	--	no	20
I306	MYTI EDU	SB	d.w.															22.2	172	34.8	32.8	32.2	8.88	29.6	16	10.6	no	--	no	21
I307	MYTI EDU	SB	d.w.															18.2	106	19.9	29.3	48.5	13.4	28.9	33.8	11.6	no	--	no	21
I131	MYTI EDU	SB	d.w.															70.8	50.9	35.4	63.1	60.3	40.9	29.8	17	28.4	no	--	no	13
I132	MYTI EDU	SB	d.w.															759	855	281	593	2730	258	390	787	1520	30.5	--	24.2	23
I133	MYTI EDU	SB	d.w.															1950	335	647	292		161	341	488	582	11.6	--	13.9	17
I201	MYTI EDU	SB	d.w.															768	1650	7970	284	1020	938	640		195	3.9	--	no	>25
I205	MYTI EDU	SB	d.w.															124		470	1390	205	197	190	1700	129	2.6	--	4.9	>25
I913	MYTI EDU	SB	d.w.																			111	634	89.5	419	65.3	1.3	-?	?	>25
I912	MYTI EDU	SB	d.w.															237		342	208	210	1590	72.6	427	110	2.2	--	no	25
I962	MYTI EDU	SB	d.w.															2420	479		682						13.6	-?	?	24
I965	MYTI EDU	SB	d.w.																					1330	433	476	9.5	-?	?	16
I969	MYTI EDU	SB	d.w.															221	169	230	139	287	198	171	41.1	633	12.7	--	4.8	22

Annual median concentration of P_S (ppb)

																											ANALYSIS			
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.												248			236	616	524	324	262	162	150	66	167	no	D-	no	15
I301	MYTI EDU	SB	d.w.															726	3420	2100	830	1250	571	795	412	250	no	--	no	18
I304	MYTI EDU	SB	d.w.															103	256	208	267	405	77.1	201	66.5	82.5	no	--	no	17
I306	MYTI EDU	SB	d.w.															100	507	228	205	296	73.1	139	146	59.6	no	--	no	19
I307	MYTI EDU	SB	d.w.															83.7	275	177	182	421	82.4	168	279	79.8	no	--	no	19
I131	MYTI EDU	SB	d.w.															207	255	191	265	360	282	118	133	214	no	--	no	13
I132	MYTI EDU	SB	d.w.															2760	2810	1390	1730	7270	1380	1170	1920	2790	11.1	--	7.2	19
I133	MYTI EDU	SB	d.w.															5690	1770	1960	1150		1080	964	1440	1260	5.1	DY	4.8	12
I201	MYTI EDU	SB	d.w.															2660	5210	17100	861	3720	2560	1300		615	2.5	--	no	24
I205	MYTI EDU	SB	d.w.															614		1770	3540	891	658	509		444	1.8	--	no	19
I913	MYTI EDU	SB	d.w.																			621	2490	657	2250	190	no	-?	?	>25
I912	MYTI EDU	SB	d.w.															1100		1530	963	1970	7300	832	2220	280	1.1	--	no	23
I962	MYTI EDU	SB	d.w.															6340	1690		1850						7.4	-?	?	20
I965	MYTI EDU	SB	d.w.																					3200	854	1480	5.9	-?	?	21
I969	MYTI EDU	SB	d.w.															1060	986	747	629	917	1160	824	170	2550	10.2	--	4.1	22

Annual median concentration of TBT (ppm)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30A	MYTI EDU	SB	d.w.																	2.71	1.51	1.47	0.935	0.802	1.81	1.08	m	--	m	13
36A	MYTI EDU	SB	d.w.																	0.0336	0.179	0.217	0.0831	0.0591	0.0792	0.103	m	--	m	20
71A	MYTI EDU	SB	d.w.																	1.02				0.431	0.702	0.375	m	-?	m	12
76A	MYTI EDU	SB	d.w.																	0.188				0.0529	0.092	0.106	m	-?	m	16
15A	MYTI EDU	SB	d.w.																					0.098	0.0811	0.0622	m	-?	m	<=5
227X	MYTI EDU	SB	d.w.																				0.375	0.417	0.672	0.709	m	-?	m	7
22A	MYTI EDU	SB	d.w.																					0.17	0.138	0.587	m	-?	m	19
98A	MYTI EDU	SB	d.w.																					0.108	0.105	0.114	m	-?	m	<=5
10A	MYTI EDU	SB	d.w.																					0.0224	0.0123	0.0067	m	D?	m	<=5

Annual median concentration of TBT (ppm)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
36G	NUCE LAP	SB	d.w.																	0.105	0.203	0.142	0.0951	0.0496	0.155	0.0846	m	--	m	16
71G	NUCE LAP	SB	d.w.																					0.133	0.344	0.235	m	-?	m	17
227G	NUCE LAP	SB	d.w.																	0.0891	0.625	0.267	0.387	0.135	0.446	0.878	m	--	m	22

Annual median VDSI

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
36G	NUCE LAP	SB												4.1		3.9				4	4	4	4	3.95	4	3.96	m	--	m	<5
227G	NUCE LAP	SB												4.47						4	4.1	4.09	4.5	4.3	4.5	4.12	m	--	m	<5

Annual median concentration of PYR1O (µG/KG/ABS 380 NM)

Cursive values in shaded area indicate earlier and not comparable method. These values are disregarded in temporal trend analysis

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR	BI	w.w.																		*115*	*130*	12.3	17	29.2	20.3	m	-?	m	12
15B	GADU MOR	BI	w.w.																		*3770*	*253*		29.7	6.32	5.66	m	-?	m	18
53B	GADU MOR	BI	w.w.																		*83*	*58.6*	9.23	3.81	18.8	3.65	m	-?	m	24
23B	GADU MOR	BI	w.w.																		*12.7*	*11.2*	4.15	2.55	3.1	5.32	m	-?	m	13

Annual median concentration of ALAD (NG PBG/MIN/MG PROT)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR	BL	w.w.																	8.98	15.6	13	14.6	12.7	10.4	6.91	m	--	m	10
36B	GADU MOR	BL	w.w.																	13	26.2	9.93	22	19.4			m	-?	m	15
15B	GADU MOR	BL	w.w.																	17.2	23.4	8.45		18.9			m	-?	m	17
53B	GADU MOR	BL	w.w.																	7.64	10.1	11.1	12.7	10	6.44	9.32	m	--	m	10
67B	GADU MOR	BL	w.w.																	7.17	28.2	16.9	22.4	19			m	-?	m	16
23B	GADU MOR	BL	w.w.																	15.8	24.8	18.1	19.8	24	19.4	16.8	m	--	m	9

Annual median concentration of EROD (PMIN/MIN/MG PROT)

																												ANALYSIS		
St	Species	Tsu	Base	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	OC	TRD	SM3	PWR
30B	GADU MOR	LI	w.w.																	68.8	109	70	260	81.2	158	88.3	m	--	m	16
36B	GADU MOR	LI	w.w.																	95.1	11.4	60.2	64.9	76.2			m	-?	m	24
15B	GADU MOR	LI	w.w.																	49.9	52.3	184		61			m	-?	m	20
53B	GADU MOR	LI	w.w.																	86.5	119	90.1	128	34.7	93.9	11.7	m	--	m	19
67B	GADU MOR	LI	w.w.																	103	76.2	84.6	103	72.9			m	-?	m	9
23B	GADU MOR	LI	w.w.																	94.1	28.6	70.1	73.5	76.5	103	41.9	m	--	m	17

Appendix I
Geographical distribution of contaminants and biomarkers in biota 2002-2003

Sorted by contaminant and species:

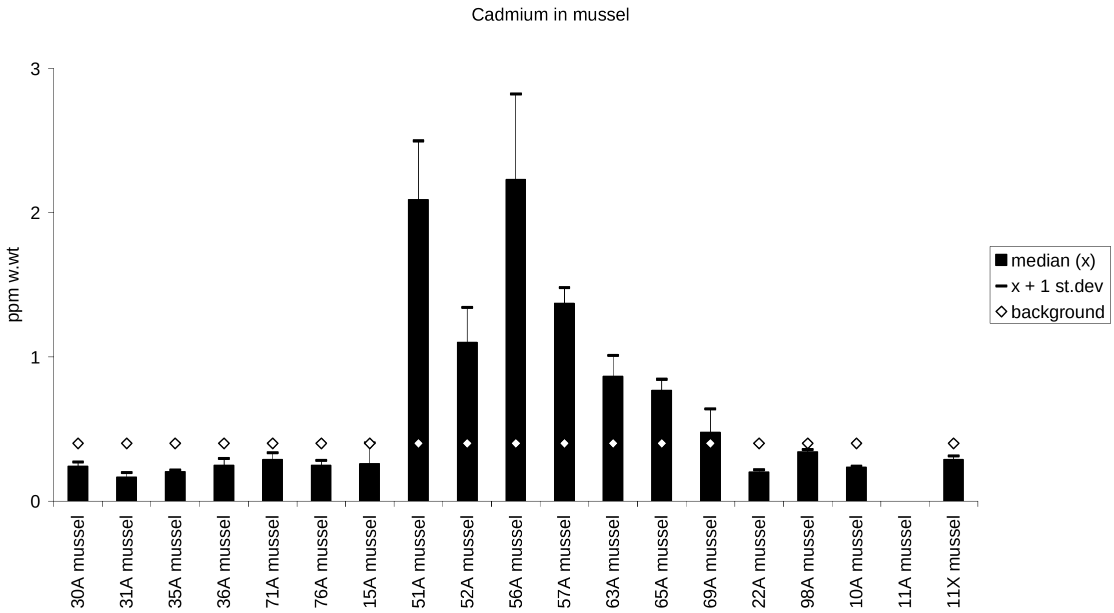
Cadmium (Cd)
Mercury (Hg)
Lead (Pb)
Sum of 7 CBs (CB-28, -52, 101, -118, -138, -153 and -180)
DDEPP (ppDDE)
HCB
CB77
CB126
CB169
TCDDN
TBT
OH-pyrene
ALA-D (δ-amino levulinic acid dehydrase inhibition)
EROD (Cytochrome P4501A-activity)
MT (Metallothionein)

MYTI EDU - Blue Mussel (*Mytilus edulis***)**
GADU MOR - Atlantic cod (*Gadus morhua***)**
PLAT FLE - Flounder (*Platichthys flesus***)**
LIMA LIM - Dab (*Limanda limanda***)**
PLEU PLA - Plaice (*Pleuronectes platessa***)**
MICR KIT - Lemon sole (*Microstomus kitt***)**
LEPI WHI - Megrim (*Lepidorhombus whiff-iagonis***)**

Station positions are shown on maps in Appendix F

Appendix I
Geographical distribution of contaminants and biomarkers in biota 2002-2003
(cont.)

A



B

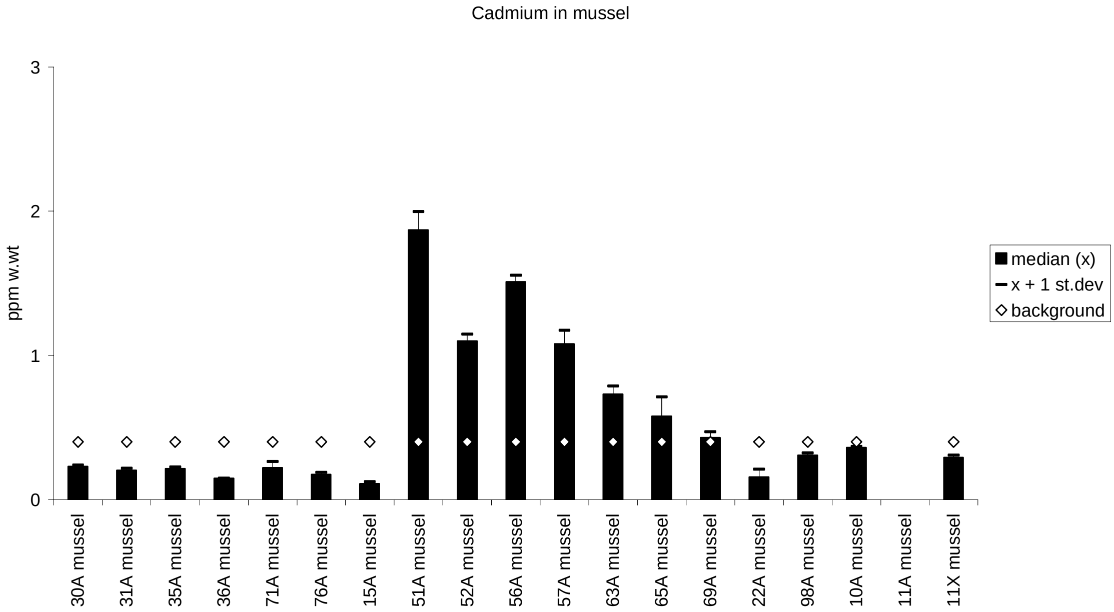


Figure 21. Median, standard deviation and provisional "high background" concentration for cadmium in mussels (*Mytilus edulis*) 2002 (**A**) and 2003 (**B**), ppm (mg/kg) wet weight (see maps in Appendix F).

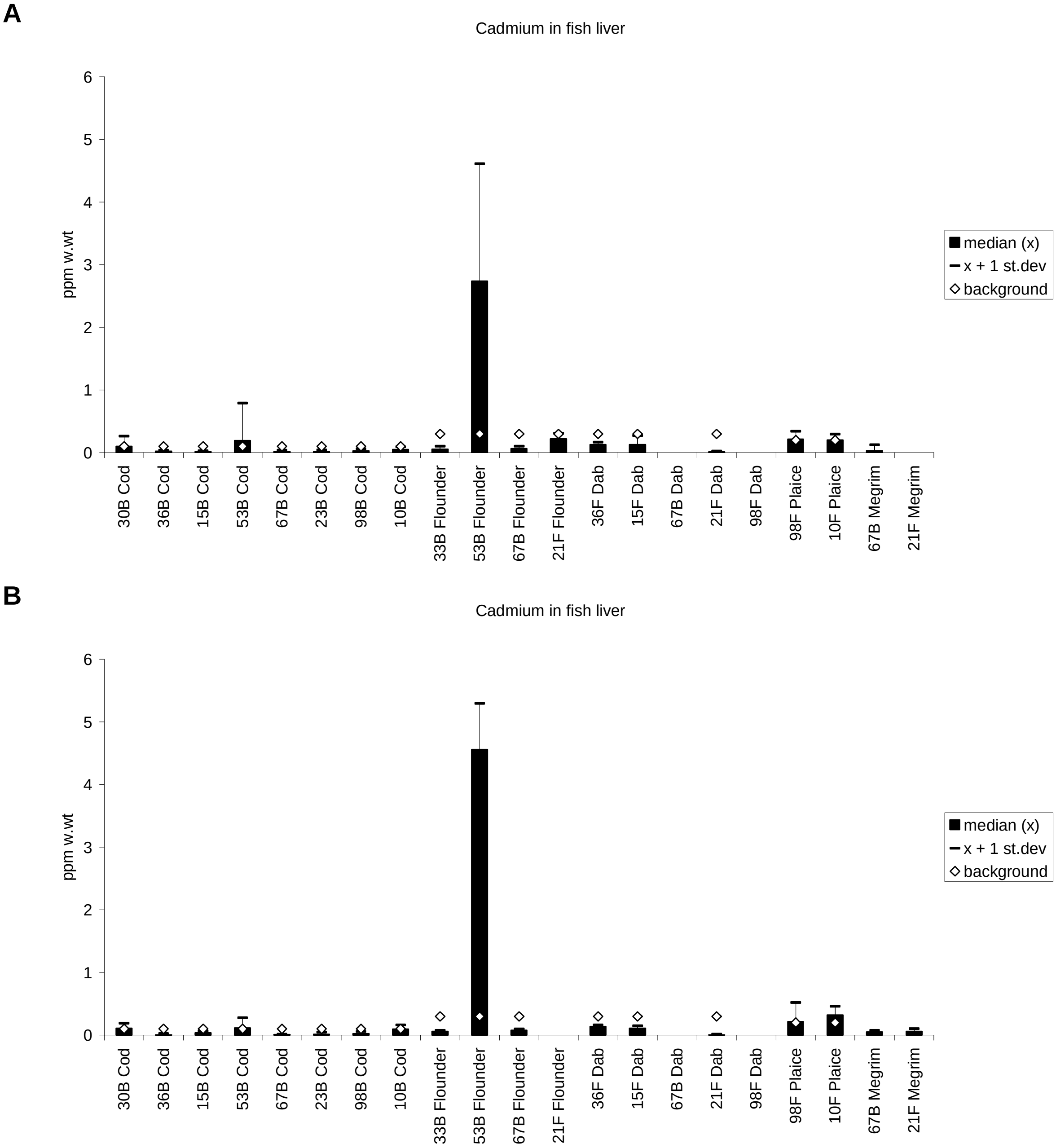


Figure 22. Median, standard deviation and provisional "high background" concentration for cadmium in fish liver 2002 (**A**) and 2003 (**B**), ppm (mg/kg) wet weight (see maps in Appendix F).

