Technical report No 58

Marinebase

Database on aggregated data for the coastline of the Mediterranean, Atlantic, North Sea, Skagerrak, Kattegat and Baltic

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1. Summary

As a part of the work programme of the European Environment Agency (EEA), the Norwegian Institute for Water Research (NIVA) has compiled a first version of a European marine database 'Marinebase'. This database on water quality parameters covers aggregated data related to eutrophication (nutrients, chlorophyll and oxygen in bottom water) and harmful substances (mainly metals in sediments and biota). The database is available through the EEA in Copenhagen from where it will be made assessable via Internet as a part of the European Environmental Reference Centre. Copies of the database were provided to all relevant EEA national focal points in October 2000.

In March 1999, a questionnaire on eutrophication and harmful substances was submitted to the national focal points in Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden and the UK. Data was received up to late September 1999.

Most of the data presented in this report has been made available through the Marine Conventions and supplied by ICES (International Council for the Exploration of the Sea) and MAP/MEDPOL (the Mediterranean action plan/Mediterranean pollution monitoring and research programme). The ICES data covers data reported to OSPAR (Commission of the Convention for the Protection of the Marine Environment of the North-east Atlantic) and HELCOM (Helsinki Commission of the Convention for the Protection of the Marine Environment of the Baltic Sea). Additionally data was received from the national focal points or reference centres in Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Norway and Sweden. The database covers the following seas: Mediterranean, Atlantic (east), North Sea, Skagerrak, Kattegat and Baltic.

Data was requested per coastal zone from individual or aggregated stations representing an area defined by the country. However, few countries in Europe have clearly defined coastal zones (Germany and France are two exceptions). A working group within EIONET will try to solve this consistency problem. In this report all data is therefore presented per station except for nutrients, which is presented as aggregated stations within 10 x 10 km grids.

Experience in gathering data from the coasts of Europe shows that the availability of data varies considerably depending on whether or not monitoring programmes and central databases exist. The marine conventions have been of major importance in this gathering of data. It is important to have strong conventions both to gather data from the countries and for the quality assurance of the data. A close collaboration with the conventions has been very helpful and is essential for future work within the EEA work programme.

EEA national reference centres for the marine and coastal environment have also been very helpful in supplying data. However, for many of these centres few resources are made available for this kind of work and a strengthening of these centres would be a great advantage to secure the supply of national data to the conventions and the EEA.

2. Background

Work by the European Topic Centre on the Marine and Coastal Environment (ETC/MCE) on the development of an European estuary/lagoons/fjord inventory as part of the work programme of the European Environment Agency (EEA) is focusing on developing a marine database covering aggregated data on eutrophication and harmful substances along the coasts of Europe. This is a demanding task and some priorities have been made mainly based on time available and data availability so that only part of Europe's coastline is presented in this report. This report is complemented by reports (van Buuren et al. in press.; Baan & van Buuren, in press a, Baan & van Buuren, in press b), which cover testing of indicators using the database described in this report.

In March 1999, a questionnaire on eutrophication and harmful substances was submitted to the EEA national focal points in Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden and the UK. The ETC/MCE consortium including institutes/organisations in Italy, Greece, France, the Netherlands, Denmark and Norway developed this questionnaire in collaboration with specialists from research institutions in each country.

The main objective for the collection of data is to establish a database with aggregated data covering European coasts and seas. The database is to be made assessable on the Internet to be used by policy-makers, management and researchers. Data has also been collected for estuaries, deltas and fjords, for which it was decided to start collecting data for a few areas in each country. In the following years this database can be developed and enable the definition of sensitive areas which can be used as a tool for policy implementation (e.g. waste water directive, 1991 or the new water framework directive, 2000).

3. Objectives

The main objectives of the work presented in this report are:

- to develop a database to be used in a first approach for the mapping of sensitive areas in Europe.

  This is a demanding task and to be able to solve it in a manageable way we chose to ask a selection of countries in Europe to select a minimum of two areas (fjords, estuaries, lagoons or deltas) for which a questionnaire could be filled in.

- to make the database available for all partners within the ETC/MCE for assessment and production of reports.

4. Data gathering

4.1. Questionnaires

A questionnaire was developed for data collection both from the conventions and from the countries through their reference centre(s).

The questionnaire is presented in Appendix B and covers the following parameters.

EUTROPHICATION

State — water column: Total Phosphorous (year-round and winter (January and February)), Ortho-phosphate (winter). Total nitrogen (year-round and winter), Nitrate (winter), Nitrate+nitrite (winter), Ammonium (winter). Total N/total P ratio (year-round), Nitrate+nitrite/phosphate ratio (year-round). Silicate. Dissolved oxygen or saturation (bottom water).

Algal blooms: Toxic algae (4 species), *Phaeocyctis* sp., Diatom/flagellate ratio (spring — based on biovolume/l), Diatom/flagellate ratio (summer — based on biovolume/l). Chlorophyll a (summer).

Sea grasses and macroalgae: Seagrasses (cover *Zostera* sp. or *Posidonia* sp.), (maximum depth of occurrence), Seaweed (cover), Seaweed (maximum depth occurrence).

Benthos: Microphytobenthos (biomass), Soft bottom Macrozoobenthos (>1mm) biomass: Polychaeta, Mollusca, Echinodermata, Crustacea, others.

Riverine input to the water column: Input of total phosphorous, total nitrogen and total carbon entering water systems. This data is part of another report covering indicators.

HARMFUL SUBSTANCES

Sediment: Cadmium, Chrome, Copper, Mercury, Lead, and Zinc. PCB, PAH, DDT (sum of DDT+DDE+DDD). Radiation.

In suspended matter: PAH, PCB, TBT.

In biota: Mussels (dry tissue), Fish (specified tissue): Cd, Cr, Cu, Hg, Pb, Zn. PCB, PAH, DDT (sum DDT+DDE+DDD). Radiation. Mammals (specified tissue): PCB, DDT (sum of DDT+DDE+DDD).