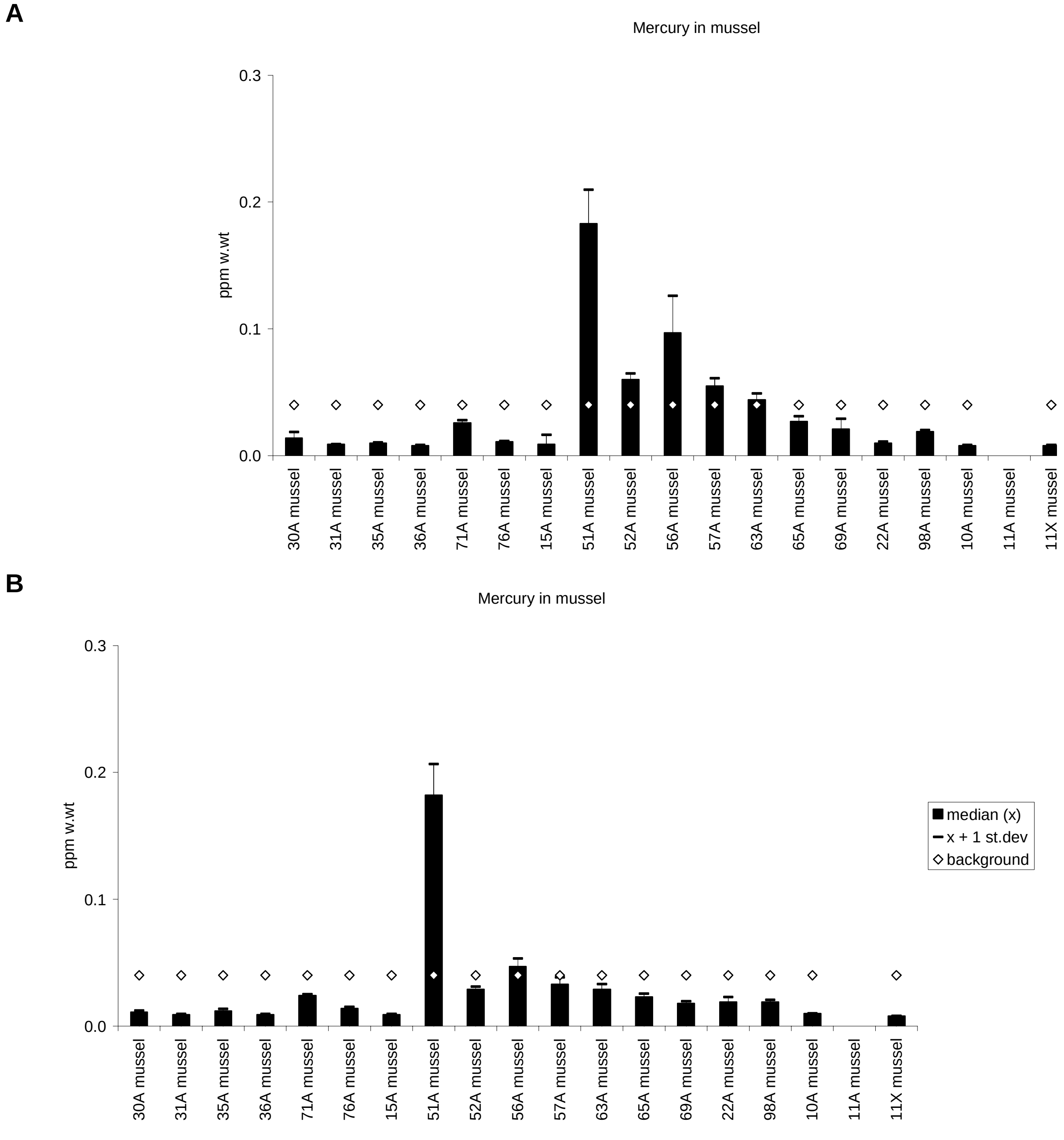
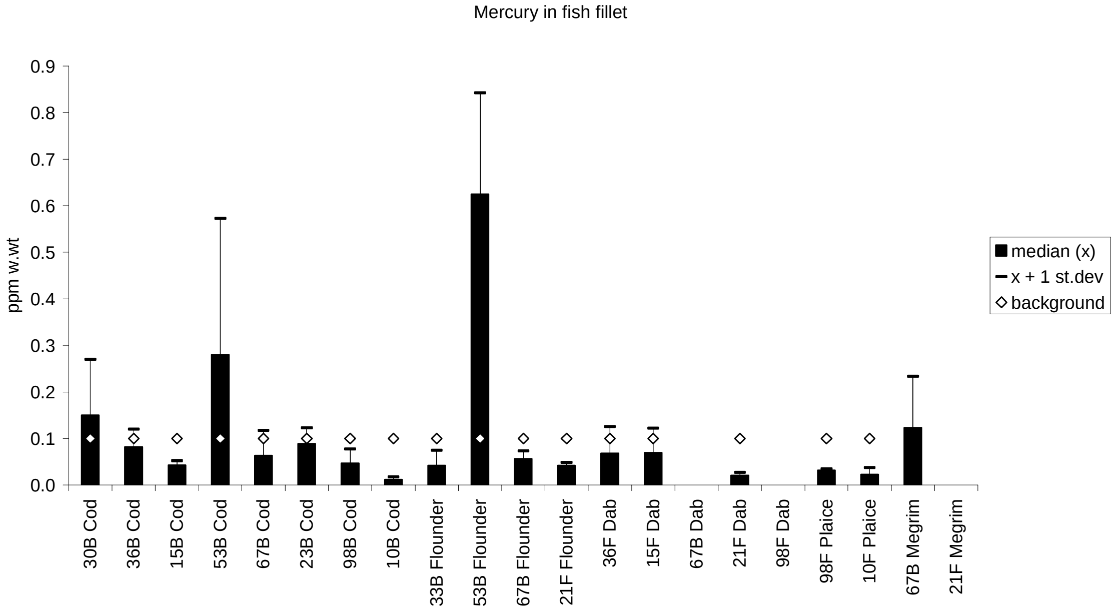


Figure 23. Median, standard deviation and provisional "high background" concentration for mercury in mussels (*Mytilus edulis*) 2002 (**A**) and 2003 (**B**), ppm (mg/kg) wet weight (see maps in Appendix F).

A



B

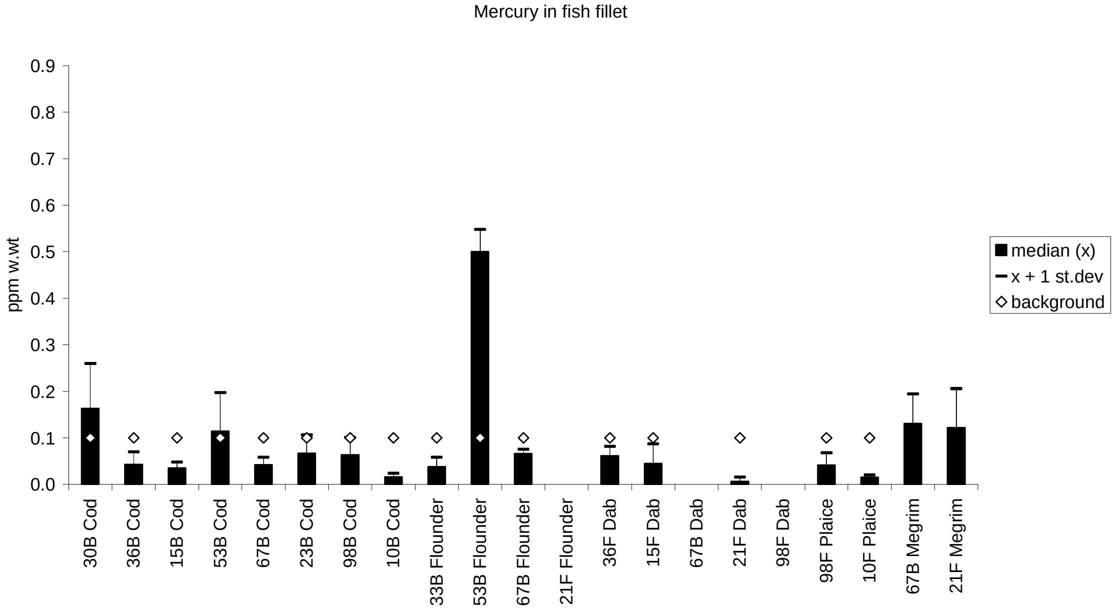


Figure 24. Median, standard deviation and provisional "high background" concentration for mercury in fish fillet 2002 (**A**) and 2003 (**B**), ppm (mg/kg) wet weight (see maps in Appendix F).

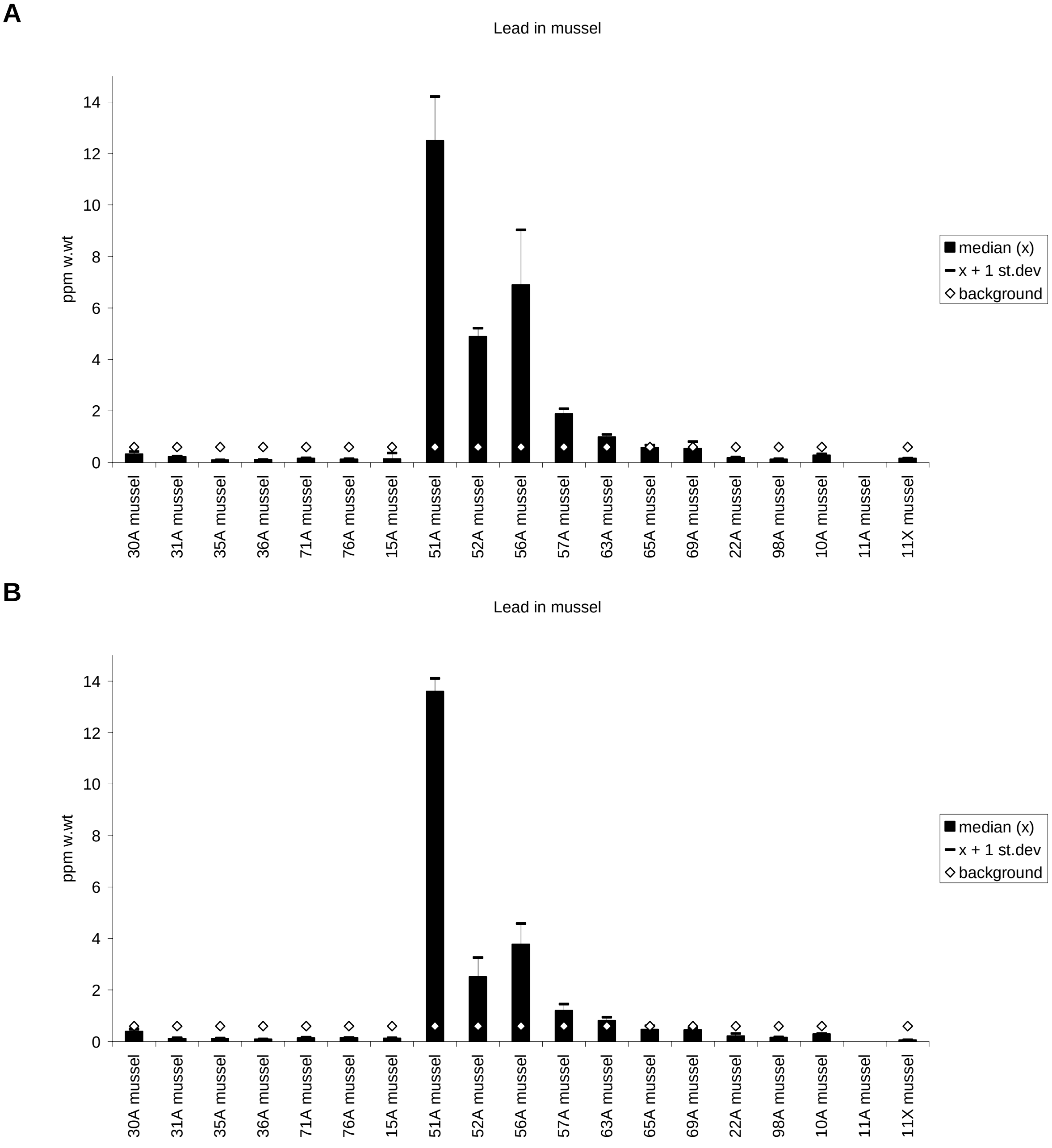


Figure 25. Median, standard deviation and provisional "high background" concentration for lead in mussels (*Mytilus edulis*) 2002 (**A**) and 2003 (**B**), ppm (mg/kg) wet weight (see maps in Appendix F).

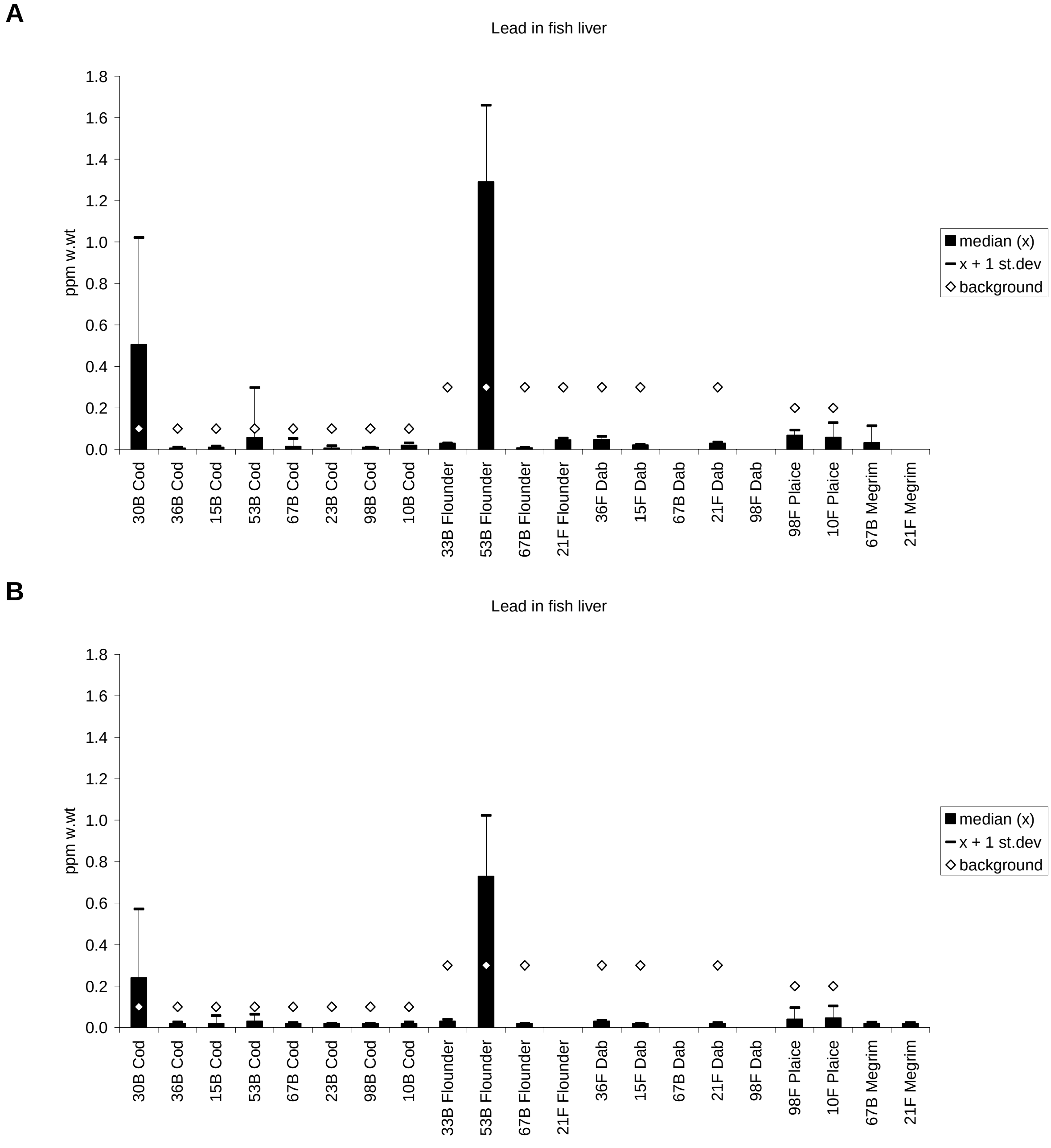


Figure 26. Median, standard deviation and provisional "high background" concentration for lead in fish liver 2002 (**A**) and 2003 (**B**), ppm (mg/kg) wet weight (see maps in Appendix F).

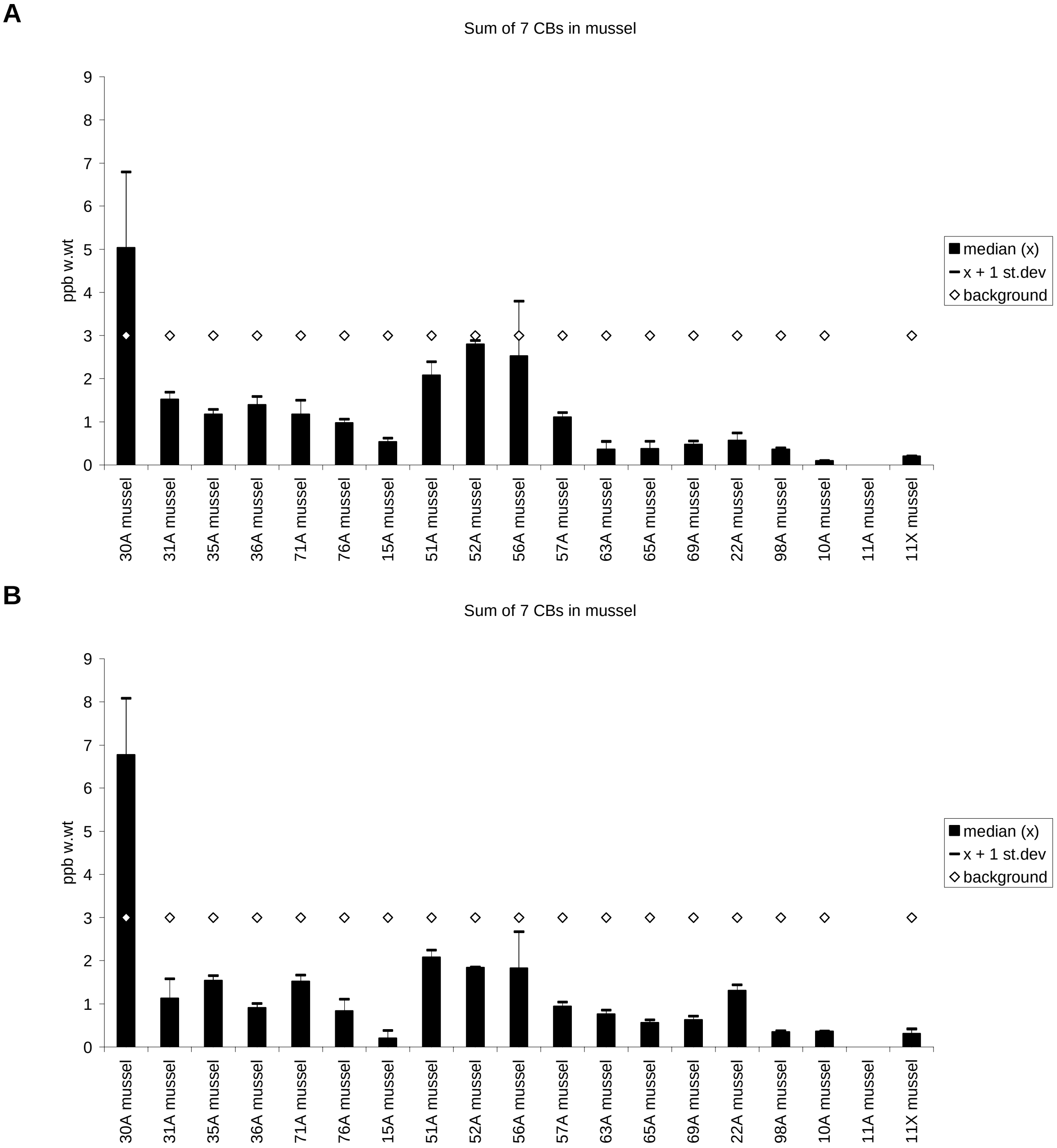
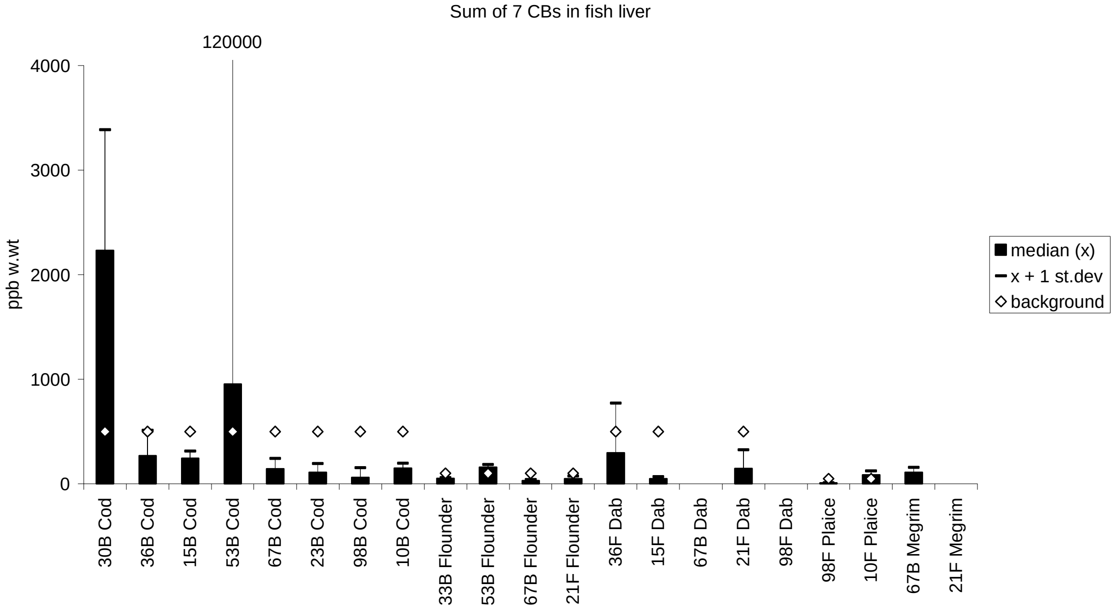


Figure 27. Median, standard deviation and provisional "high background" concentration for sum of 7 PCBs (CB-28, -52, 101, -118, -138, -153 and -180) in mussels (*Mytilus edulis*) 2002 (**A**) and 2003 (**B**), ppb (µg/kg) wet weight (see maps in Appendix F).

A



B

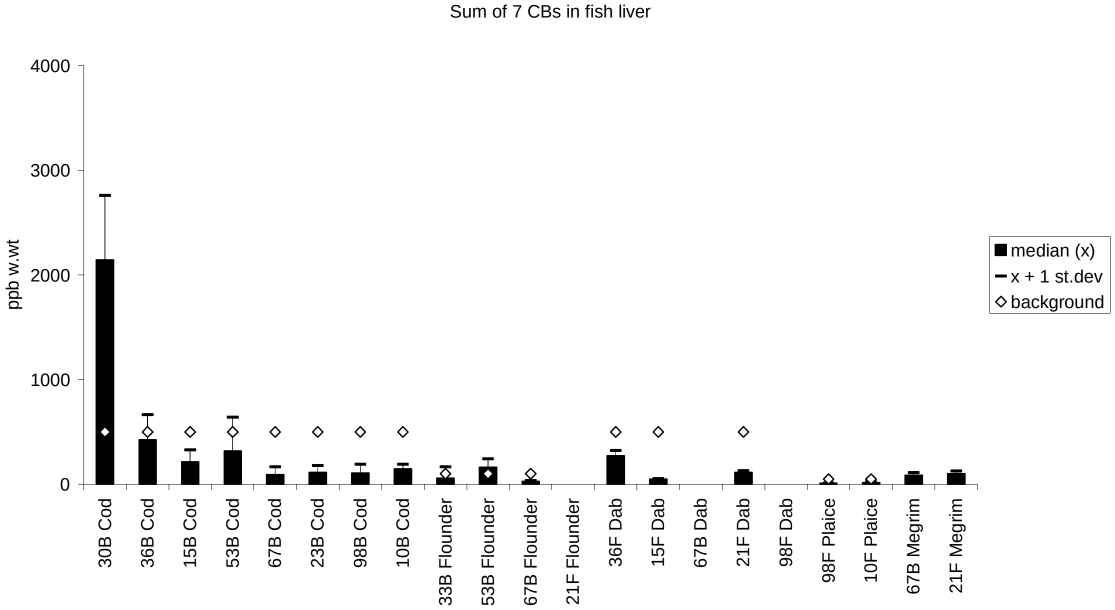


Figure 28. Median, standard deviation and provisional "high background" concentration for sum of 7 PCBs (CB-28, -52, 101, -118, -138, -153 and -180) in fish liver 2002 (**A**) and 2003 (**B**), ppb (µg/kg) wet weight (see maps in Appendix F).

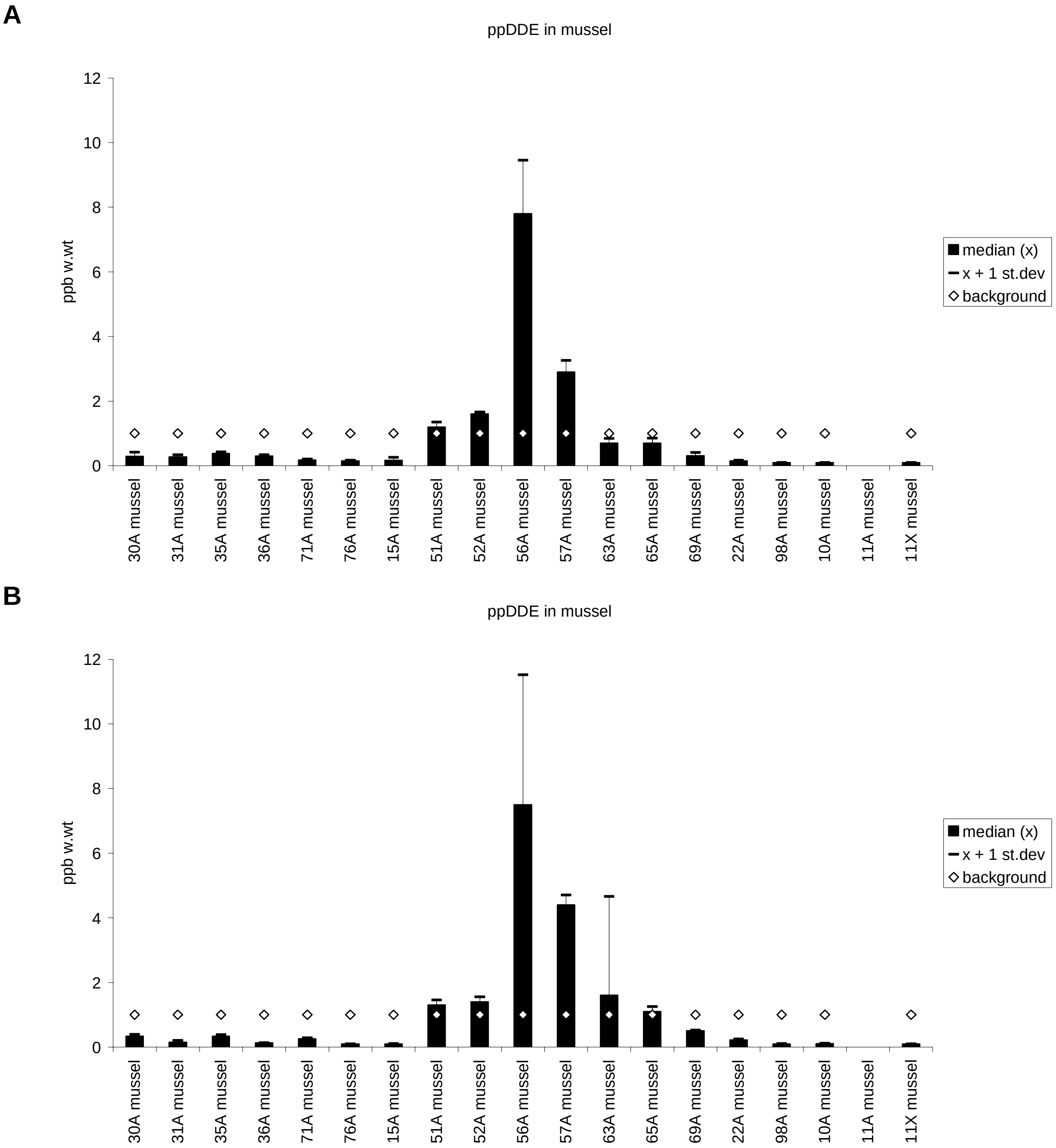


Figure 29. Median, standard deviation and provisional "high background" concentration for ppDDE (DDEPP) in mussels (*Mytilus edulis*) 2002 (**A**) and 2003 (**B**), ppb (µg/kg) wet weight (see maps in Appendix F). (See also footnote in Table 6).

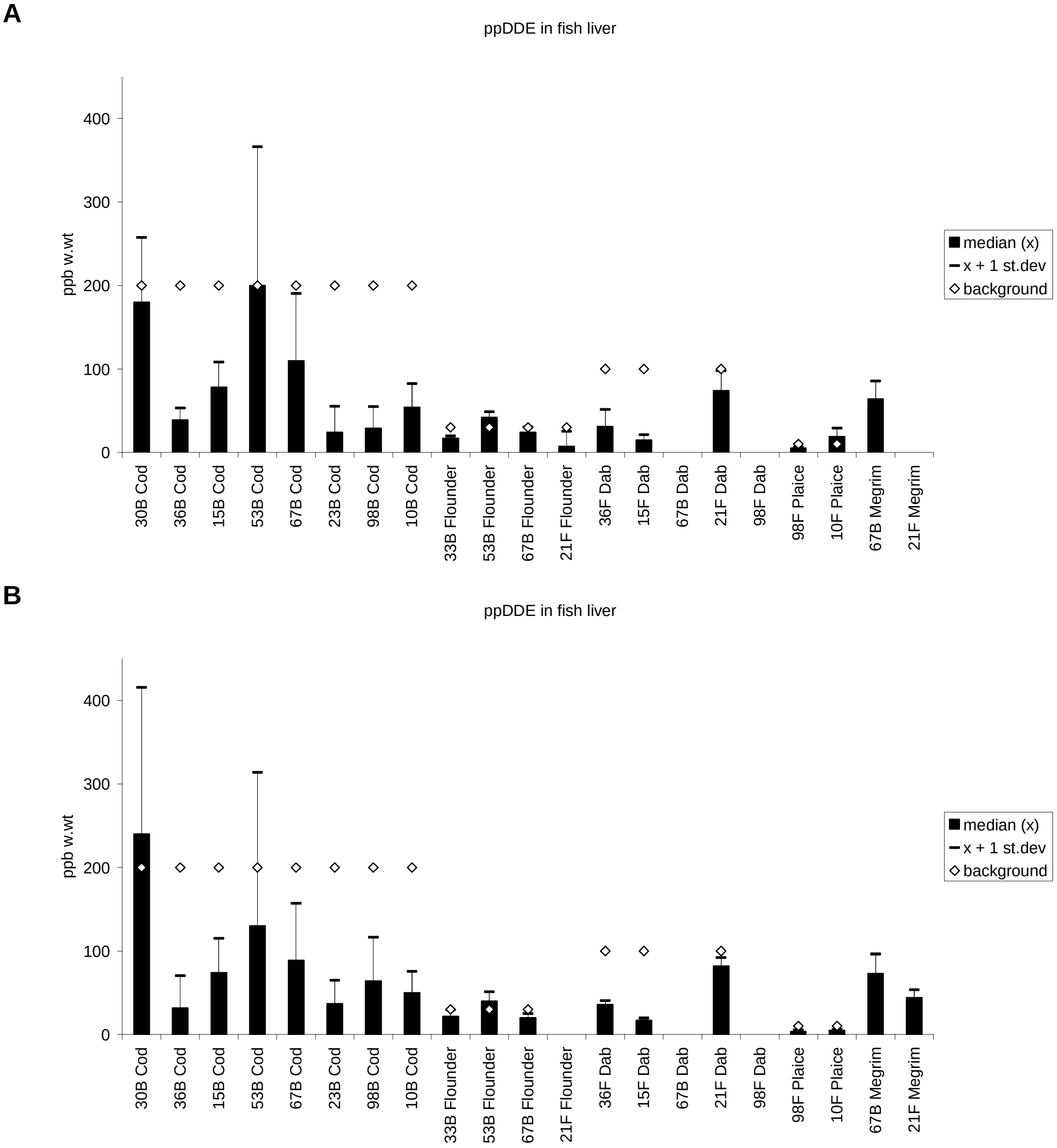


Figure 30. Median, standard deviation and provisional "high background" concentration for ppDDE (DDEPP) in fish liver 2002 (**A**) and 2003 (**B**), ppb (µg/kg) wet weight (see maps in Appendix F). (See also footnote in Table 6).

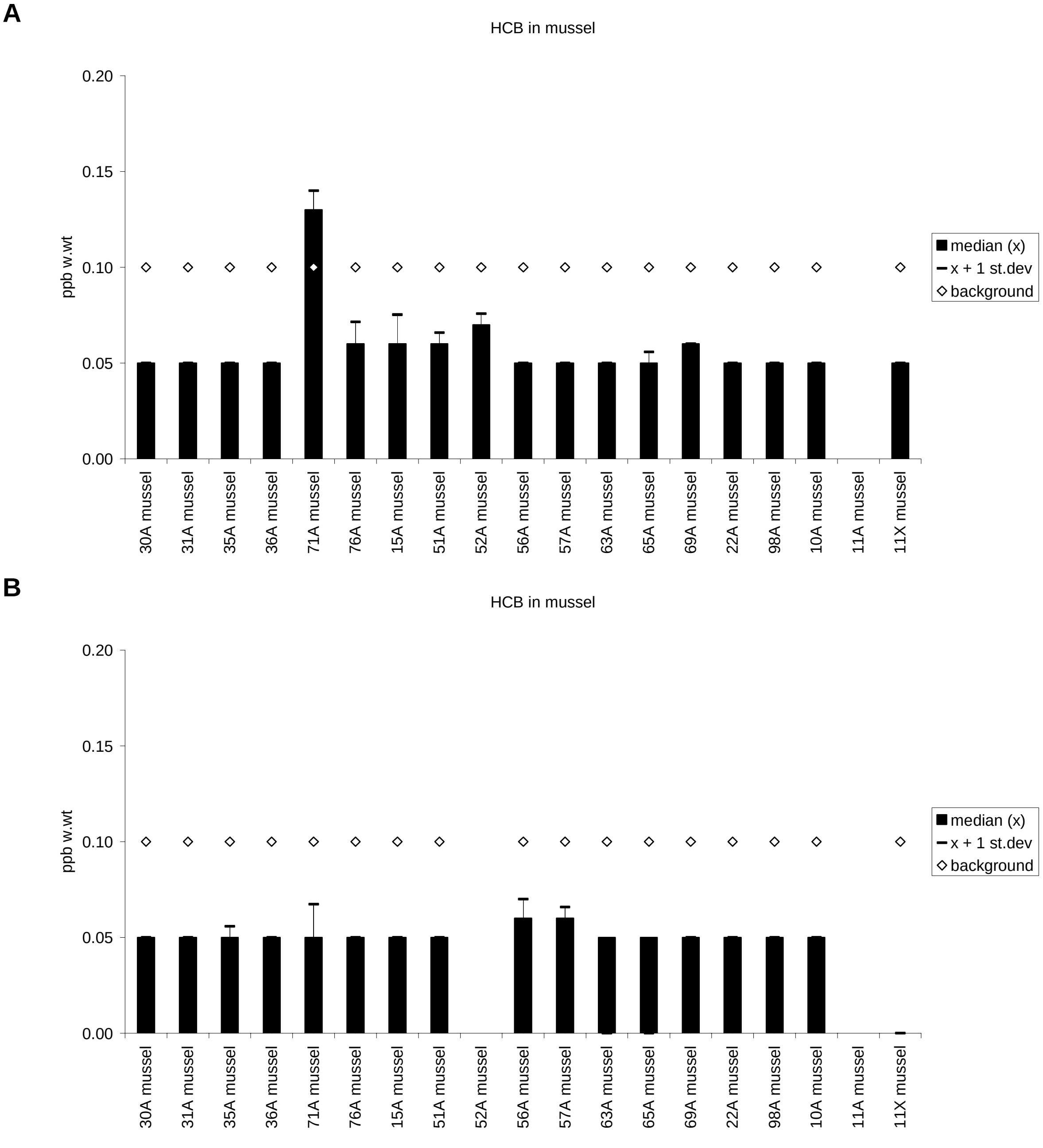
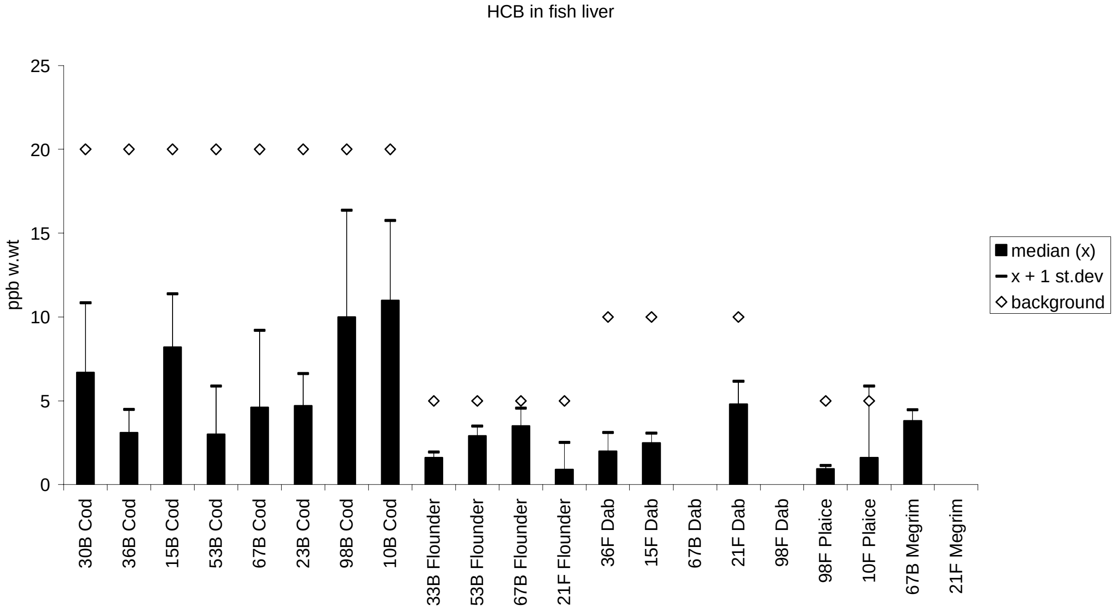


Figure 31. Median, standard deviation and provisional "high background" concentration for HCB in mussels (*Mytilus edulis*) 2002 (**A**) and 2003 (**B**), ppb (µg/kg) wet weight (see maps in Appendix F).

A



B

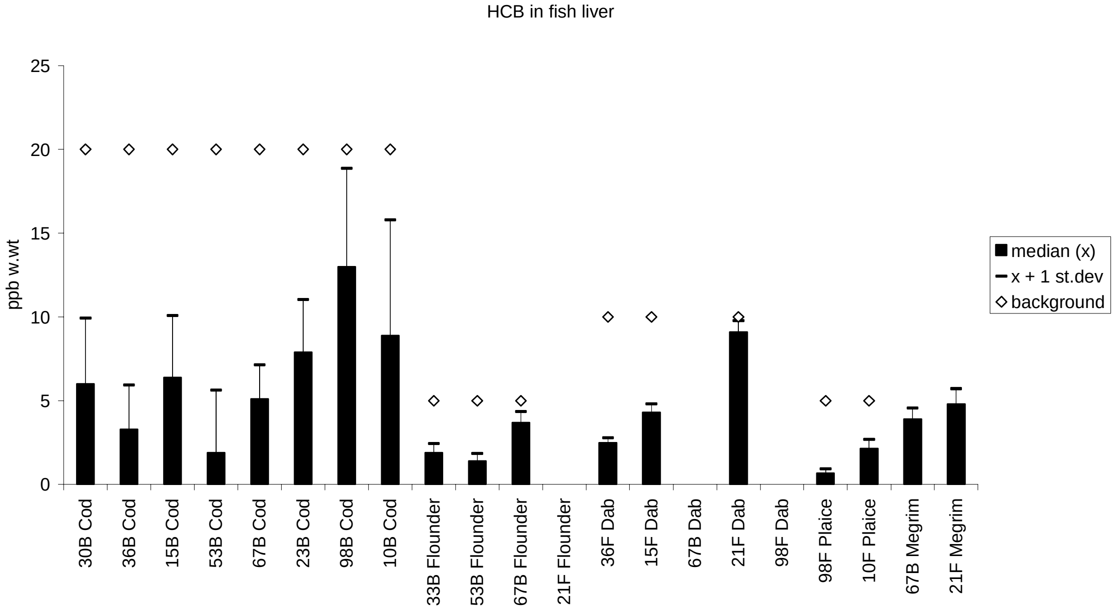


Figure 32. Median, standard deviation and provisional "high background" concentration for HCB in fish liver 2002 (**A**) and 2003 (**B**), ppb (µg/kg) wet weight (see maps in Appendix F).