Riverine input to marine waters: Cd, Cr, Cu, Hg, Pb, Zn. PCB, PAH, DDT (sum of DDT+DDE+DDD). Radiation.

OIL POLLUTION

State: Oil spills on surface. Coastline affected. Birds and mammals affected.

Source and amount: Oil and gas industry (direct). Accidents. Ship discharges. Riverine input.

4.2. Choice of parameters

The questionnaire contains a large number of parameters that were chosen based on recommendation from several experts on monitoring of environmental impact related to eutrophication and harmful substances. The questionnaire was then circulated to the members of the ETC consortium for comments and recommendations before it was distributed to the 15 countries selected.

Eutrophication parameters

Dissolved nutrients were chosen to be reported for the winter months, since this is the period with the lowest algae production and therefore the best time of the year to look for concentrations higher than what would be expected to be reference values and thereby indicate eutrophication.

Lack of oxygen in bottom waters is often a good indicator for eutrophication. The countries were asked to report oxygen values for the autumn period (September–October) to cover the oxygen consumption of the decomposition of the spring/summer algal blooms in coastal areas.

Total nitrogen and total phosphorous were also requested to be tested as a possible indicator for nutrient limitations (concentrations).

Harmful substances

All values reported are from sediments and biota since data from the water column is rare due to low concentrations in most cases.

Heavy metals requested were chosen based on the international conventions lists of prioritised metals to be monitored.

PCBs cover the sum of: CB 28, CB 52, CB 101, CB 118, CB 138, CB 153 and CB 180. This follows the OSPAR Commission working group on concentrations, trends and effects of substances in the marine environment (SIME). If a sum of these seven components was not available, the countries were asked to state the PCB with highest concentration determined from a reasonable time series.

PAHs cover sum of: anthracine, benzo(*a*)anthracine, benzo(*ghi*)perylene, benzo(*a*)pyrene, chrysene, fluoranthene, indeno(1,2,3-*cd*)pyrene, pyrene, phenanthrene. This follows the OSPAR Commission working group on concentrations, trends and effects of substances in the marine environment (SIME). If a sum of these nine components was not available, the countries were asked to state the PAH with highest concentration determined from a reasonable time series.

4.3. Coastal zones and representative stations

The countries were requested to supply data from coastal areas out to 20 km offshore. They were also asked to present data from defined major coastal areas and choose representative stations for each area.

The countries were also asked to choose areas of major importance to present more detailed information from at least two estuaries, deltas or fjords. The estuaries should cover the major rivers, and the lagoons/fjords could be the major ones in terms of environmental significance. The countries were asked to choose areas that are representative for the nation and preferably, long-term time series should be reported.

4.4. Aggregation of data and expected output

Spatial aggregation

The width of the coastal zones reported are limited to 20 km (about 12 miles) from outer coastline.

All data from ICES/OSPAR/HELCOM or MEDPOL is stored and presented as it was delivered to them. For nutrients in surface waters (ICES) all data was delivered aggregated within squares of 10 x 10 km (20 x 20 km for Iceland and parts of the Irish Sea). For harmful substances all data was delivered per station and is presented as such without further aggregation.

For additional data presented by each country the following options were suggested for aggregation of data for the coastal water systems to be described. If there is only one sampling station in the water system, the coordinates for this water system should be used. If there are multiple sampling stations, one out of two methods should be used: (a) choose the sampling station which is the most representative; or (b) use averaged results of multiple sampling stations and present it a dummy station representative for the water system.

Aggregation in time

Data was requested for the period 1985 to 1998. However, some older data including data from the 1970s is available in the database. All data presented is aggregated and presented as median (some also including means) value for the period of time defined in the questionnaire (Appendix A) except for parameters that are only measured once per year, which often is the case for harmful substances in sediment and biota.

4.5. Data storage

All data gathered from the conventions and countries is stored in a database at NIVA (Norwegian Institute for Water Research, Oslo). A detailed description of the database is presented in the results chapter, see also user manual in Appendix C.

The whole database is copied and sent to the data centre at the EEA (Copenhagen). Further development and maintenance of the database will be defined annually.

5. Results

5.1. Results of the questionnaire — national response

Percentage of respondents

Fifteen countries were asked to fill in the questionnaires. Nine of these countries returned the questionnaires with data from their coasts, which is a response of 67 %. Of the remaining five countries, three indicated that they did not have sufficient resources to prioritise the task, and two gave no reply (**Table 1**). Quite a few parameters were only reported by one or a few countries. This data exists in the database but is not presented here.

Table 1: Number of respondent countries and number of parameters reported

		Numbers of parameters reported for:							
		Eutrophication (9 [1])				Harmful substances (38 [1])			
Countries asked for data	Reply 1.8.99	NRC	ICES [4]	MED POL	ICES + MEDPOL	NRC	ICES [4]	MED POL 1985–	ICES + MEDPOL
Belgium	1	[2]	8	na	8	-	15	na	15
Denmark	1	7	9	na	9	0	13	na	13
Finland	1	8	9	na	9	0	7	na	7
France	1	2	7	-	7	12	10	0	10
Germany	1	9	9	na	9	12	12	na	12
Greece	1	9	na	-	0	25	na	8	8
Ireland [3]	-	-	4	na	4	-	6	na	6
Iceland	-	-	4	na	4	-	11	na	11
Italy	1	7	na	-	0	0	na	3	3
Norway	1	9	9	na	9	10	15	na	15
Netherlands	1	9	9	na	9	21	16	na	16
Portugal	-	-	5	na	5	-	6	na	6
Spain	-	-	7	-	7	-	14	1	15
Sweden	1	9	9	na	9	20	15	na	15
UK	-	-	9	na	9	-	15	na	15
Total of 15	10								
Average number of parameters		7.7	7.5	0	6.5	11	12	3	11
% reply	67	85	83	0	72	29	31	8	29

(1) Numbers in brackets: Total number of single parameters asked.
(2) Data already reported to ICES.
(3) Data received after 1 August, integrated in the database but not discussed in the report.
(4) ICES (HELCOM and OSPAR).
na Not applicable, country not part of members reporting to the convention.