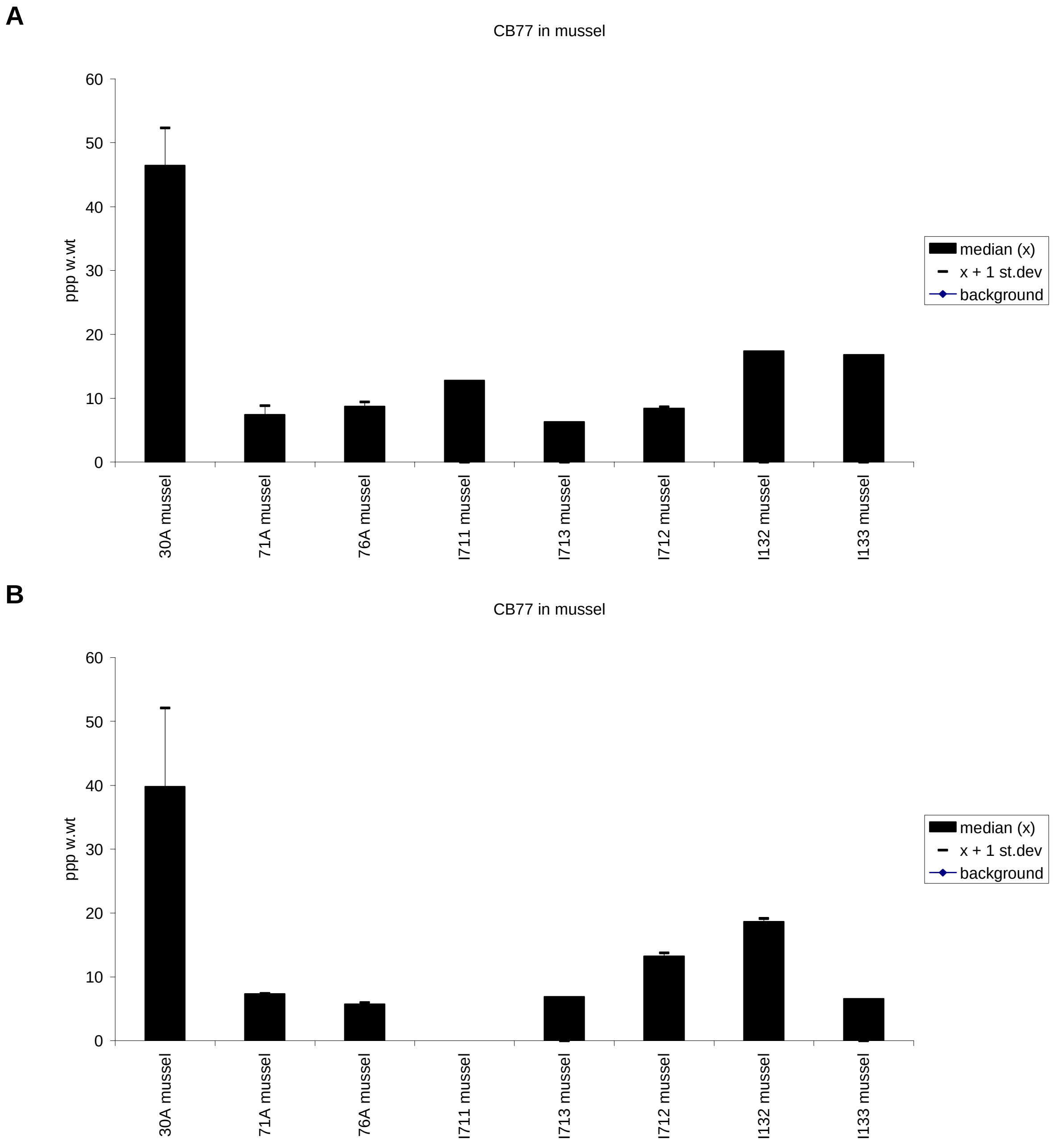


Figure 33. Median and standard deviation concentration for non-ortho co-planar PCB CB77 in mussels 2002 (**A**) and 2003 (**B**), ppp (ng/kg) wet weight (see maps in Appendix F).

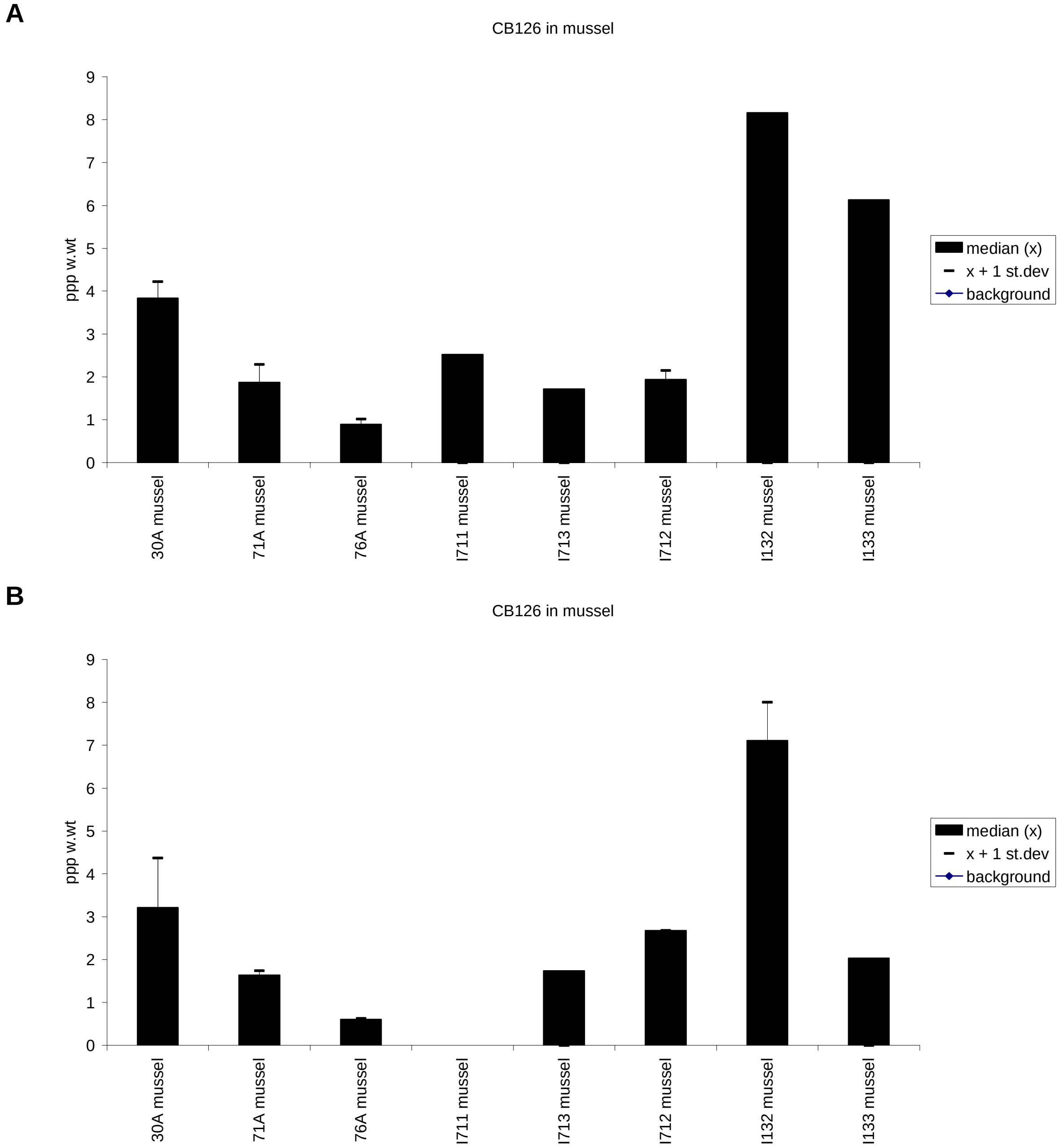


Figure 34. Median and standard deviation concentration for non-ortho co-planar PCB CB126 in mussels 2002 (**A**) and 2003 (**B**), ppp (ng/kg) wet weight (see maps in Appendix F).

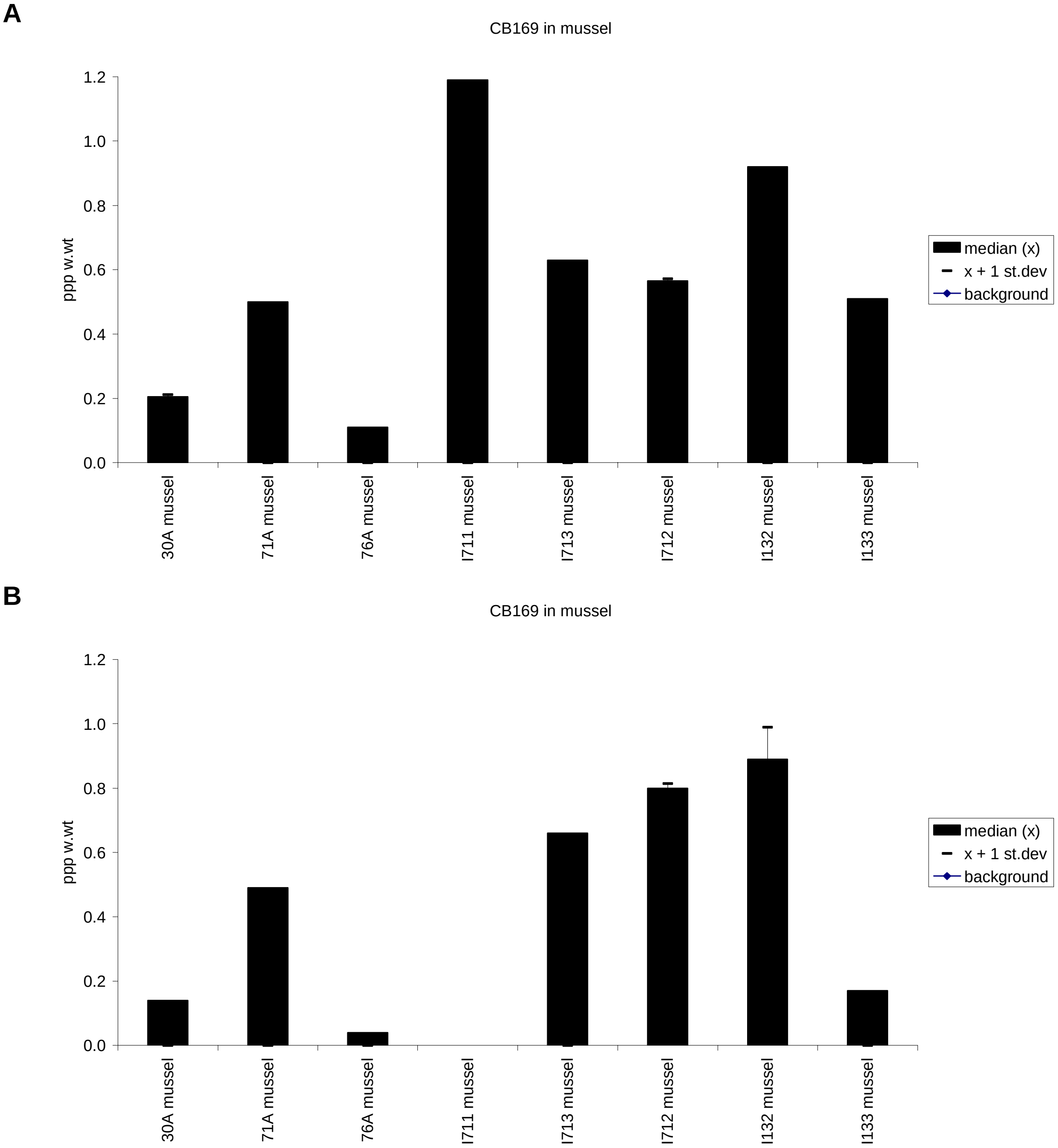


Figure 35. Median and standard deviation concentration for non-ortho co-planar PCB CB69 in mussels 2002 (**A**) and 2003 (**B**), ppp (ng/kg) wet weight (see maps in Appendix F).

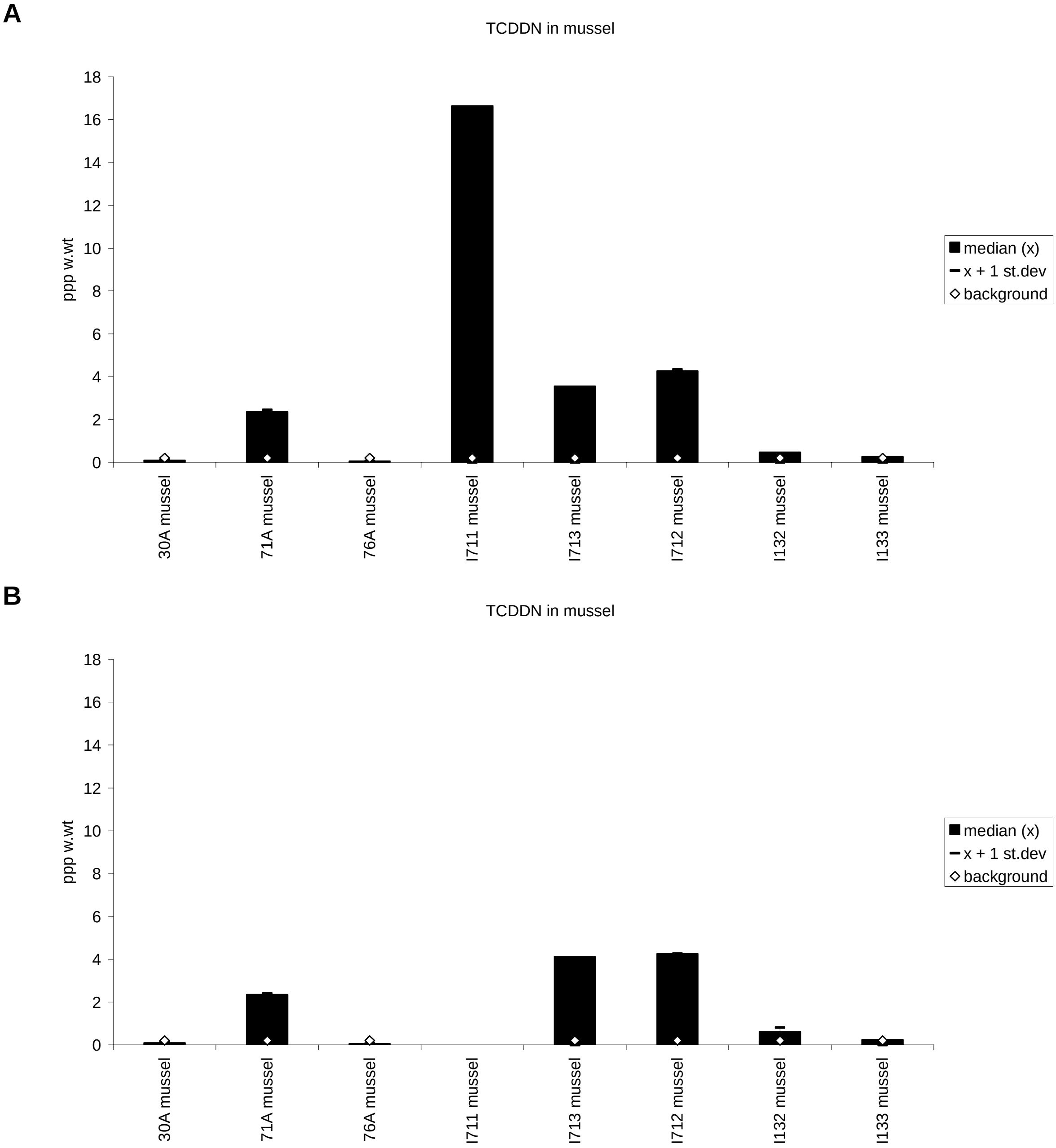


Figure 36. Median, standard deviation and provisional "high background" concentration for dioxin TCDD-toxicity equivalents after nordic model (TCDDN) in mussels 2002 (**A**) and 2003 (**B**), ppp (ng/kg) wet weight (see maps in Appendix F). NB: TCDDN is a sum of specific dioxin compounds of which may be of uncertain quantification.

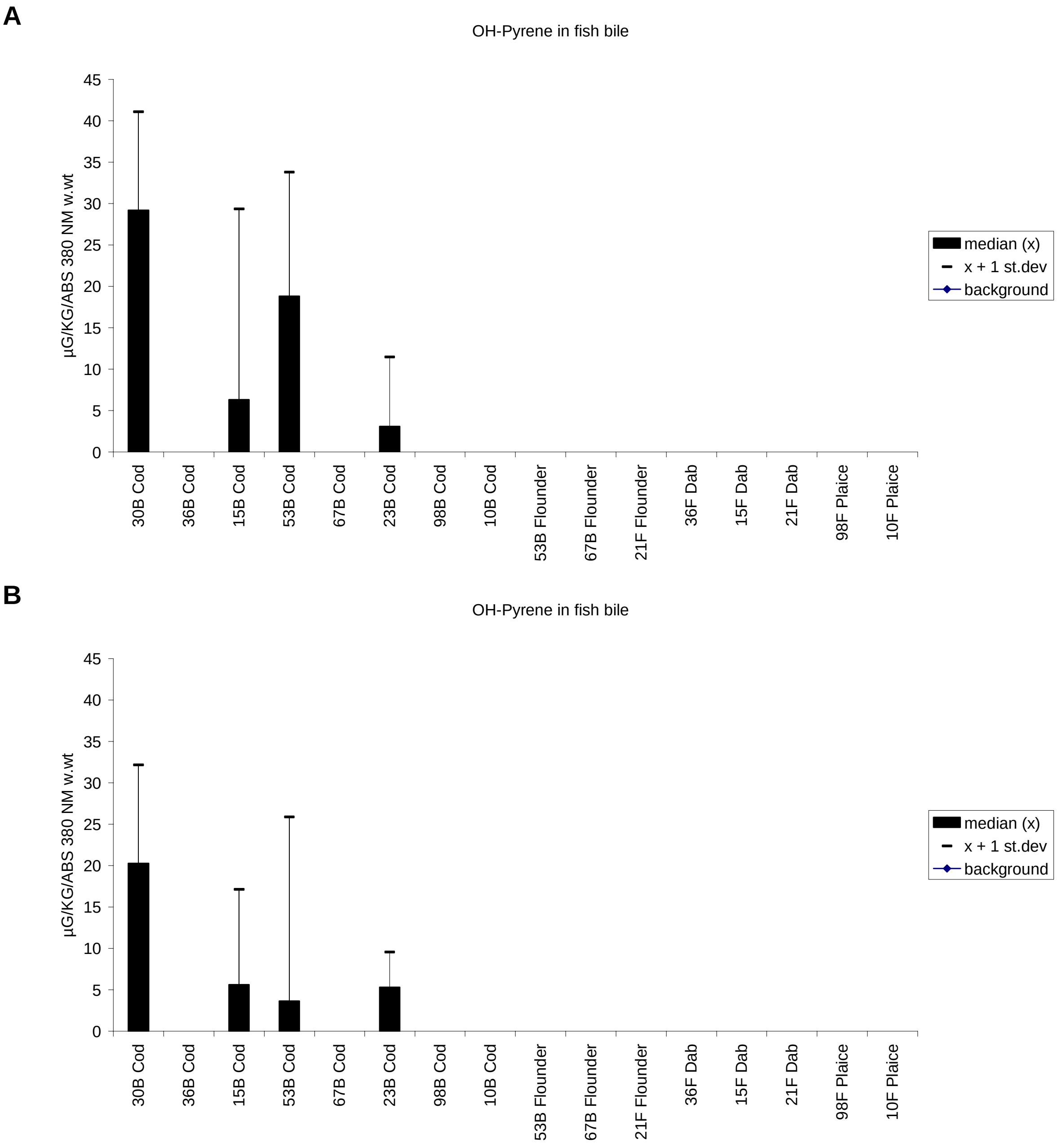
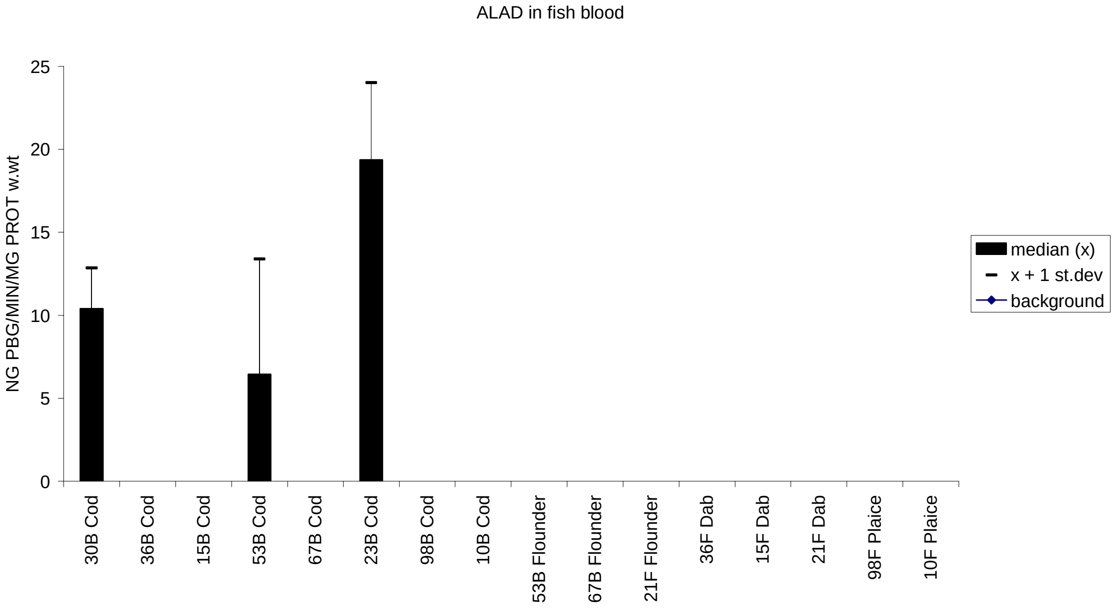


Figure 37. Median and standard deviation concentration for OH-pyrene (Pyrene metabolite) in fish bile 2002 (**A**) and 2003 (**B**), µg/kg/ABS (absorbance) 380 nm (see maps in Appendix F).

A



B

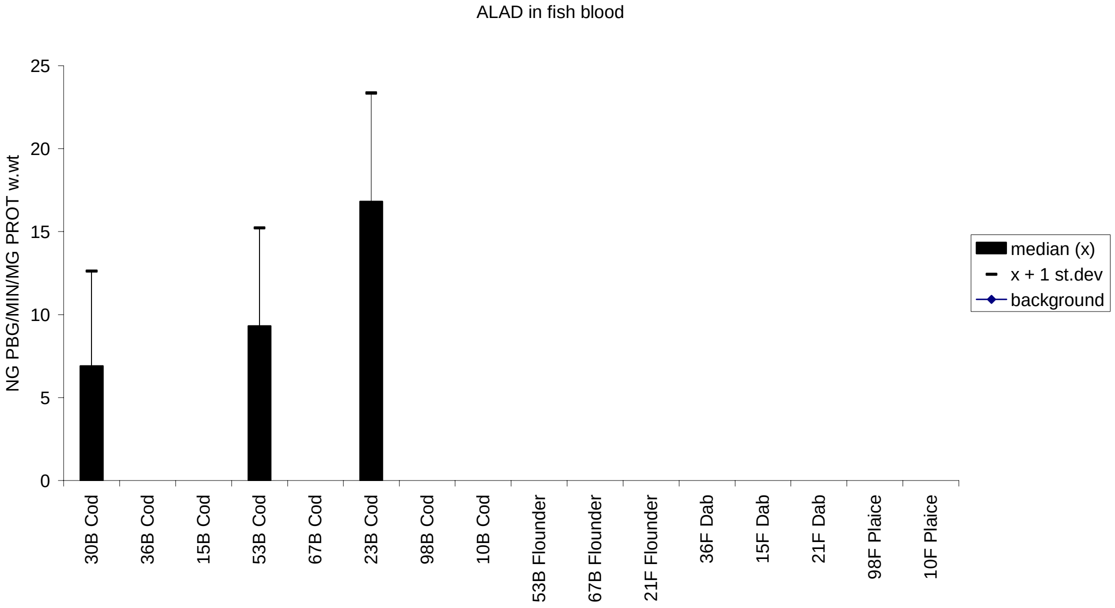
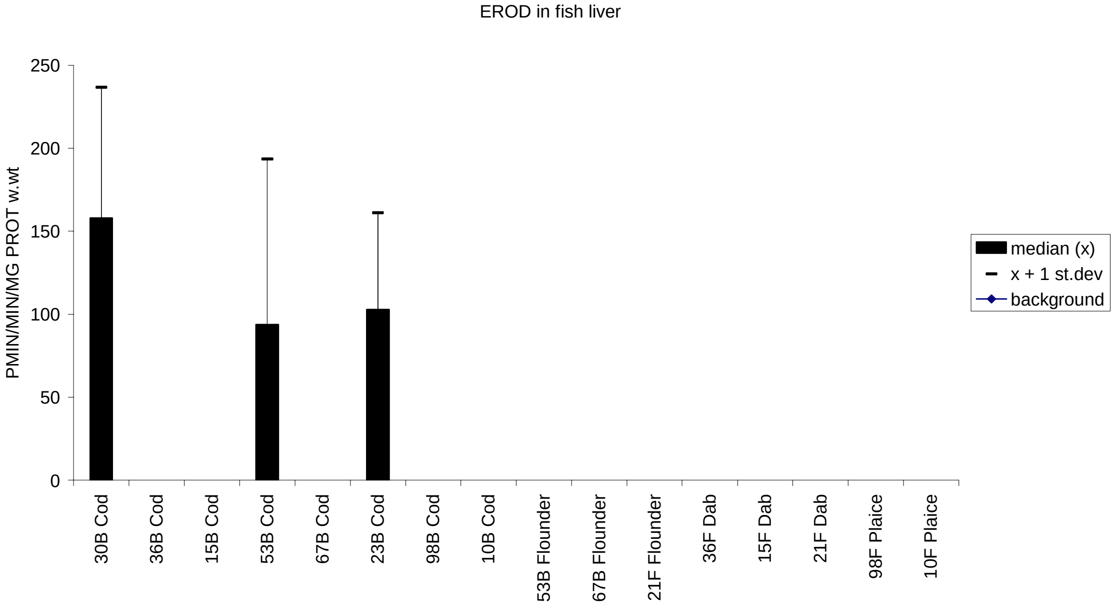


Figure 38. Median and standard deviation activity for ALA-D (δ-amino levulinic acid dehydrase inhibition) in fish liver 2002 (**A**) and 2003 (**B**), ng PBG (porphobilinogen)/min/mg protein (see maps in Appendix F).

A



B

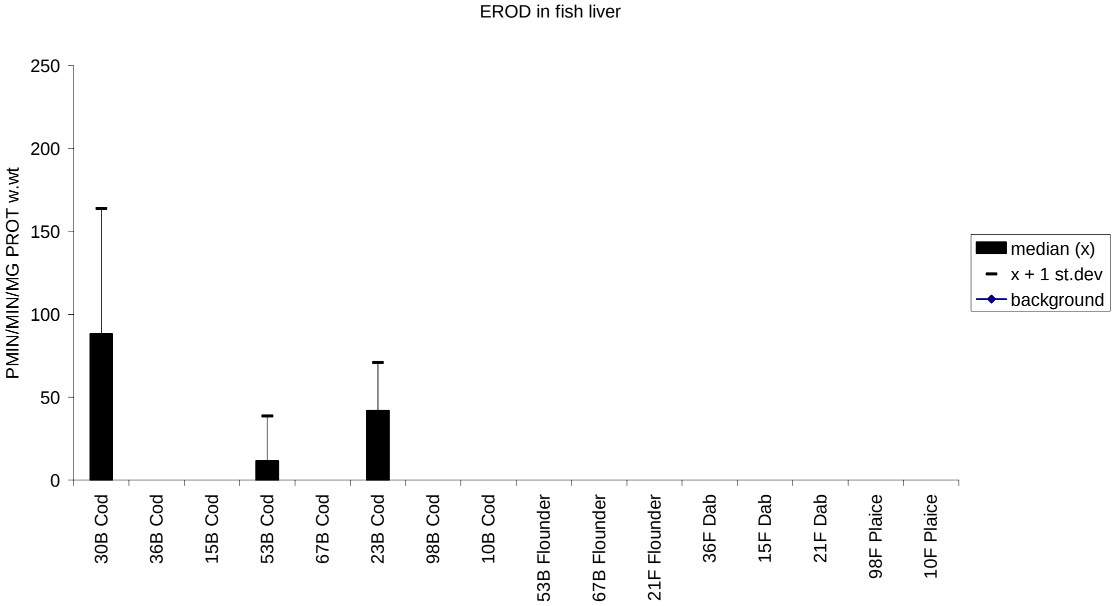


Figure 39. Median and standard deviation activity for EROD (Cytochrome P4501A-activity) in fish liver 2002 (**A**) and 2003 (**B**), pmol/min/mg protein (see maps in Appendix F).

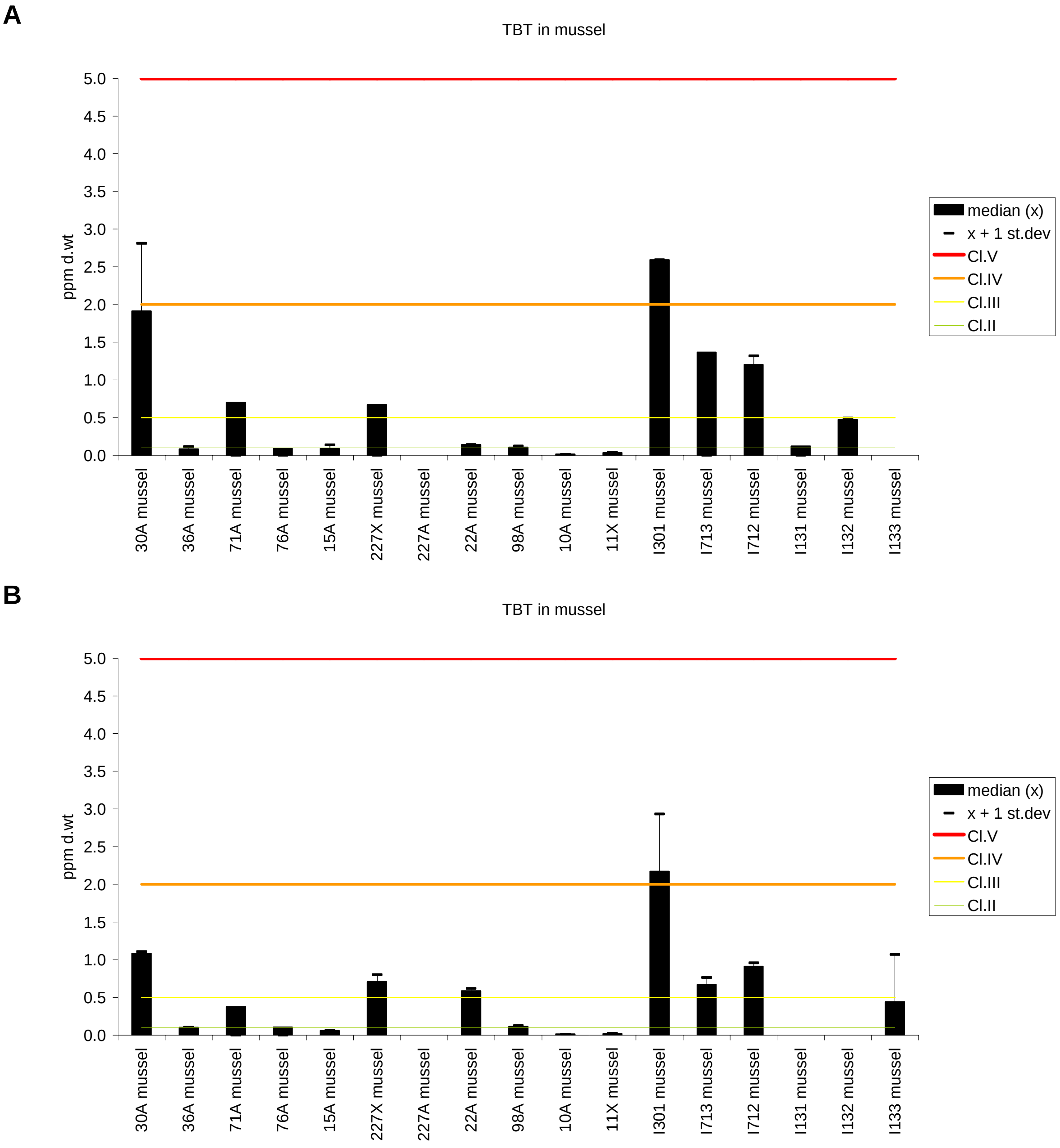


Figure 40. Median, standard deviation and provisional "high background" concentration for tributyl tin (TBT-concentration on a formulation basis) in dogwhelks 2002 (**A**) and 2003 (**B**), ppm (2.44* mg Sn/kg) dry weight (see maps in Appendix F).

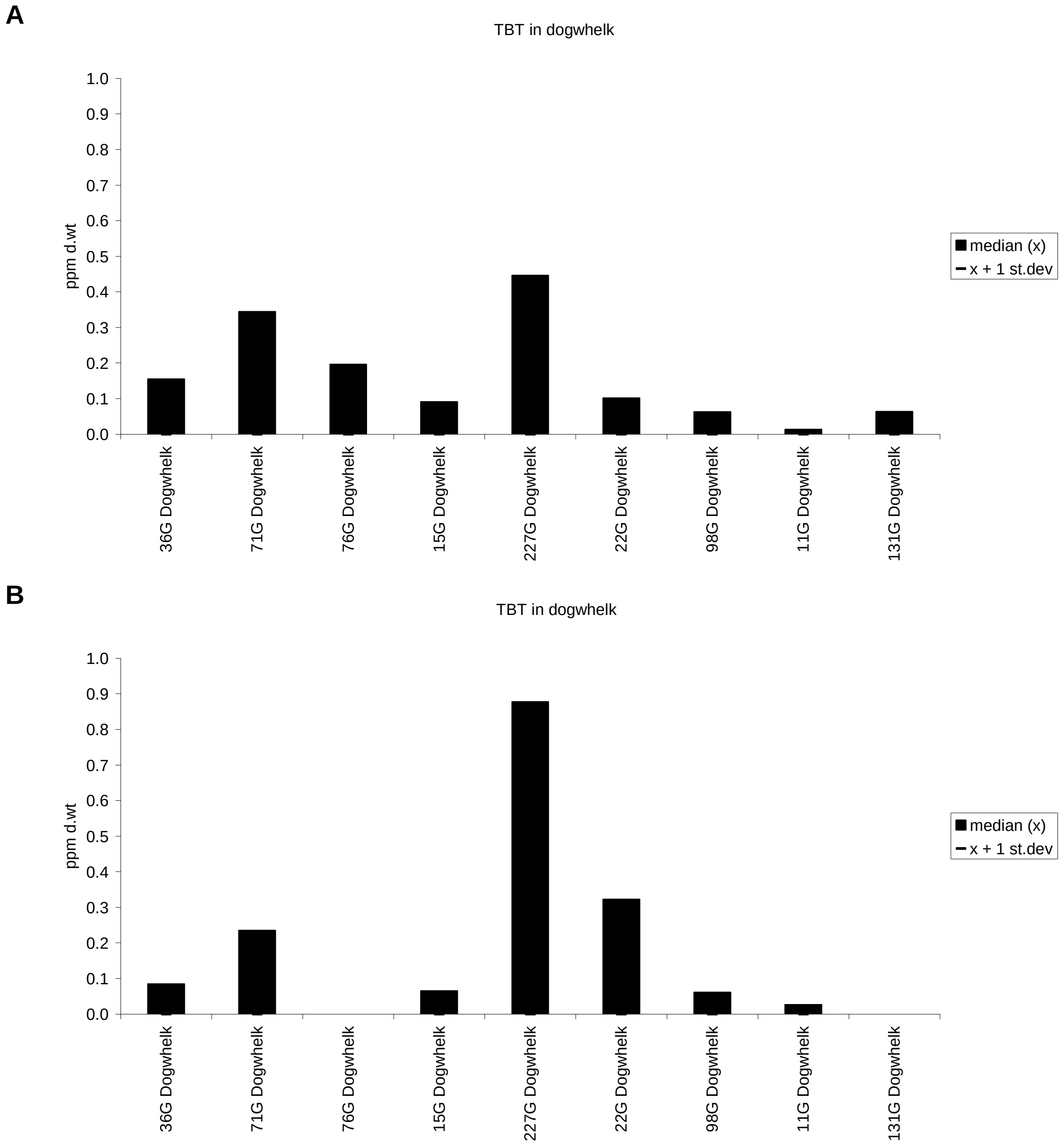


Figure 41. Median, standard deviation and provisional "high background" concentration for tributyl tin (TBT-concentration on a formulation basis) in dogwhelks 2002 (**A**) and 2003 (**B**), ppm (2.44* mg Sn/kg) dry weight (see maps in Appendix F).

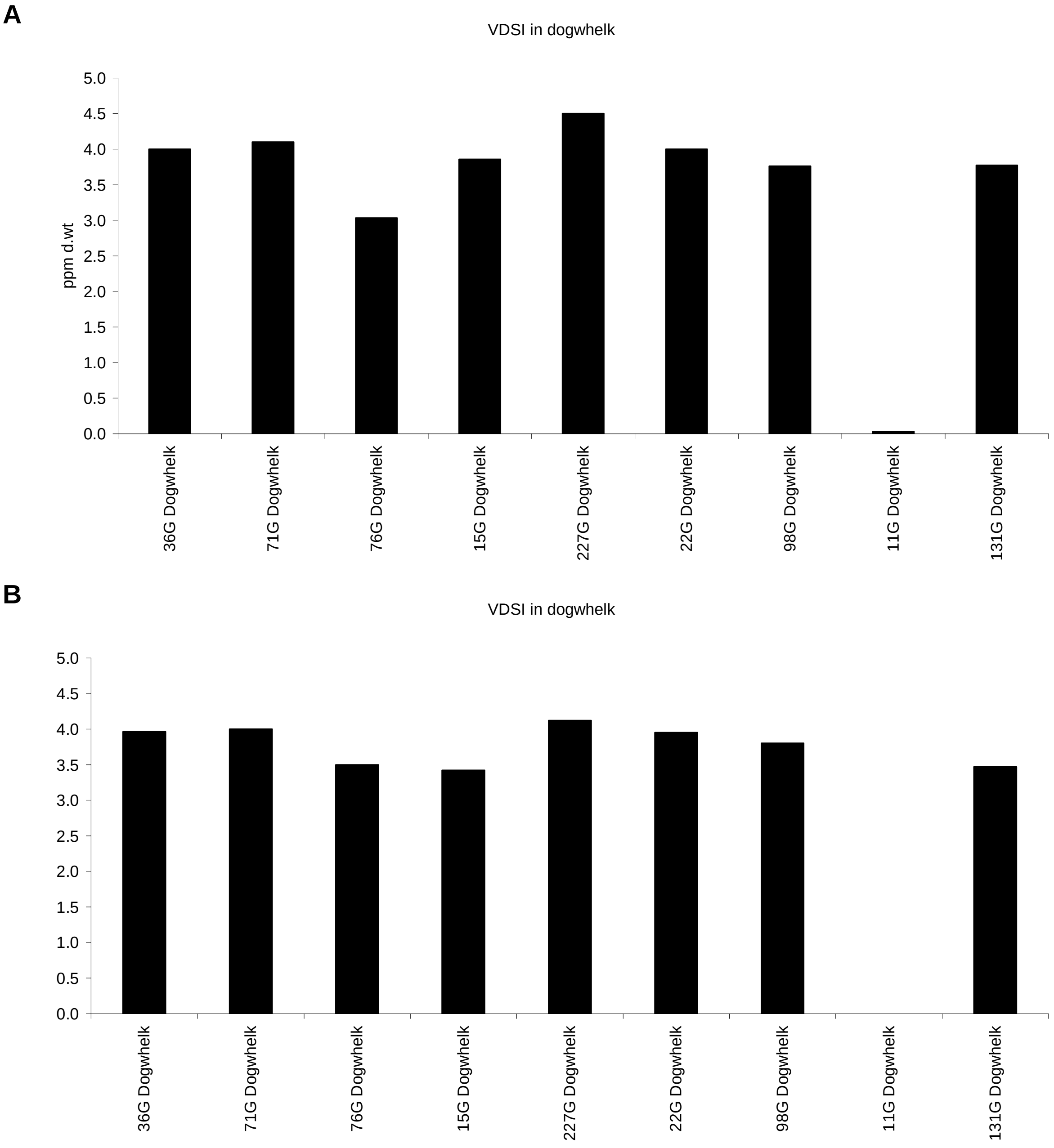


Figure 42. Average VDSI in dogwhelks 2002 (**A**) and 2003 (**B**) (see maps in Appendix F).