Percentage of parameters reported

Eutrophication

Chemical parameters: Out of 9 parameters asked for in the questionnaires, an average of 7.7 (85 %) were reported (**Table 1**).

Algal blooms and macro algae: Several questions relating to algal blooms, toxic algae, occurrence of macro algae and their maximum growth depth were asked. Three countries have replied to these questions, which is a response of 20 %.

Harmful substances

Out of 38 parameters asked for in the questionnaires, an average of 11 (30 %) were reported (**Table 1**). The most reported parameters are heavy metals, mainly mercury, cadmium, lead and zinc. For the organic pollution indicators most data is reported as PCB and PAH (both total). A few countries have also reported DDT (Tables 5, 6 and 8).

Sampling stations for which data is reported in the database

Below is presented an overview of all stations, which is stored in the database. This is a combination of stations reported from both the conventions and from the national reference centres (**Figure 1**). The stations do also represent water stations (**Figure 2**), biota (**Figure 3**) and sediments (**Figure 4**). The amount of data available from each station varies from a few values from one year, to long data series with many parameters for more than 10 years.

Please click in the map to zoom and see the data!

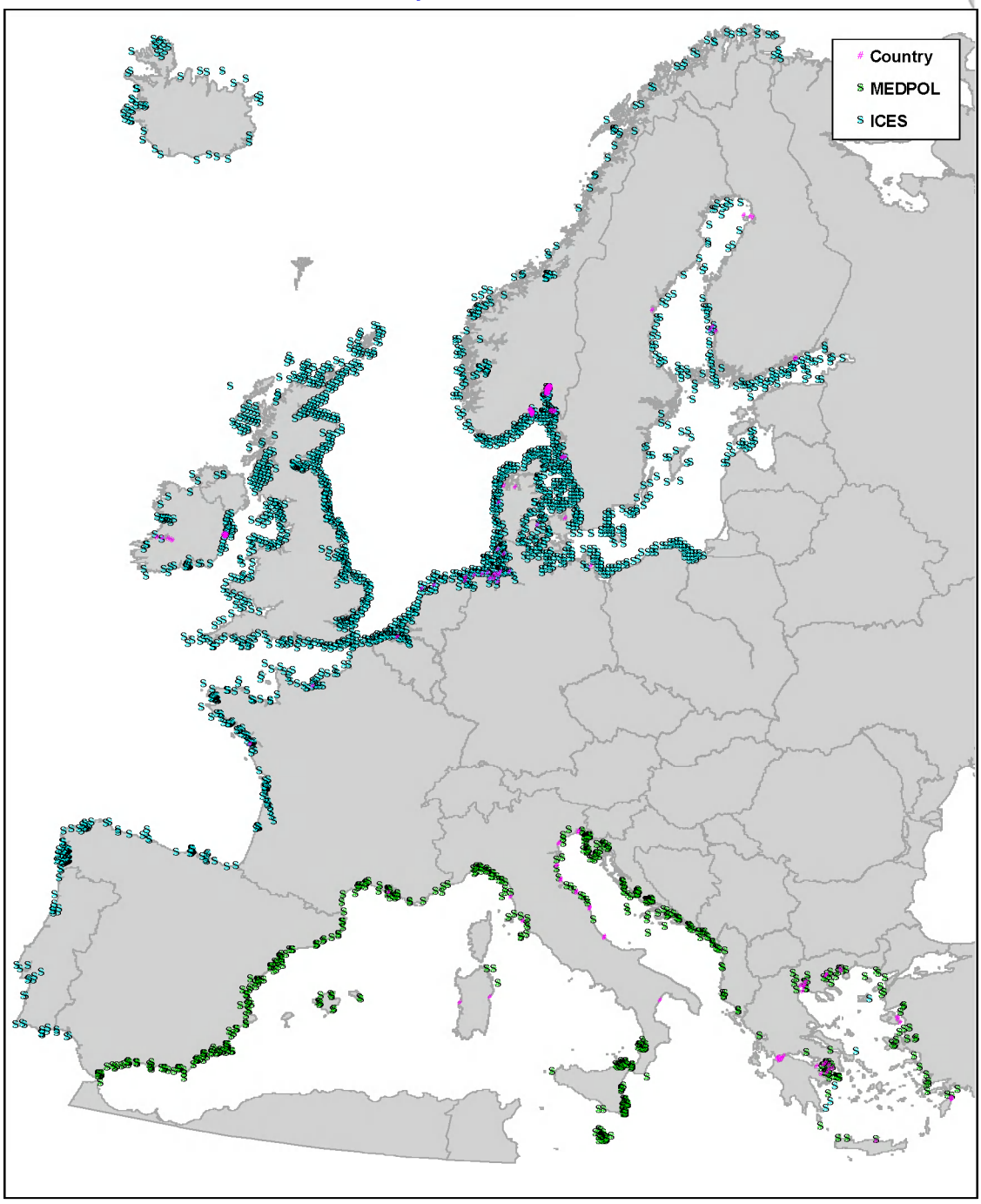

Figure 1: Overview of complete set of stations within the 20 km coastal zone, for which data was reported (water, biota and sediment) and stored in the database

Please click in the map to zoom and see the data!