Appendix J
Results from INDEX determinations 1995-2003

Introduction

The Norwegian Pollution Control Authority (SFT) has requested that a small group of indices be established to assess the quality of the environment with respect to contaminants. The target indicator medium for both indices may vary depending on what purpose is defined, however sediment, cod and mussels are considered to be the most relevant choices. Blue mussels were selected for this investigation (Appendix J1 and Appendix J2).

Two indices are calculated. One index is based on the contaminant concentrations in the blue mussel collected annually from 9 of the more contaminated fjords in Norway (Walday *et al*. 1995), herein designated “Pollution Index”. This index was initiated in 1995. Initially there were 11 fjords but sampling from Orkdalsfjord and Iddefjord was discontinued in 1997. It was practical to organise sampling within JAMP. Some JAMP results could be used to calculate the index value.

In addition, a “Reference Index” was initiated in 1995 based on annual contaminant concentrations in the blue mussel. The mussels were collected at JAMP stations along the entire coast where there is presumably low levels of contamination. The importance of “reference” stations for monitoring of contaminants has been discussed earlier (cf. Green 1987). One of the main reasons for this work is to establish points of reference for contaminated fjords. Initially 8 areas were involved but since 1998 only 5 have been sampled.

Calculation of the index

Sampling strategy and a detailed discussion of calculation of the Pollution Index has been given earlier (cf. Walday *et al.* 1995) and only a brief summary will be given here. The relevant contaminants for each of the Pollution Index fjords are summarised in Appendix J2 and J3. Their selection is based on earlier investigations. Two to five stations were sampled from each area. Three replicate samples with 20 individuals with a shell length of 3-5 cm were collected from each station. Each sample was analysed for the contaminants according to the scheme in Appendix J3. "Dioxins" were only investigated in 1995-96, but reinstated for some stations in 2002-2003. Assessment of TBT concentrations was introduced in 2002 even though it is not identified as a selection criteria by Walday *et al.* (1995).

One to three stations were sampled from selected areas for the determination of the Reference Index. Each station included three replicates which were analysed for the usual JAMP contaminants (cf. analysis code A, Appendix J3). Some samples were also analysed for PAHs and dioxins.

The strategy for sampling mussels differed depending on whether the mussels were to be used for the Index or for JAMP and Index in that stations that were exclusively to be used for Index calculations allowed a slightly greater size range (3-5 cm) compared to JAMP and that the mussels were frozen directly and not depurated.

The maximum median for each contaminant for all the stations in an area was determined. These concentrations were classified according to SFT's classification system for contaminants in the marine environment (Appendix J4). The highest class found for any contaminant measured in an area determined the index value for that area.

The SFT Classes are based on the provisional “high background” levels. This system has been revised (Molvær *et al.* 1997); where among other changes the sum of CB-28, -52, -101, -118, -138, -153, and -180 (CBΣΣe) is now a distinct parameter for classification. The sum of all PAHs excluding the dicyclic PAHs (PAH_Σ) was compared to the system's “sum-PAH”. Previously this was the calculation of sum-PAH that included the dicyclic PAHs. For this report PAH_Σ was calculated, also for previous years. As a result, the classification may be different by a Class from what has been previously reported. “Dioxins” were assessed based on toxicity equivalency factors (TEQ) according to a Nordic model (Ahlborg 1989) which differs insignificantly from the recently revised WHO-model (van den Berg *et al.* 1998). Note that EPOCl is considered a relevant contaminant for one area but is not included in the part of the classification system based on levels in mussels. Likewise, there are contaminants which are included in the classification system but have not been measured in any area (e.g., tributyltin (TBT), arsenic, fluoride, nickel, silver).

The maximum class found for any contaminant determined the Class (I-V) of the area. The average Class for all the contaminated sub areas and all the reference localities determined the Pollution or Reference Index, respectively. The lowest Index value is 1 and means that all median values were in Class I (slightly polluted). The highest Index value is 5 and means that at least one median value from each of the areas was in Class V (extremely polluted).

Conclusion from application of the indices

The indices have been in used since 1995 based on contaminant concentrations in mussels from 14-19 areas (cf. Green *et al.* 2004). An assessment of their application suggested that the pollution index needed mainly two improvements (Green & Knutzen 2001): 1) more stations to avoid the consequences of insufficient sample size and 2) inclusion of more relevant contaminant analyses with respect to the pollution load expected and in relation to the SFT classification system for environmental quality (Molvær *et al.* 1997). SFT provided funds to improve the index in 2002. Three additional stations have since been established: one in the Frierfjord area (I713 Strømtangen, about 800 m east of I711 Steinsholmen), one in the inner Ranfjord (I964 Toraneskaien, about 500 m north of I965 Moholmen) and one in the Sunndalsfjord area (I915 Flåøya, northwest, about halfway between I913 and the inner most part of the fjord). Dioxin and TBT analyses were added to the programme for samples collected in the Frierfjord area, inner Oslofjord and the inner Kristiansandsfjord. TBT-analyses were also included for some of the reference stations (see Appendix J6). These changes affect the outcome of the index and comparison to previous years should be cautioned. The differences are discussed below. For results up to and including 2001 SFT has presented only the results using the old method of calculation (cf SFT's website at www.miljostatus.no/templates/themepage___2699.aspx).

It should also be noted that the SFT classification system is under revision and may affect calculations of the indices in the future. One likely change will be the lowering of limits to the classes for PCBs taking into consideration a lower background from 4 to 3 ppb wet weight suggested by Green & Knutzen (2003).

To compare the 2003 results with results from years previous to 2002 the calculations were done on a common basis with respect to areas and contaminants. Nine fjord areas were used to calculate the Pollution Index for 1998-2003 compared to eight for 1995-1997. As before, no special considerations were made when one but not all the stations within an area were sampled. The lack of sufficient samples has occurred several times for the Pollution Index: (st. I205 Bølsnes from Saudafjord 1996, st. I911 Horvika in the Sunndalsfjord since 1999, st. I021 in the Hvaler area 1999, st.I962 in the Inner Ranfjord since 1999, and st. I711 Steinholmen in the Frierfjord 2001).

Because insufficient amount of mussels were found at station Horvika in the Sunndalsfjord, two new stations were introduced; Fjøseid (I913) in 1999 and Flåøya, northwest (I915) in 2003, about 15 and 5 km farther out the fjord from Horvika, respectively. Because sufficient amount of mussels were not found at station I962 Koksverktomta in the Ranfjord since 1999, two new stations were introduced; Moholmen (I965) in 2001 and Toraneskaien (I964) in 2002, 1.7 and 0.6 km south of Koksverktomta, respectively. The Pollution Index for 2003 based on this common basis is 2.9 compared to 3.2 in 2002 (Table 8, Appendix J5). A value between 3 and 4 would be termed by the SFT system as "Severe" and between 2 and 3 as "Marked". One reason for the higher value in 2002 were the exceptionally high values of Lindane found at one station in the Grenlandsfjord area (st.71A), which were not found in 2003. The levels of dioxin in this area were Class V or "Extreme"in the SFT system in both 2002 and 2003.

With the new calculation where supplementary stations and dioxin and TBT analyses are included, the Pollution Index for 2003 is 3.6 compared to 2.9 using the older method (Table 8). The index was affected by the inclusion of the new station in the Inner Ranfjord (Toraneskaien) and the supplementary analyses due to the dioxin results for the Frierfjord area (Gjemesholmen) that were in Class V and TBT results for the Inner Oslofjord (Akershuskaia) in Class IV.

Based on the new calculation the Pollution Index for 2002 was 3.4 compared to 3.6 in 2003. The increase was mainly due to an increase found in benzo[*a*]pyrene in the inner Kristianfjord and the

Inner Ranfjord, lead in the Sørfjord and PCB in Byfjorden, Bergen (cf. Table 8 and Green *et al.* 2004). The increase in the Index was inhibited by a decrease in benzo[*a*]pyrene in the Saudafjord and total PAH in the Sunndalsfjord. Statistical analyses, however, revealed no significant longterm trend for these contaminants in these areas on a station-by-station basis.

Only five fjords/areas were monitored for the Reference Index for 1998-2003 compared to seven for 1997 and eight for 1995-1996 (Table 9, Appendix J6). However, only four of these provided a common basis. Similar to the application Pollution Index, the Reference Index made no special considerations when one but not all the stations within an area were sampled. For the four common areas, this has occurred several times, all in the Varangerfjord area (st.48A since 1997 and st.11A since 1998). The index for 2003 using the common basis approach is 1.2, and the lowest recorded. A value between 1 and 2 would be termed by the SFT system as “Moderate”.

With the new calculation where supplementary analyses of TBT are included, the Reference Index was 1.8 for the four common areas, and 1.6 if Lofoten is included, compared to 1.2 using the older method (Table 9). All five fjords/areas included the TBT analyses. The inclusion caused an increase from Class I to Class II in the mid and outer Oslofjord area and an increase from Class I to Class III in the Bømlo-Sotra area.

Table 8. Maximum environmental classification for fjords selected for Pollution INDEX. (See text and Appendix J5).

Index Area 1)	'95	'96	'97 2)	'98	'99	'00	'01	'02	'02 new 7)	'03	'03 new 7)
Hvaler/Singlefjord	2	2	2	3	2	2	2	2	2	2	2
Iddefjord	-	-	-	-	-	-	-	-	-	-	-
Inner Oslofjord	3	3	4	2	3	2	2	2	4	2	4
Frierfjord, Grenlandsfjords	3	4	3	3	3	3	3	5 6)	5	3 6)	5
Inner Kristiansandsfjord	5	5	5	5	5	4	3	3	3	4	4
Saudafjord	4	5	5	3	4	3	3	4	4	2	2
Sørfjord	5	4	3	3	4	4	3	4	4	5	5
Byfjorden, Bergen 3)	3	3	3	2	2	2	2	3	3	4	4
Sunndalsfjord	3	3	3 4)	2	3	4	2	3	3	1 6)	1
Orkdalsfjord	-	-	-	-	-	-	-	-	-	-	-
Inner Ranfjord	5	3	3 5)	4	2	2	3	3 6)	3	3 8)	5
AVERAGE (Pollution INDEX)	**3.7**	**3.6**	**3.4**	**3.0**	**3.1**	**2.9**	**2.7**	**3.2**	**3.4**	**2.9**	**3.6**

1) Iddefjord and Orkdalsfjord not sampled since 1997, hence the indices 1995-96 do not include the local indices from these fjords

2) Copper, zinc and TCDDN excluded since 1997, hence indices for 1995-96 excludes these contaminants

3) PCB (DDTΣ, HCB, HCHΣΣ and CBΣΣ) analysed in stored samples for 1995-1996

4) Change in classification (cf. Green *et al.* 1999) due to recalculation of PAHs that excluded the dicyclic compounds

5) Change in classification (cf. Green *et al.* 1999) due to calculation error

6) Results from supplementary station would not influence the outcome of classification

7) Inclusion of supplementary a station in Frierfjord, Inner Ranfjord, and Sunndalsfjord (2003), and supplementary dioxin and TBT analyses for Inner Oslofjord, Frierfjord, and Inner Kristiansandfjord.

8) Results from supplementary station would influence the outcome of classification.

Table 9. Maximum environmental classification for fjords selected for Reference INDEX. (See text and Appendix J6).

Index Area	'95	'96	'97	'98	'99	'00	'01	'02	'02 new 5)	'03	'03 new 5)
Mid and outer Oslofjord 1)	2	2	2	1	1	1	2	1	1	1	2
Lista	1	1	1	1	2	2	2	2	2	1	1
Bømlo-Sotra	1	1	1	1	1	2	2	1	2	1	3
Outer Ranfjord, Helgeland 2)	(1)	(1)	-	-	-	-	-	-	-	-	-
Lofoten 3)	(2)	(2)	(1)	(2)	(2)	(1)	(2)	(2)	2	(2)	2
Finnsnes-Skjervøy 2)	(2)	(1)	(1)	-	-	-	-	-	-	-	-
Hammerfest-Honningsvåg 2)	(2)	(3) 4)	(2)	-	-	-	-	-	-	-	-
Varanger Peninsula	1	2	1	2	1	1	1	1	1	1	1
AVERAGE (Reference INDEX)	**1.3**	**1.5**	**1.3**	**1.3**	**1.3**	**1.5**	**1.8**	**1.3**	**1.6**	**1.2**	**1.8**

1) Inclusion of results for arsenic, nickel and silver in 1996 did not affect the classification

2) Outer Ranfjord, Finnsnes-Skjervøy and Hammerfest-Honningsvåg stations were not sampled in 1998, hence, the index for 1995-97 did not take these results into account. See cf., Green *et al.* 2000 for more details for outer Ranfjord.

3) Inconsistency in sampling site, st.98X in 1995-96 and st.98A in 1997, hence, results from Lofoten excluded. See cf., Green *et al.* 2000 for more details for st 98X.

4) Change in classification (cf. Green *et al.* 1999) due to recalculation of PAHs that excluded the dicyclic compounds.

5) Inclusion of supplementary TBT analyses for Mid and outer Oslofjord, Lista, Bømlo-Sotra, Lofoten and Varangerfjord Peninsula.

Appendix J1

INDEX - Stations and programme 1995-2003

Appendix J1. INDEX station positions and sampling overview for blue mussels 1995-2003, where P = “Pollution Index” and R = “Reference Index” (contaminated and assumed “background” stations, respectively). Mussels were sampled from rock surfaces unless otherwise noted. See Walday *et al.* (1995) for discussion of station selection and analyses.

Station	Locality name	North latitude	East longitude	ICES position	INDEX type P/R	notes
HVALER/SINGLEFJORDEN, east of outer OSLOFJORD						
I021	Kjøkø, south	59°07.8'	10°57.1'	47G13	P	
I024	Kirkø, north west	59°04.9'	10°59.2'	47G09	P	
I022	West Damholmen	59°06.2'	10°57.9'	47G09	P	
I023	Kirkø, north west	59°05.7'	11°08.2'	47G09	P	
IDDEFJORD, east of outer OSLOFJORD						
I001	Sponvikskansen	59°05.4'	11°12.5'	47G09	P	
I011	Kråkenebbet	59°06.1'	11°17.3'	47G09	P	
INNER OSLOFJORD						
JAMP 30A	Gressholmen	59°52.5'	10°43.0'	48G07	P	
I301	Akershuskaia	59°54.2'	10°45.5'	48G07	P	
I304	Gåsøya	59°51.0'	10°35.5'	48G04	P	
I307	Ramtonholmen	59°44.7'	10°31.4'	48G05	P	
I306	Håøya	59°24.7'	10°33.4'	48G04	P	
MID and OUTER OSLOFJORD						
JAMP 31A	Solbergstrand	59°36.9'	10°39.4'	48G06	R	
JAMP 35A	Mølen	59°29.2'	10°30.1'	47G04	R	
JAMP 36A	Færder	59°01.6'	10°31.7'	47G06	R	
FRIERFJORD AREA, west of outer Oslofjord						
I711	Steinholmen	59°03.2'	09°40.7'	48F99	P	
I712	Gjermundsholmen	59°02.8'	09°42.5'	47F99	P	
I713	Strømtangen	59°03.2'	09°41.5'	47F99	P	
JAMP 71A	Bjørkøya (Risøyodden)	59°01.4'	09°45.4'	47F99	P	
JAMP 76A	Risøy	58°43.6'	09°17.0'	46F92	R	
INNER KRISTIANSANDSFJORD						
I132	Fiskåtangen	57°07.7'	07°59.2'	43F79	P	
I133	Odderø, west	57°07.9'	08°00.3'	43F83	P	
LISTA AREA						
JAMP 15A	Gåsøy (Ullerø area)	58°03.1'	06°53.3'	45F69	R	
I131	Lastad	58°03.3'	07°42.4'	45F79	R	7
SAUDAFJORD						
I201	Ekkjegrunn (G1)	59°38.7'	06°21.4'	48F66	P	
** I205	Bølsnes (G5)	59°35.5'	06°18.3'	48F63	P	
BØMLO AREA						
JAMP 22A	Espevær, west	59°35.2'	05°58.5'	48F59	R	C, 1
SØRFJORD						
* 51A	Byrkjenes	60°05.1'	06°33.1'	49F66	P	
JAMP 52A	Eitrheimsneset	60°05.8'	06°32.2'	49F66	P	3

Appendix J1 (cont'd)

Station	Locality name	North latitude	East longitude	ICES position	INDEX type P/R	notes
BYFJORDEN, Bergen						
I242	Valheimneset	60°23.7'	05°16.1'	49F51	P	
I241	Nordnes	60°24.1'	05°18.2'	49F51	P	
I243	Hagreneset	60°24.9'	05°18.3'	49F51	P	
SUNNDALSFJORDen						
I912	Honnhammer	62°51.2'	08°09.7'	54F81	P	
I911	Horvika	62°44.1'	08°31.4'	54F85	P	
I913	Fjøseid	62°49.0'	08°16.48'	54F85	P	
I914	Flåøya, southeast	62°45.35'	08°26.70'	54F85	P	
I915	Flåøya, northwest	62°45.48'	08°26.39'	54F85	P	
[TRONDHEIM AREA - not related to INDEX investigation**]**						
* 80A	Østmerknes	63°27.5'	10°27.5'	56G04	P	
ORKDALSFJORD AREA, supplementary area (cf. Walday *et al*. 1995)						
JAMP 82A	Flakk	63°27.1'	10°12.6'	56G01	P	
JAMP 84A	Trossavika	63°20.8'	09°57.8'	55F97	P	
JAMP 87A	Ingdalsbukt	63°27.8'	09°54.8'	55F97	P	
INNER RANFJORD						
I969	Bjørnbærviken (B9)	66°16.8'	14°02.1'	61G42	P	
I965	Moholmen (B5)	66°19.0'	14°07.5'	61G42	P	
I964	Toraneskaien	66°19.3'	14°08.0'	61G42	P	
I962	Koksverkkaien (B2)	66°19.4'	14°08.0'	61G42	P	3
OUTER RANFJORD, Helgeland area						
* 96A	Breiviken	66°17.6'	12°50.5'	61G28	R	1
LOFOTEN AREA						
JAMP 98A	Husvågen (1997)	68°15.4'	14°40.6'	65G46	R	5
JAMP 98A	Husvågen (1998)	68°16.9'	14°40.1'	65G46	R	
FINNSNES-SKJERVØY AREA						
JAMP 41A	Fensneset, Grytøya	68°56.9'	16°38.5'	66G64	R	3
HAMMERFEST-HONNINGSVÅG AREA						
JAMP 44A	Elenheimsundet	70°30.8'	22°14.8'	70H23	R	1, 6
JAMP 46A	Smineset in Altesula	70°58.4'	25°48.1'	70H57	R	3, 6
VARANGER PENINSULA AREA						
JAMP 48A	Trollfjorden i Tanafjord	70°41.6'	28°33.3'	70H85	R	
JAMP 10A	Skagoodden	70°04.2'	30°09.8'	69J03	R	2
JAMP 11A	Sildkroneset, Bøkfjorden	69°47.0'	30°11.1'	68J02	R	
JAMP 11X	Brashavn	69°53.9'	29°44.7'	68H97	R	

notes:

* - JAMP station but not sampled in accordance to JAMP guidelines, see Appendix text.
** - Sufficient mussel-sample not found in 1996.
1 - mussels collected from buoy and/or buoy anchor lines
2 - mussels collected from sand/gravel bottom
3 - mussels collected from iron/cement pilings
4 - mussels collected from metal navigation buoys
5 - mussels collected from floating dock
6 - mussels collected from wooden docks
7 - mussels collected from tire on jetty

Appendix J2
INDEX - Sampling and analyses for 1995-2003

Appendix J2. Blue mussel samples planned or used in INDEX and other purposes besides JAMP 1995-2003, where P = “Pollution Index” and R = “Reference Index” (contaminated and assumed “background” stations, respectively). + indicates JAMP sampling and analyses (i.e. equivalent to analysis code A). The number indicates the number samples analysed. Codes for analysis (A, B etc.) are defined in Appendix J3. See Walday *et al.* (1995) for discussion of selection of stations and analyses.