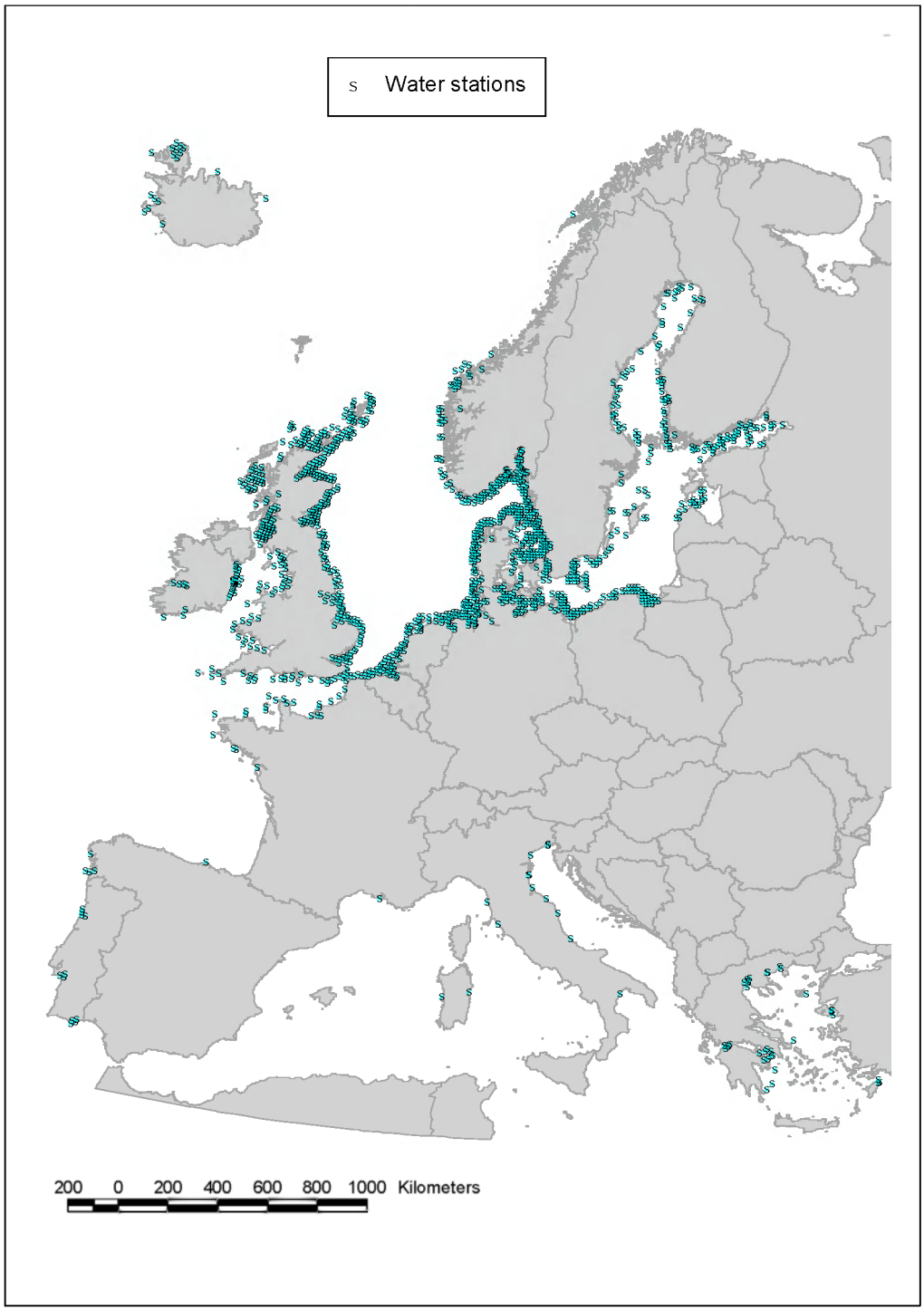

Figure 2: Distribution of stations for nutrients, chlorophyll and oxygen in water along the coast of Europe

Please click in the map to zoom and see the data!

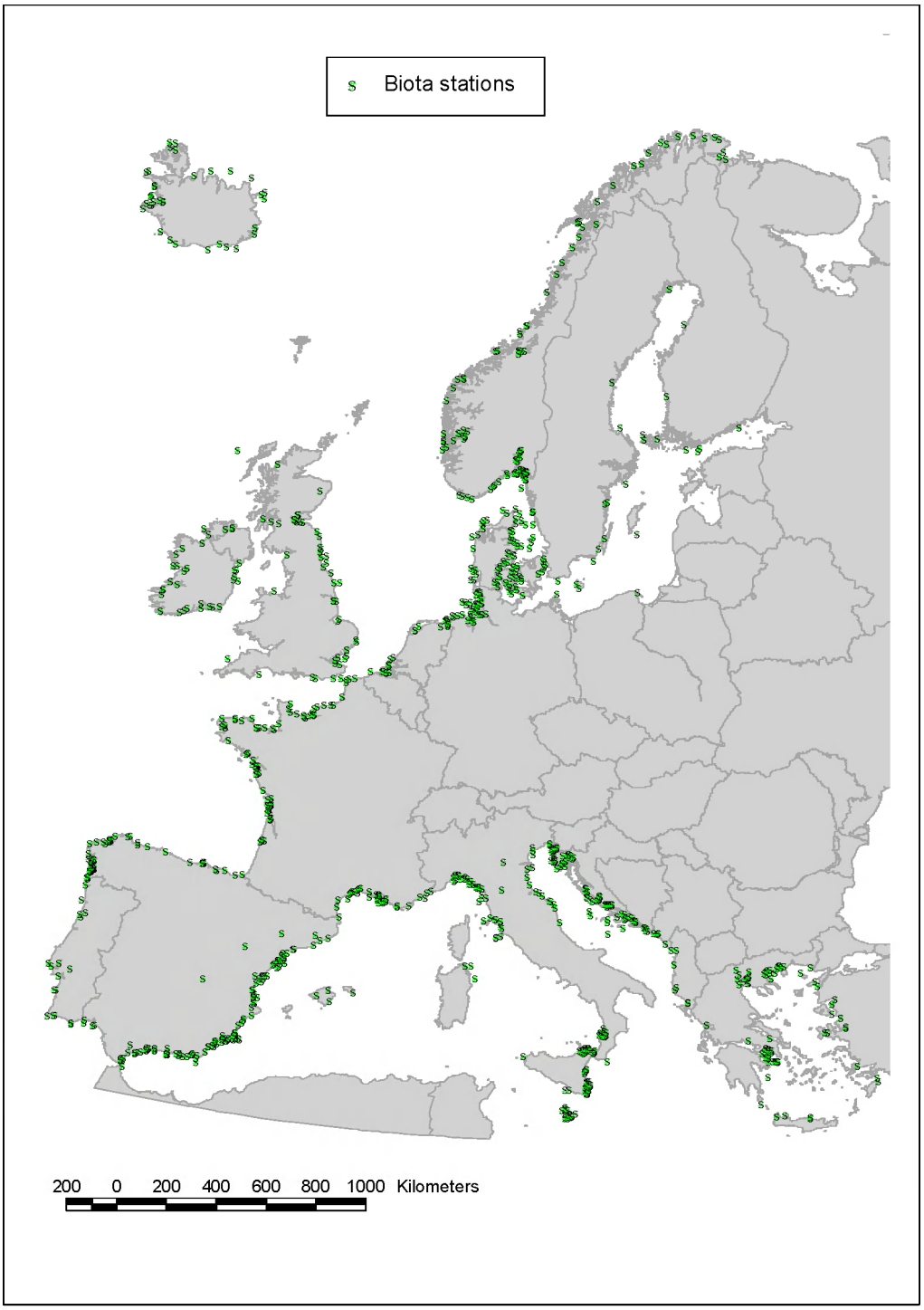

Figure 3: Distribution of stations for harmful substances in biota along the coast of Europe

Please click in the map to zoom and see the data!

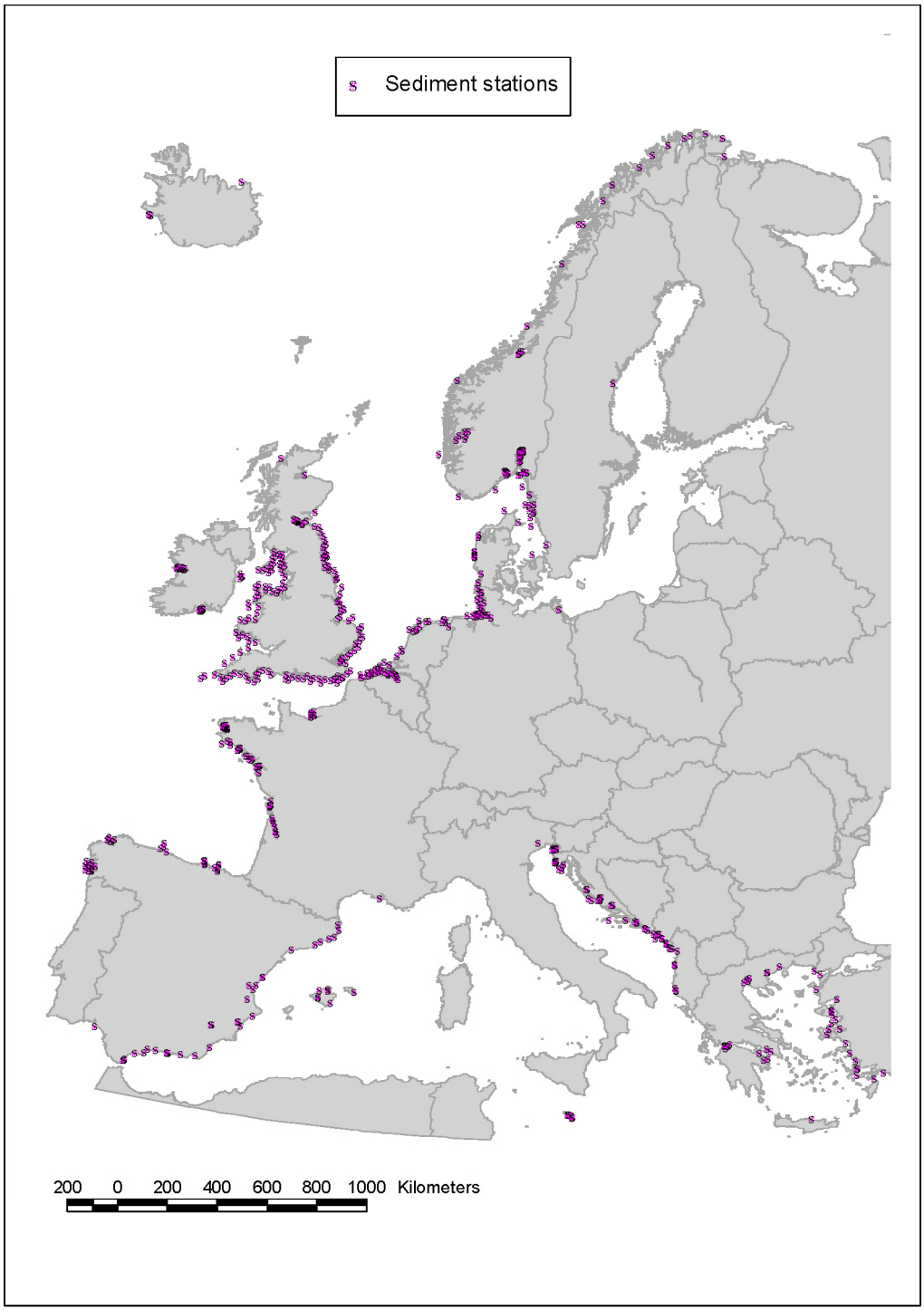

Figure 4: Distribution of stations for harmful substances in sediments along the coast of Europe

Overview on data presented by the countries

Nine national reference centres reported data to the EEA (Tables 17–24, Appendix D). This data is presented in Appendix D. Some of the countries have already reported most of their monitoring data to different conventions, the results therefore have to be combined with the data from the conventions (Chapter 4.2 and 4.3). Input (riverine and discharge) data is merged in one table (Table 25, Appendix D).