	STATION	INDEX	ANALYSIS CODE											
JAMP st.			+	A	B	C	D	E	F	G	H	I	J	K
	HVALER/SINGLEFJORD AREA													
021	Kjøkø, south	P	.	3	.	.	.	.	.	.	.	.	.	.
024	Kirøy, north west	P	.	3	.	.	.	.	.	.	.	.	.	.
022	West Damholmen	P	.	3	.	.	.	.	.	.	.	.	.	.
023	Singlekalven, south	P	.	3	.	.	.	.	.	.	.	.	.	.
	IDDEFJORD													
01A	Sponvikskansen	P	.	.	3	.	.	.	.	.	.	.	.	.
011	Kråkenebbet	P	.	.	3	.	.	.	.	.	.	.	.	.
	OSLOFJORD, inner													
30A	Gressholmen	P	+	.	.	.	.	.	.	.	3	.	2	2
301	Akershuskaia	P	.	.	.	3	.	.	.	.	.	.	.	2
304	Gåsøya	P	.	.	.	3	.	.	.	.	.	.	.	.
307	Ramtonholmen	P	.	.	.	3	.	.	.	.	.	.	.	.
306	Håøya	P	.	.	.	3	.	.	.	.	.	.	.	.
	OSLOFJORD, mid and outer													
31A	Solbergstrand	R	+	.	.	.	.	.	.	.	.	.	.	.
35A	Mølen	R	+	.	.	.	.	.	.	.	.	.	.	.
36A	Færder	R	+	.	.	.	.	.	.	.	.	.	.	2
	FRIERFJORD AREA, west of outer Oslofjord													
712	Gjermundsholmen	P	.	.	.	.	3	.	.	.	.	.	2	2
713	Strømtangen	P	.	.	.	.	3	.	.	.	.	.	1	2
71A	Bjørkøya	P	+	.	.	.	.	.	.	.	.	.	2	1
76A	Risøy	R	+	.	.	.	.	.	.	.	.	.	2	1
	INNER KRISTRIANSANDSFJORD													
132	Fiskåtangen	P	.	.	.	.	.	3	.	.	.	.	2	2
133	Odderø, west	P	.	.	.	.	.	3	.	.	.	.	1	2
	LISTA AREA													
15A	Gåsøya	R	+	.	.	.	.	.	.	.	.	.	.	2
131	Lastad	R	.	.	.	3.	.	.	.	.	.	.	.	.
	SAUDAFJORD													
201	Ekkjegrunn (G1)	P	.	.	.	.	.	.	3	.	.	.	.	.
205	Bølsnes (G5)	P	.	.	.	.	.	.	3	.	.	.	.	.
	[HAUGESUND AREA not related to INDEX investigation]													
227	Melandsholmen	O	+	.	.	.	.	.	.	.	.	.	.	1
	BØMLO-SOTRA AREA													
22A	Espevær, west	R	+	.	.	.	.	.	.	.	.	.	.	2
	SØRFJORD													
51A	Byrkjeneset	P	.	3	.	.	.	.	.	.	.	.	.	.
52A	Eirtrheimsneset	P	+	.	.	.	.	.	.	.	.	.	.	.

*) indicates Toxaphene included

Appendix J2 (cont'd)

	STATION	INDEX					ANALYSIS CODE											
JAMP st.							+	A	B	C	D	E	F	G	H	I	J	K
	BYFJORDEN, BERGEN																	
242	Valheimsneset	P	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.
241	Nordnes	P	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.
243	Hagreneset	P	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.
	SUNNDALSFJORD																	
912	Honnhammer	P	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.
913	Fjøseid	P	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.
914	Flåøya, southeast	P	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.
915	Flåøya, northwest	P	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.
	[TRONDHEIM AREA - not related to index investigation]																	
80A	Østmarknes	-	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
	ORKDALSFJORD AREA (not suggested in Walday *et al.* 1995)																	
82A	Flakk	P	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
84A	Trossavika	P	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
87A	Ingdalsbukta	P	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
	INNER RANFJORD																	
964	Toraneskaien	P	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
965	Moholmen (B5)	P	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
969	Bjørnbærviken (B9)	P	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
	OUTER RANFJORD, HELGELAND AREA																	
96A	Breivika, Tomma	R	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.
	LOFOTEN AREA																	
98A	Husvågen	R	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	2
	FINNSNES-SKJERVØY AREA																	
41A	Fensneset, Grytøya	R	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.
	HAMMERFEST-HONNINGSVÅG AREA																	
44A	Elenheimsundet	R	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.
46A	Smineset in Altesula	R	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.
	VARANGER PENINSULA AREA																	
48A	Trollfjorden i Tanafjord	R	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.
10A	Skagoodden	R	.	.	.	.	+	3	.	.	.	.	.	.	.	.	.	
11X	Brashavn	R	.	.	.	.	+	3	.	.	.	.	.	.	.	.	.	2

*) indicates Toxaphene included

Appendix J3
INDEX - Key to analysis codes and sample counts
(Used in Appendix J2)

ANALYSIS CODES[1)] See Walday *et al.* (1995) for discussion of selection of analyses.

	Analysis code										
Contaminant	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Lead	x	x	.	.	.	x	.	.	x	.	
Cadmium	x	x	x	.	.	x	.	.	x	.	
Copper [2])	x	x	x	.	.	.	.	.	.	.	
Mercury	x	x	x	.	.	.	.	.	.	.	
Zinc [2])	x	x	x	.	.	.	x	.	x	.	
EPOCl	.	.	.	.	x	.	.	.	.	.	
PAHs	.	.	x	.	x	x	.	x	x	.	
PCBs	x	.	x	x	x	.	x	.	.	.	
“Dioxin” [3])	.	.	.	.	.	.	.	.	.	x	
TBT [4])	.	.	.	.	.	.	.	.	.	.	x

[1]) Concerns MUSSEL - 1 size group (3-5 cm), 3 replicate samples each a bulk of 20 individuals (see text)
[2]) Concerns MUSSEL - discontinued since 1996
[3]) Concerns MUSSEL - discontinued since 1995, but reinstated 2002 for st.30A, 71A, I711, I712, I713, 76A, I132 and I133
[4]) Concerns MUSSEL – not included in Walday *et al.* (1995).

Appendix J4
INDEX - SFT Environmental quality classes

(Molvær *et al.* 1997)

As	arsenic
Pb	lead
F	fluoride
Cd	cadmium
Cu	copper
Cr	chromium
Hg	mercury
Ni	nickel
Zn	zinc
Ag	silver
TBT	tributyltin
PAH_S	total PAH excluding dicyclic (=PAH_Σ)*
BAP	benzo[*a*]pyrene
DDTSS	DDTPP+DDEPP+TDEPP (=DDTΣΣ)*
HCB	hexachlorobenzene
HCHSS	HCHG+HCHA+HCHB (=HCHΣΣ)*
CBSSe	sum of CB: 28+52+101+118+138+153+180 *
TCDDN	Sum of TCDD-toxicity equivalents *

*) See also Appendix B for definitions.

Basis: D = dry weight, W = wet weight
Units: M = ppm (mg/kg), U = ppb (µg/kg), P = ppp (ng/kg)

SFT's Environmental quality classes for blue mussels (Molvær *et al.* 1997).

Contaminant	basis	unit	Class I	Class II	Class III	Class IV	Class V
As	D	M	<10	10-30	30-100	100-200	>200
Pb	D	M	<3	3-15	15-40	40-100	>100
F	D	M	<15	15-50	50-150	150-300	>300
Cd	D	M	<2	2-5	5-20	20-40	>40
Cu	D	M	<10	10-30	30-100	100-200	>200
Cr	D	M	<3	3-10	10-30	30-60	>60
Hg	D	M	<0.2	0.2-0.5	0.5-1.5	1.5-4	>4
Ni	D	M	<5	5-20	20-50	50-100	>100
Zn	D	M	<200	200-400	400-1000	1000-2500	>2500
Ag	D	M	<0.3	0.3-1	1-2	2-5	>5
TBT	D	M	<0.1	0.1-0.5	0.5-2	2-5	>5
PAH_S	W	U	<50	50-200	200-2000	2000-5000	>5000
BAP	W	U	<1	1-3	3-10	10-30	>30
DDTSS	W	U	<2	2-5	5-10	10-30	>30
HCB	W	U	<0.1	0.1-0.3	0.3-1	1-5	>5
HCHSS	W	U	<1	1-3	3-10	10-30	>30
CBSSe	W	U	<4	4-15	15-40	40-100	>100
TCDDN	W	P	<0.2	0.2-0.5	0.5-1.5	1.5-3	>3

Appendix J5
INDEX - Summary table “Pollution index”
1995-2003

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 3.7

Index areaname (Pollution area) **1995**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Hvaler/Singlefjorden	4	4	i	1.06	i	1.73	i	i	0.2	i	i	i	i	i	0.93	0.1	0.53	6.73	i	II
Iddefjord	1	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	5	5	i	i	i	1.33	i	i	0.1	i	i	i	<132.90	0.8	1.95	<0.05	0.41	20.6	i	III
Frierfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	0.85	0.6	0.27	4.74	i	III
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	1088.5	15	0.65	9.6	0.76	5.08	i	V
Saudafjord	2	2	i	4.77	i	0.82	i	i	i	i	i	i	<428.80	15	i	i	i	i	i	IV
Sørfjord	2	2	i	149	i	36.8	i	i	1.5	i	i	i	i	i	6.01	0.1	0.28	2.67	i	V
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	3.76	0.2	0.74	19	i	III
Sunndalsfjord	2	2	i	i	i	i	i	i	i	i	i	i	809.8	8	i	i	i	i	i	III
Orkdalsfjord area	3	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	2	2	i	4.44	i	0.75	i	i	i	i	i	i	785.7	31	i	i	i	i	i	V

I	20
II	10
III	9
IV	4
V	3

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 3.6

Index areaname (Pollution area) **1996**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Hvaler/Singlefjorden	4	4	i	2.29	i	2.26	i	i	0.4	i	i	i	i	i	<0.56	0.1	0.27	4.83	i	II
Iddefjord	1	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	5	5	i	i	i	0.82	i	i	0.1	i	i	i	<644.80	3.3	1.08	<0.05	0.3	20.86	i	III
Frierfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	0.26	2.2	0.19	4.18	i	IV
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<542.40	17	0.61	18	1.32	6.64	i	V
Saudafjord	1	2	i	4.39	i	0.86	i	i	i	i	i	i	891.4	35	i	i	i	i	i	V
Sørfjord	2	2	i	60.3	i	25.3	i	i	0.9	i	i	i	i	i	4.08	<0.05	0.6	1.92	i	IV
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	7.8	0.2	1.03	30.72	i	III
Sunndalsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<290.00	3.8	i	i	i	i	i	III
Orkdalsfjord area	3	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	2	2	i	5.34	i	0.61	i	i	i	i	i	i	301.9	6.2	i	i	i	i	i	III

I	16
II	12
III	12
IV	4
V	2

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 3.4

Index areaname (Pollution area) **1997**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Hvaler/Singlefjorden	4	4	i	1.65	i	2.48	i	i	0.5	i	i	i	i	i	1.14	0.1	0.42	5.61	i	II
Iddefjord	0	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	5	5	i	i	i	0.86	i	i	0.1	i	i	i	<409.10	3.5	12.08	0.1	0.79	33.81	i	IV
Frierfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	0.65	0.8	0.26	<2.68	i	III
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	356	9.1	1.22	7.6	0.81	<6.00	i	V
Saudafjord	2	2	i	6.96	i	1.37	i	i	i	i	i	i	2726.5	108	i	i	i	i	i	V
Sørfjord	2	2	i	20.6	i	13.4	i	i	0.3	i	i	i	i	i	5.07	<0.05	0.29	<2.71	i	III
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	2.94	0.1	0.4	24.54	i	III
Sunndalsfjord	1	2	i	i	i	i	i	i	i	i	i	i	<238.90	1.4	i	i	i	i	i	III
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	2	2	i	3.55	i	0.64	i	i	i	i	i	i	<132.90	3.1	i	i	i	i	i	III

I	17
II	13
III	12
IV	2
V	2

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 3.0

Index areaname (Pollution area) **1998**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Hvaler/Singlefjorden	4	4	i	2.12	i	3.31	i	i	0.9	i	i	i	i	i	1.13	0.1	<0.23	<4.42	i	III
Iddefjord	0	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	5	5	i	i	i	1.27	i	i	0.1	i	i	i	<149.20	1	2.34	0.1	0.59	13.75	i	II
Frierfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	<0.63	0.7	0.41	3.18	i	III
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<279.00	3.8	0.53	7.2	<0.65	<5.09	i	V
Saudafjord	2	2	i	4.67	i	0.93	i	i	i	i	i	i	<550.50	9.8	i	i	i	i	i	III
Sørfjord	2	2	i	29.6	i	10.3	i	i	0.6	i	i	i	i	i	w	0.1	0.51	2.04	i	III
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	<2.83	0.2	0.79	10.87	i	II
Sunndalsfjord	1	2	i	i	i	i	i	i	i	i	i	i	<180.00	1	i	i	i	i	i	II
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	2	2	i	2.99	i	0.61	i	i	i	i	i	i	257.5	12	i	i	i	i	i	IV

I	19
II	14
III	10
IV	1
V	1

Max(median). Statistics for alle areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 3.1

Index areaname	n	N	As	Pb	F	Cd	Cu	Cr	Hg	Ni	Zn	Ag	PAH_S	BAP	DDTSS	HCB	HCHSS	CBSSe	TCDDN	Max
(Pollution area)			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppp	E.C
1999			d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	w.w.	w.w.	w.w.	w.w.	w.w.	w.w.	w.w.	I:V
Hvaler/Singlefjorden	3	4	i	1.94	i	2.45	i	i	0.42	i	i	i	i	i	<1.15	0.09	<0.26	3.27	i	II
Iddefjord	0	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	5	5	i	i	i	1.29	i	i	0.11	i	i	i	223.9	2.1	2.2	0.25	<0.34	20.01	i	III
Frierfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	0.76	0.6	<0.28	<2.64	i	III
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<1172.40	48	0.73	0.3	0.29	<4.10	i	V
Saudafjord	2	2	i	5.97	i	1.49	i	i	i	i	i	i	622.8	14	i	i	i	i	i	IV
Sørfjord	2	2	i	37.14	i	34.71	i	i	2.89	i	i	i	i	i	6.21	0.07	0.35	<2.42	i	IV
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	4.5	0.12	0.28	13.88	i	II
Sunndalsfjord	2	3	i	i	i	i	i	i	i	i	i	i	384.2	3	i	i	i	i	i	III
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	1	2	i	5.13	i	0.59	i	i	i	i	i	i	<173.60	1.95	i	i	i	i	i	II

I	19
II	13
III	10
IV	3
V	1

Max(median). Statistics for alle areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 2.9

Index areaname	n	N	As	Pb	F	Cd	Cu	Cr	Hg	Ni	Zn	Ag	PAH_S	BAP	DDTSS	HCB	HCHSS	CBSSe	TCDDN	Max
(Pollution area)			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppp	E.C
2000			d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	w.w.	w.w.	w.w.	w.w.	w.w.	w.w.	w.w.	I:V
Hvaler/Singlefjorden	4	4	i	1.05	i	1.83	i	i	0.36	i	i	i	i	i	<0.93	0.09	<0.32	<2.77	i	II
Iddefjord	0	2	i	I	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	5	5	i	I	i	1.13	i	i	0.06	i	i	i	<118.80	0.5	3.2	0.1	<0.31	11.45	i	II
Frierfjorden	3	3	i	I	i	i	i	i	i	i	i	i	i	i	0.56	0.43	0.21	<2.15	i	III
Inner Kristiandsfjord	2	2	i	I	i	i	i	i	i	i	i	i	<246.60	1.8	0.33	1.1	<0.26	1.9	i	IV
Saudafjord	2	2	i	7.09	i	1.99	i	i	i	i	i	i	<383.00	7.2	i	i	i	i	i	III
Sørfjord	2	2	i	91.67	i	27.33	i	i	3.86	i	i	i	i	i	4.27	0.05	0.29	<1.75	i	IV
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	2.85	0.12	<0.26	9.88	i	II
Sunndalsfjord	2	3	i	i	i	i	i	i	i	i	i	i	1287.8	23	i	i	i	i	i	IV
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	1	2	i	3	i	0.83	i	i	i	i	i	i	<192.50	2.8	i	i	i	i	i	II

I	23
II	13
III	5
IV	5
V	0

Max(median). Statistics for alle areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 2.7

Index areaname (Pollution area) **2001**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Hvaler/Singlefjorden	4	4	i	1.65	i	2.53	i	i	0.44	i	i	i	i	i	<0.62	<0.10	<0.15	<2.82	i	II
Iddefjord	0	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	5	5	i	i	i	1.16	i	i	0.07	i	i	i	<110.40	1.3	<0.99	0.1	<0.23	8.59	i	II
Frierfjorden	2	3	i	i	i	i	i	i	i	i	i	i	i	i	0.7	0.37	<0.15	<1.96	i	III
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<182.90	5	0.28	0.48	<0.10	<2.44	i	III
Saudafjord	2	2	i	6.15	i	1.49	i	i	i	i	i	i	<186.10	4.5	i	i	i	i	i	III
Sørfjord	2	3	i	32.35	i	5.59	i	i	0.77	i	i	i	i	i	3.41	<0.10	<0.15	<9.72	i	III
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	4.01	0.09	<0.20	11.33	i	II
Sunndalsfjord	2	3	i	i	i	i	i	i	i	i	i	i	<141.55	0.7	i	i	i	i	i	II
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	2	3	i	20	i	2.02	i	i	i	i	i	i	<362.60	27	i	i	i	i	i	IV

I	22
II	14
III	9
IV	1
V	0

Pollution index 2002 (as calculated prior to 2002)