Coastal zones and reference stations

Data was requested per coastal zone from individual or aggregated station representing an area for the country to define. However, few countries in Europe have clearly defined coastal zones (Germany and France are two exceptions). A working group within EIONET will try to solve this consistency problem in 2000. In this report all data is therefore presented per station except for nutrients (ICES), which is presented as aggregated stations (10 x 10 km grids).

5.2. Abbreviations for countries — country codes and names

ICES use partly a two-letter letter code (as file extension) and the IOC alphanumeric country codes. In the MEDPOL data 3-letter country codes are used. In many cases the codes follow the international ISO 3166 standard, but there are some differences, and some of the codes that are used are in conflict with the ISO standard for other countries.

The database refers to countries by the 3-letter codes in the ISO 3166-1 standard (Appendix C). These codes are used both for to indicate geographic location of stations, and as information about 'owner' of data that comes directly from the countries involved. Data that come from ICES or MEDPOL has the organisation or convention acronym as owner and a relevant country code as geographic information (Appendix C).

A complete and ISO-authorised list of country names and the corresponding ISO 3166-1 Alpha-2 code elements — the ISO country code used in the Internet — is found on their page:
http://www.din.de/gremien/nas/nabd/iso3166ma/index.html.

A list of country names, alpha-3 and numeric country codes is published with permission of the ISO-3166-1 Maintenance Agency by the United Nations Statistics Division at URL:
http://www.un.org/Depts/unsd/methods/m49alpha.html.

5.3. Data from the International Council for the Exploration of the Seas (ICES)

Conventions and countries covered

The data from ICES is supplied through the conventions: OSPAR and HELCOM. The data presented in this report was initially supplied from ICES and cover the following countries: Belgium, Denmark, Finland, France (west coast), Germany, Ireland, Iceland, Norway, the Netherlands, Portugal, Spain (exclusive Mediterranean coast), Sweden and the UK. **Figures 2**, **3** and **4** show distribution of stations covering water, sediments and biota along the coasts of Europe.

Parameters and years covered

Eutrophication

Chemical parameters: Out of 9 parameters requested, ICES could supply 8 parameters (89 %) for the 13 countries in question (Tables 2 and 3).

Algal blooms and macro algae: ICES do not yet supply data on species and biomass.

Table 2: Overview of the years for which eutrophication related data was made available by ICES for OSPAR regions

ICES water eutrophication data — OSPAR												
Component	BEL	DNK	ESP	FRA	DEU	ISL	IRL	NLD	NOR	PRT	SWE (1)	GBR
Total-P	85–88	85–98	92–97		85–97			85–97	88;90–94		85–98	95–96
PO4-P	85–88; 90–97	85–98	92–97	88–92; 96–97	85–97	87–88; 91	92	85–97	85–98	85;90	85–98	85–98
Total-N		85–98	92–97		85–97			86–97	88; 90–94		85–98	86;97
NO3-N	85–97	85–98	92–97	85–86; 89–92; 96–97	85–97	87–88; 91	92	85–97	85–98	90	85–98	85–98
NO2-N	85–86; 88; 92–97	85–98	92–97	89; 91–92; 96–97	85–97			85–97	85–98	90	85–98	85–89; 91–97
NH4-N	85–97	85–98	92–97	85–86; 89–92; 96–97	85–97			85–97	85–94	85;90	85–98	86–87; 89–97
SiO3-Si	85–88; 90–97	85–98	92–97	88–92; 96–97	85–97	87–88; 91	92	85–97	86–98	90	85–98	85–98
Chlorophyll a	93–97	85–98	92	86; 88–89; 93–97	85–97		94–96	88–89; 93–97	85–98		85–98	85–90; 92–97
O2	90;95	85–98	94; 96–97	88–90	85–97	87;91		86; 88–92; 95–96	85–87; 89–98		85–97	88–89

(1) West coast.

Table 3: Overview of the years for which eutrophication related data was made available by ICES for HELCOM regions

ICES water eutrophication data — HELCOM								
Component	ESP	FIN	LVA	POL	RUS	DEU	DNK (1)	SWE (1)
Total-P		85–88;92–97	94	96	92–93;95–96	85–97	85–98	85–98
PO4-P	93–96	85–88;92–97	94	85;87–93;96	92–93;95–96	85–97	85–98	85–98
Total-N		85–88;92–97	94	96	92–93;95–96	85–97	85–98	85–98
NO3-N	93–96	85–88;92–97	94	90–93;96	93–94;96–97	85–97	85–98	85–98
NO2-N	93–94	85–88;92–97	94	90–93;96	92–93;95–96	85–97	85–98	85–98
NH4-N	93–94	85–88;92–97	94	92–93;96	92–93;95–96	85–97	85–98	85–98
SiO3-Si	94–95	85–88;92–97	94	90–91;93;96	92–93;95–96	85–97	85–98	85–98
Chlorophyll a	93	85–87;90–97		93–94;97	90–92;94	85–97	85–98	85–98
O2	94–95	87–89;91–92; 94–96	96	87–97	89–90;92;94–95	85–97	85–98	85–97

(1) East coast.

Harmful substances

Out of 38 parameters requested in the questionnaires, ICES (HELCOM+OSPAR) could supply 12 (32 %).

The most reported parameters are heavy metals, mainly mercury, cadmium, lead and zinc. For the organic pollution indicators most data is reported as PCB and PAH (both total). A few countries report data on DDT and TBT (Tables 4 and 5).

Table 4: Overview of the years for which data on harmful substances in sediments was made available by ICES

ICES sediment toxic-substances data											
Component	BEL	DNK	FRA	DEU	ISL	IRL	NLD	NOR	ESP	SWE	GBR
Cd	88; 90–94	88; 90–91	87–88	87–88; 90	90	90	85;87–88; 90–94	86–87, 90; 92;94	90	90–91	86–88; 90–91
Cr	91–95	88; 90–91		87–88; 90		90	85;87–88; 90–95	94	85	90–91	87; 90–91
Cu	88; 90–95	88; 90–91		87–88; 90	90	90	85;87–88; 90–95	86–87,90; 92;94	85;90	90–91	86–88; 90–91
Hg	88; 90–95	88; 90–91		87–88; 90	90	90	85;87–88; 90–95	86–87,90; 92;94	85;90	90–91	86–88; 90–91
Pb	88; 90–95	88; 90–91	87–88;91	87–88; 90	90	90	85;87–88; 90–95	86–87, 90;92;94	85;90	90–91	86–88; 90–91
PCB									85		90–91
Sum DDT							90		85		90–91
Tributyltin TBT	90						90			90	
Zn	88; 90–95	88; 90–91	87–88;91	87–88; 90	90	90	85;87–88; 90–95	86–87,90; 92;94	85;90	90–91	86–88; 90–91

Note: The table presents data from both OSPAR and HELCOM.

Table 5: Overview of the years for which data on harmful substances in biota was made available by ICES

ICES biota toxic-substances data													
Component	BEL	DNK	FIN	FRA	DEU	ISL	NLD	NOR	POL	PRT	ESP	SWE	GBR
Cd	85–96	85–97	85–93	85–93	85–96	85; 89–96	86–88; 90–96	85–97	~~84~~-86	85;90	85–96	85–96	85–87; 90–91
Cr	85–90	85			85–96	94–95	86–88; 90–96	89;92				85; 95–96	86–87
Cu	85–96	85–97	85–93	85–93	85–96	85; 89–96	86–88; 90–96	86–97	~~84~~-86	90	85–96	85–96	85–87; 90–93; 95
Hg	85–96	85–91; 93–97	85–93	85–93	85–96	85; 89–96	86–88; 90–96	85–97	~~84~~-86	85;90	85–96	85–96	85–87; 89–93; 95
Pb	85–96	85–91; 93–97	85–93	85–93	85–96	85; 89–96	86–88; 90–96	85–97	~~84~~-86	85;90	85–96	85–96	85–87; 90–91
Zn	85–96	85–97	85–93	85–93	85–96	85; 89–96	86–88; 90–96	86–97	~~84~~-86	90	85–96	85–96	85–87; 90–93; 95
PAH				85				87					
PCB	85–89		85–87	85–93				85–91	~~84~~-85			85–89	86; 90–95
SDDT		85	85–88; 90–93				86;88; 90–91	93;95		85	85	85–96	
TBT	90												
Radioactivity							86;88; 90–91						

Note: Years with strike-through are data older than 1985, which is the oldest data requested in the questionnaires. The table presents data from both HELCOM and OSPAR.

Assessment reports

OSPAR — The Convention for the Protection of the Marine Environment of the North-east Atlantic

Status reports for the OSPAR areas are available through the web site: www.ospar.org/. The OSPAR Commission has finalised five regional quality status reports on the greater North Sea, the Celtic Seas, the Bay of Biscay and the Iberian coast, and the wider Atlantic and, as a summary, one holistic convention-wide quality status report (QSR 2000).

HELCOM — Helsinki Commission, Baltic Marine Environment Protection Commission

Status reports and recommendations for the HELCOM area are available through the web site: www.HELCOM.fi/ec.html.

The first draft of the fourth periodic assessment of the state of the marine environment of the Baltic Sea, 1994–98 (4PA) is scheduled for publication in April 2001. The progress report is addressed to members of the project group for the assessment, environment committee, and the convener groups responsible for drafting of the 4PA. A copy of the progress report will be available also at the HELCOM EC Internet site on the 4PA.

Reports from the working groups 'Nature conservation and biodiversity' and 'Monitoring and assessment' are available to download from the web.

5.4. Data from Mediterranean pollution monitoring and research programme (MEDPOL)

Countries covered

The Mediterranean pollution monitoring and research programme covers the countries around the Mediterranean. In this round we asked for data covering France, Greece, Italy and Spain, since local data was requested from these countries. However, some data from Albania, Malta, Turkey, and former Yugoslavia were supplied and is also stored in the database.

Parameter and years covered

Eutrophication

MEDPOL does not collect data on nutrients or other eutrophication indicators.

Harmful substances

Out of 38 parameters requested in the questionnaires, MEDPOL have available an average of 3 (8 %) of the parameters in question (data between 1985–98) for the four countries in question (**Table 1**). Data older than 1985 is excluded from the table as this was not requested in the questionnaires. However, all data received (Table 6, all years included) is stored in the database.

Most of the data made available from MEDPOL is covering heavy metals. For the organic pollution indicators the data available is halogenated hydrocarbons in biota (Table 7).

Table 6: Overview of the years for which data on harmful substances in biota was made available by MEDPOL

Heavy metals in biota								
Component	ALB	FRA	GRC	ITA	MLT	ESP	TUR	YUG
Ag			75–79					
As			75–79			88–91		77–78
Cd	92	77–79	75–80; 85–89	76–80; 87–89	76–79; 85–90	79–85;88–91	77–79;84	77–79;83–91
Co			75–79				77–78	
Cr			75–79; 85–89			82–85	77–79	79
Cs			75–79					
Cu	92		75–80; 85–89	76–80	76–79; 85–90	79–80	77–79	77–79;83–89
Fe	92		75–80; 85–87			80	77–79	
HgO				79–79		90–91		90
HgT	92	77–79	75–80; 85–86	75–80; 87–89	76–79; 85–90	79–80; 82–85; 88–91	77–79;84–85	77–79;83–91
Mn	92	76	78–80	76–80	76–79	80	77–78	88
Ni			79–80; 85–89			82	77–79	79
Pb	92	77–79	75–80	76–80	77–79;85–90	78–85;88–89	77–79	77–79;83–91
Rb			79					
Sb			75–77;79					77–78
Se			75–79	78–79				77
Zn	92		75–80; 85–89	76–80	76–79;85–90	80	77–79	77–79;83–89

Note: Years with strike-through are data older than 1985, which is the oldest data requested in the questionnaires.