Average of Max E.C is 3.2

Index areaname (Pollution area) 2002	N	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	TBT ppm d.w.	Max E.C I:V
Hvaler/Singlefjorden	4	4	i	1.27	i	2.7	i	i	0.32	i	i	i	i	i	<0.68	<0.05	<0.10	<2.73	i	i	II
Iddefjord	0	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	5	5	i	i	i	1.75	i	i	0.1	i	i	i	<68.90	<0.50	1.21	0.06	<0.10	9.74	i	i	II
Frierfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	<0.35	0.41	<78.10	<1.36	i	i	V
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<252.50	6.5	<0.32	0.31	<0.10	<1.49	i	i	III
Saudafjord	2	2	i	9.27	i	2.8	i	i	i	i	i	i	w	21	i	i	i	i	i	i	IV
Sørfjord	2	3	i	98.43	i	16.59	i	i	1.45	i	i	i	i	i	3.37	0.07	<0.21	<2.80	i	i	IV
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	4.28	0.11	<0.23	19.11	i	i	III
Sunndalsfjord	1	3	i	i	i	i	i	i	i	i	i	i	<330.60	2	i	i	i	i	i	i	III
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	2	3	i	12.69	i	2.15	i	i	i	i	i	i	<112.30	4	i	i	i	i	i	i	III

I	20
II	13
III	9
IV	2
V	1

Pollution index 2002-new (with supplementary analyses and stations)

Average of Max E.C is 3.4

ndex areaname (Pollution area) **2002**	n	N	As ppm d.w.	Pb Ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	TBT ppm d.w.	Max E.C I:V
Hvaler/Singlefjorden	4	4	i	1.27	i	2.7	i	i	0.32	i	i	i	i	i	<0.68	<0.05	<0.10	<2.73	i	i	II
ddefjord	0	2	i	I	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
nner Oslofjord	5	5	i	I	i	1.75	i	i	0.1	i	i	i	<68.90	0.5	1.21	0.06	<0.10	9.74	<0.10	2.59	IV
Frierfjorden	4	4	i	I	i	i	i	i	i	i	i	i	i	i	<0.35	0.49	<78.10	<1.71	16.65	1.37	V
nner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<252.50	6.5	<0.31	0.31	<0.10	<1.49	<0.48	0.47	III
Saudafjord	2	2	i	9.27	i	2.8	i	i	i	i	i	i	w	21	i	i	i	i	i	i	IV
Sørfjord	2	3	i	98.43	i	16.59	i	i	1.45	i	i	i	i	i	3.37	0.07	<0.21	<2.80	i	i	IV
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	4.28	0.11	<0.23	19.11	i	i	III
Sunndalsfjord	1	3	i	i	i	i	i	i	i	i	i	i	<330.60	2	i	i	i	i	i	i	III
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
nner Ranfjord	3	4	i	12.69	i	2.15	i	i	i	i	i	i	<112.30	4.1	i	i	i	i	i	i	III

I	21
II	15
III	10
IV	3
V	2

Pollution index 2003 (as calculated prior to 2002)

Average of Max E.C is 2.9

Index areaname (Pollution area) **2003**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	TBT ppm d.w.	Max E.C I:V
Hvaler/Singlefjorden	3	4	i	1.73	i	2.03	i	i	0.23	i	i	i	i	i	<0.54	<0.05	<0.10	<2.06	i	i	II
Iddefjord	0	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	3	5	i	i	i	1.56	i	i	0.07	i	i	i	<44.72	<0.50	<1.17	<0.05	<0.10	11.15	i	i	II
Frierfjorden	2	3	i	i	i	i	i	i	i	i	i	i	i	i	0.7	0.48	<0.10	<2.48	i	i	III
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<412.47	13	<0.37	0.29	<0.32	<1.93	i	i	IV
Saudafjord	2	2	i	3.4	i	1.25	i	i	i	i	i	i	<102.90	1.2	i	i	i	i	i	i	II
Sørfjord	2	3	i	108.46	i	14.68	i	i	1.47	i	i	i	i	i	3.73	<0.05	<0.10	<2.08	i	i	V
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	7.15	<0.05	<0.10	53.75	i	i	IV
Sunndalsfjord	2	3	i	i	i	i	i	i	i	i	i	i	<40.97	<0.50	i	i	i	i	i	i	I
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	2	3	i	6.45	i	0.81	i	i	i	i	i	i	<404.65	7.8	i	i	i	i	i	i	III

I	27
II	9
III	7
IV	2
V	1

Pollution index 2003-new (with supplementary analyses and stations)

Average of Max E.C is 3.6

Index areaname (Pollution area) **2003**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	TBT ppm d.w.	Max E.C I:V
Hvaler/Singlefjorden	3	4	i	1.73	i	2.03	i	i	0.23	i	i	i	i	i	<0.54	<0.05	<0.10	<2.06	i	i	II
Iddefjord	0	2	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Oslofjord	3	5	i	i	i	1.56	i	i	0.07	i	i	i	<44.72	<0.50	<1.17	<0.05	<0.10	11.15	<0.10	2.17	IV
Frierfjorden	3	4	i	i	i	i	i	i	i	i	i	i	i	i	0.7	0.48	<0.10	<2.48	<4.26	0.91	V
Inner Kristiandsfjord	2	2	i	i	i	i	i	i	i	i	i	i	<412.47	13	<0.37	0.29	<0.32	<1.93	<0.62	0.44	IV
Saudafjord	2	2	i	3.4	i	1.25	i	i	i	i	i	i	<102.90	1.2	i	i	i	i	i	i	II
Sørfjord	2	3	i	108.46	i	14.68	i	i	1.47	i	i	i	i	i	3.73	<0.05	<0.10	<2.08	i	i	V
Byfjorden	3	3	i	i	i	i	i	i	i	i	i	i	i	i	7.15	<0.05	<0.10	53.75	i	i	IV
Sunndalsfjord	3	4	i	i	i	i	i	i	i	i	i	i	<40.97	0.64	i	i	i	i	i	i	I
Orkdalsfjord area	0	3	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	miss
Inner Ranfjord	3	4	i	6.45	i	0.81	i	i	i	i	i	i	1069.9	44	i	i	i	i	i	i	V

I	28
II	10
III	8
IV	3
V	3

Appendix J6
INDEX - Summary table “Reference Index”
1995-2003

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 1.5

Index areaname (Reference area) **1995**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	w	1.68	w	1.32	i	w	0.1	w	i	w	w	w	<0.95	0.1	0.4	7.86	i	II
Lista area	2	2	w	0.52	w	1.44	i	w	0.1	w	i	w	<31.60	0.5	<0.34	<0.05	0.38	<1.28	i	I
Bømlo-Sotra area	1	1	w	1.18	w	1.41	i	w	0.1	w	i	w	w	w	<0.46	<0.05	0.31	<1.38	i	I
Outer Ranfjord, Helgeland area	1	2	w	1.12	w	0.96	i	w	0.1	w	i	w	<37.70	<0.50	0.21	<0.05	0.38	<0.90	i	I
Lofoten area	1	2	w	3.12	w	0.69	i	w	0.3	w	i	w	w	w	4.42	0.1	0.15	12.31	i	II
Finnsnes- Skjervøy area	1	1	w	0.9	w	2.95	i	w	0.1	w	i	w	w	w	<0.18	<0.05	0.16	<0.81	i	II
Hammerfest- Honningsvåg area	2	2	w	2.57	w	2.74	i	w	0.1	w	i	w	<129.90	0.7	<0.23	<0.05	<0.15	<1.34	i	II
Varanger peninsula area	3	3	w	2.78	w	1.71	i	w	0.2	w	i	w	<6.90	<0.50	<0.36	<0.05	0.16	<0.88	i	I

I	56
II	8
III	0
IV	0
V	0

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 1.6

Index areaname (Reference area) **1996**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	7	2.04	w	1.6	i	0.5	0	0.9	i	0.1	w	w	<0.25	<0.05	0.25	13.95	i	II
Lista area	2	2	w	0.67	w	1.22	i	w	0.1	w	i	w	<44.60	<0.50	<0.20	<0.05	0.29	<2.14	i	I
Bømlo-Sotra area	1	1	w	1.51	w	1.14	i	w	0.1	w	i	w	w	w	<0.11	<0.05	<0.14	<0.78	i	I
Outer Ranfjord, Helgeland area	1	2	w	0.9	w	0.78	i	w	0.1	w	i	w	w	w	<0.12	<0.05	0.21	<0.62	i	I
Lofoten area	1	2	w	4.11	w	0.78	i	w	0.3	w	i	w	w	w	<1.15	<0.05	<0.13	8.9	i	II
Finnsnes- Skjervøy area	1	1	w	0.79	w	1.63	i	w	0.1	w	i	w	<24.25	<0.50	<0.05	<0.05	<0.05	<0.40	i	I
Hammerfest-Honningsvåg area	2	2	w	1.66	w	2.72	i	w	0.1	w	i	w	<212.50	0.8	<0.11	<0.05	<0.11	<1.59	i	III
Varanger peninsula area	3	3	w	0.74	w	2.34	i	w	0.1	w	i	w	<21.30	<0.50	<0.14	<0.05	0.14	<0.98	i	II

I	61
II	6
III	1
IV	0
V	0

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 1.3

Index areaname (Reference area) **1997**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	w	2.17	w	1.84	i	w	0.1	w	i	w	w	w	2.75	0.1	1.16	4.9	i	II
Lista area	2	2	w	1.12	w	1.14	i	w	0.1	w	i	w	<36.70	<0.50	0.58	<0.05	0.53	2.43	i	I
Bømlo-Sotra area	1	1	w	1.37	w	1.01	i	w	0.1	w	i	w	w	w	<0.39	<0.05	0.26	<0.73	i	I
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Lofoten area	1	2	w	1.54	w	0.85	i	w	0.1	w	i	w	w	w	0.61	<0.05	0.14	<1.57	i	I
Finnsnes- Skjervøy area	1	1	w	0.65	w	1.88	i	w	0.1	w	i	w	w	w	<0.15	<0.05	0.12	<0.40	i	I
Hammerfest-Honningsvåg area	1	2	w	1.15	w	1.51	i	w	0.1	w	i	w	w	w	0.27	<0.05	0.18	<4.49	i	II
Varanger peninsula area	2	3	w	0.81	w	1.59	i	w	0.2	w	i	w	w	w	0.33	0.1	0.13	<1.07	i	I

I	46
II	5
III	0
IV	0
V	0

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 1.4

Index areaname (Reference area) **1998**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	w	1.57	w	1.14	i	w	0.1	w	i	w	w	w	<1.30	<0.03	<0.52	<2.01	i	I
Lista area	2	2	w	1.28	w	1.31	i	w	0.1	w	i	w	<42.70	<0.50	0.6	<0.03	<0.53	3.58	i	I
Bømlo-Sotra area	1	1	w	1.21	w	0.85	i	w	0.1	w	i	w	w	w	<1.61	<0.03	<0.51	<2.05	i	I
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Lofoten area	1	2	w	2.36	w	1.58	i	w	0.2	w	i	w	w	w	<2.28	<0.05	<0.20	<1.21	i	II
Finnsnes- Skjervøy area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Hammerfest-Honningsvåg area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Varanger peninsula area	1	3	w	2.34	w	2.32	i	w	0.1	w	i	w	w	w	w	w	w	w	i	II

I	31
II	2
III	0
IV	0
V	0

Max(median). Statistics for all areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 1.4

Index areaname (Reference area) **1999**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	w	1	w	1.53	i	w	0.1	w	i	w	w	w	1.83	<0.05	<0.44	2.88	i	I
Lista area	2	2	w	1.66	w	1.18	i	w	0.1	w	i	w	<68.05	1	<0.67	0.1	<0.40	<2.49	i	II
Bømlo-Sotra area	1	1	w	1.7	w	1.32	i	w	0.1	w	i	w	w	w	<0.54	<0.05	<0.23	<0.93	i	I
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Lofoten area	1	2	w	1.59	w	2.17	i	w	0.3	w	i	w	w	w	<0.52	<0.06	<0.20	<0.43	i	II
Finnsnes- Skjervøy area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Hammerfest-Honningsvåg area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Varanger peninsula area	1	3	w	1.57	w	1.61	i	w	0.1	w	i	w	w	w	<0.47	<0.05	<0.30	<0.90	i	I

I	33
II	4
III	0
IV	0
V	0

Max(median). Statistics for alle areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 1.4

Index areaname (Reference area) **2000**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	w	0.94	w	1.65	i	w	0.05	w	i	w	w	w	0.77	0.09	0.41	<1.31	i	I
Lista area	2	2	w	2.2	w	1.98	i	w	0.16	w	i	w	<66.40	<0.50	<0.36	0.06	<0.32	<2.20	i	II
Bømlo-Sotra area	1	1	w	1.3	w	2.69	i	w	0.03	w	i	w	w	w	0.51	0.04	0.29	<1.07	i	II
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Lofoten area	1	2	w	1.49	w	1.68	i	w	0.11	w	i	w	w	w	<0.20	<0.05	<0.19	<0.53	i	I
Finnsnes- Skjervøy area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Hammerfest-Honningsvåg area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Varanger peninsula area	1	3	w	1.44	w	1.53	i	w	0.05	w	i	w	w	w	<0.18	<0.05	<0.16	<0.75	i	I

I	35
II	2
III	0
IV	0
V	0

Max(median). Statistics for alle areas: (n = Index-station measured, N = Station programmed for index)

Average of Max E.C is 1.8

Index areaname	n	N	As	Pb	F	Cd	Cu	Cr	Hg	Ni	Zn	Ag	PAH_S	BAP	DDTSS	HCB	HCHSS	CBSSe	TCDDN	Max
(Reference area)			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppp	E.C
2001			d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	w.w.	w.w.	w.w.	w.w.	w.w.	w.w.	w.w.	I:V
Mid and outer Oslofjord	3	3	w	0.87	w	2.59	i	w	0.05	w	i	w	w	w	1.5	<0.10	<0.32	<1.73	i	II
Lista area	2	2	w	0.96	w	4.4	i	w	0.08	w	i	w	<17.60	<0.50	<0.28	<0.10	<0.15	<2.14	i	II
Bømlo-Sotra area	1	1	w	1.21	w	2.01	i	w	0.05	w	i	w	w	w	<0.45	<0.10	<0.15	<0.66	i	II
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Lofoten area	1	2	w	1.34	w	2.38	i	w	0.11	w	i	w	w	w	<0.53	<0.10	<0.15	<0.56	i	II
Finnsnes- Skjervøy area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Hammerfest-Honningsvåg area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	miss
Varanger peninsula area	1	3	w	1.39	w	1.23	i	w	0.05	w	i	w	w	w	<0.15	<0.10	<0.15	<0.15	i	I

I	33
II	4
III	0
IV	0
V	0

Reference index 2002 (as calculated prior to 2002)

Average of Max E.C is 1.4

Index areaname (Reference area) **2002**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	TBT ppm d.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	w	1.43	w	1.16	i	w	0.06	w	i	w	w	w	<0.68	<0.05	<0.24	<1.52	i	i	I
Lista area	2	2	w	0.71	w	1.31	i	w	0.05	w	i	w	<23.90	<0.50	<0.34	0.06	<0.22	<5.27	i	i	II
Bømlo-Sotra area	1	1	w	0.88	w	0.98	i	w	0.05	w	i	w	w	w	<0.45	<0.05	<0.10	<0.57	i	i	I
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	i	miss
Lofoten area	1	1	w	0.89	w	2.13	i	w	0.11	w	i	w	w	w	<0.30	<0.05	<0.10	<0.37	i	i	II
Finnsnes- Skjervøy area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	i	miss
Hammerfest-Honningsvåg area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	i	miss
Varanger peninsula area	1	3	w	1.8	w	1.41	i	w	0.05	w	i	w	w	w	<0.15	<0.05	<0.10	<0.10	i	i	I

I	35
II	2
III	0
IV	0
V	0

Reference index 2002-new (with supplementary analyses and stations)

Average of Max E.C is 1.6

Index areaname (Reference area) **2002**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	TBT ppm d.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	w	1.43	w	1.16	i	w	0.06	w	i	w	w	w	<0.68	<0.05	<0.24	<1.52	w	0.08	I
Lista area	2	2	w	0.71	w	1.31	i	w	0.05	w	i	w	<23.90	<0.50	<0.34	0.06	<0.22	<5.27	w	0.12	II
Bømlo-Sotra area	1	1	w	0.88	w	0.98	i	w	0.05	w	i	w	w	w	<0.45	<0.05	<0.10	<0.57	w	0.14	II
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	w	w	miss
Lofoten area	1	2	w	0.89	w	2.13	i	w	0.11	w	i	w	w	w	<0.30	<0.05	<0.10	<0.37	w	0.11	II
Finnsnes- Skjervøy area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	w	w	miss
Hammerfest-Honningsvåg area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	w	w	miss
Varanger peninsula area	1	3	w	1.8	w	1.41	i	w	0.05	w	i	w	w	w	<0.15	<0.05	<0.10	<0.10	w	0.01	I

I	37
II	5
III	0
IV	0
V	0

Reference index 2003 (as calculated prior to 2002)

Average of Max E.C is 1.2

Index areaname (Reference area) **2003**	n	N	As ppm d.w.	Pb ppm d.w.	F ppm d.w.	Cd ppm d.w.	Cu ppm d.w.	Cr ppm d.w.	Hg ppm d.w.	Ni ppm d.w.	Zn ppm d.w.	Ag ppm d.w.	PAH_S ppb w.w.	BAP ppb w.w.	DDTSS ppb w.w.	HCB ppb w.w.	HCHSS ppb w.w.	CBSSe ppb w.w.	TCDDN ppp w.w.	TBT ppm d.w.	Max E.C I:V
Mid and outer Oslofjord	3	3	w	0.81	w	1.33	i	w	0.06	w	i	w	w	w	<0.93	<0.05	<0.10	<1.54	i	i	I
Lista area	2	2	w	0.76	w	0.86	i	w	0.07	w	i	w	<35.62	<0.50	<0.33	<0.05	<0.10	<1.09	i	i	I
Bømlo-Sotra area	1	1	w	1.46	w	1.04	i	w	0.13	w	i	w	w	w	<0.52	<0.05	<0.10	<1.31	i	i	I
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	i	miss
Lofoten area	1	1	w	1.16	w	2.27	i	w	0.14	w	i	w	w	w	<0.41	<0.05	<0.10	<0.35	i	i	II
Finnsnes- Skjervøy area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	i	miss
Hammerfest-Honningsvåg area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	i	i	miss
Varanger peninsula area	1	3	w	1.65	w	1.98	i	w	0.05	w	i	w	w	w	<0.31	<0.05	<0.10	<0.37	i	i	I

I	36
II	1
III	0
IV	0
V	0

Reference index 2003-new (with supplementary analyses and stations)

Average of Max E.C is 1.8

Index areaname	n	N	As	Pb	F	Cd	Cu	Cr	Hg	Ni	Zn	Ag	PAH_S	BAP	DDTSS	HCB	HCHSS	CBSSe	TCDDN	TBT	Max
(Reference area)			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppp	ppm	E.C
2003			d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	d.w.	w.w.	w.w.	w.w.	w.w.	w.w.	w.w.	w.w.	d.w.	I:V
Mid and outer Oslofjord	3	3	w	0.81	w	1.33	i	w	0.06	w	i	w	w	w	<0.93	<0.05	<0.10	<1.54	w	0.1	II
Lista area	2	2	w	0.76	w	0.86	i	w	0.07	w	i	w	<35.62	<0.50	<0.33	<0.05	<0.10	<1.09	w	0.06	I
Bømlo-Sotra area	1	1	w	1.46	w	1.04	i	w	0.13	w	i	w	w	w	<0.52	<0.05	<0.10	<1.31	w	0.59	III
Outer Ranfjord, Helgeland area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	w	w	miss
Lofoten area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	w	w	miss
Finnsnes- Skjervøy area	0	1	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	w	w	miss
Hammerfest-Honningsvåg area	0	2	w	w	w	w	i	w	w	w	i	w	w	w	w	w	w	w	w	w	miss
Varanger peninsula area	1	3	w	1.65	w	1.98	i	w	0.05	w	i	w	w	w	<0.31	<0.05	<0.10	<0.37	w	<0.01	I

I	32
II	1
III	1
IV	0
V	0