Table 7: Overview of the years for which data on harmful substances in biota was made available by MEDPOL

MEDPOL data — halogenated hydrocarbons in biota								
Component	ALB	FRA	GRC	ITA	MLT	ESP	TUR	YUG
HHBI	92	77–79	75–79; 86–89	75–79; 87–89	84–90	79–86; 88–91	75–79; 84–85	76–80; 83–90

Note: Years with strike-through are data older than 1985, which is the oldest data requested in the questionnaires.

Assessment reports covered for the area

A new assessment report covering the identification of priority pollution hot spots and sensitive areas in the Mediterranean is available. The report has been prepared in the framework of a strategic action programme (SAP) for the Mediterranean, as a follow-up to the signing of the protocol for the protection of the Mediterranean Sea against pollution from land-

based sources and activities. It summarises the results of consolidating and analysing country reports prepared by the national teams headed by the government-designated national coordinators for the strategic action programme in the country, and has been funded by a grant of the global environment facility (GEF). The report can be downloaded from the web site: www.unepmap.gr/.

5.5. Information on the data and the database

A Microsoft Access 97 database is used for storage and retrieval of data. The data tables supplied from ICES and MEDPOL were in formats suitable for direct import into Access tables, where further sorting, selecting, coding and linking procedures were performed. The data returned from the separate countries by ETC Questionnaires were handled by spreadsheet shuffling procedures (Microsoft Excel 97) before import to Access.

Only the data from positions within 20 km distance from the coastline (islands included) were selected for inclusion in the ETC database. The identification of positions falling within the 20 km coastal zone was performed using a functionality in the Arcview GIS application.

A detailed description/manual for the database is given in Appendix C.

6. Conclusions and recommendations

6.1. Databases

Location

The database described in this report is available through the EEA, and will be maintained within the Topic Centre for Water in the future.

Quality assurance

The database will be maintained and quality assured according to the EEA data management strategy.

Existing data and need for supplementing data

This is the first version of a marine water database covering data for all of Europe's coasts. To establish such a database more work is yet to be done. At the moment the database covers 15 countries in Europe and a variable number of parameters per country. However, the structure is established and a first overview of data availability in Europe has been achieved.

For some of the data already established in the database supplementary data is needed, e.g. sediment-fraction data for many of the metal data reported from the conventions and salinity data for nutrients in estuary and deltas. These are data that are needed to be able to compare values from different areas and are in many cases yet to be filled in before the database can be used for assessment.

6.2. Data flow

The marine conventions

The conventions are of major importance for establishing monitoring programmes especially related to harmonisation of sampling and analysis, collection of data from countries, and updating and maintenance of large databases. It is therefore essential that they receive sufficient resources to be able to manage new data and quality assure the existing databases. This would also ensure a better data availability on an international level and facilitate the work of the EEA.

EEA national reference centres

It is also essential and critical that the national reference centres are assured sufficient basic funding to be able to report to the conventions. In most cases the reference centres do both monitoring and reporting for some of the national areas and depend upon collecting data from other national research institutions. Our experience with the questionnaires is that the persons responsible for reporting to the conventions and others are overloaded with work. The consequence of this may be that existing information is not available either to the conventions or to the EEA.

6.3. Purpose and future work

EEA requested the European Topic Centre for Marine and Coastal Environment (ETC/MCE) to develop indicators for the marine and coastal environment. The main objective of the questionnaire and the database is the gathering of data relevant at the European level for the characterisation of environmental state and pressure for coastal ecosystem quality in order to produce information to be used for the following specific purposes:

Short term

— EEA reporting (indicator based reports and state and outlook reports);
— ecosystem quality (eutrophication, harmful substances, oil pollution), Biodiversity, ICZM, spatial development;
— further develop national databases as the gaps in knowledge and information become visible;
— apart from gathering monitoring data, the questionnaire is used to obtain an overview of as much (grey) literature, scientific publications, reports and other information as possible on the subjects covered.

Long term

— develop a structured database for aggregated data on status for water, sediments and biota based on the indicators relevant in EU policy;
— produce information easily accessible to the public via Internet;
— make the information accessible at all relevant levels.

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Appendix B: Questionnaire

European Topic Centre

on Marine and Coastal Environment

(ETC/MCE)

UNDER CONTRACT TO
THE EUROPEAN ENVIRONMENT AGENCY

INDICATOR QUESTIONNAIRE

On behalf of ETC/MCE: Thank you for your support!

The ETC/MCE partners are:

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Objectives of the questionnaire

The European Environment Agency (EEA), based in Copenhagen, has requested the European Topic Centre for Marine and Coastal Environment (ETC/MCE) to develop indicators for the marine and coastal environment. In order to facilitate the exchange of data/information ETC/MCE partners are willing to visit the countries, if needed, to help with the completion of the questionnaire.

The main objective of this questionnaire is to gather data at the European level relevant for the characterisation of environmental state and pressure for coastal ecosystem quality in order to produce information to be used for the following specific purposes:

— to use the information for EEA reporting;
— to develop a structured database on coastal typology and the indicators for the themes relevant in EU policy;
— ecosystem quality (eutrophication, harmful substances, oil pollution), biodiversity, ICZM, spatial development;
— to produce information easy accessible to the public via the world wide web (Internet).
— to make the information accessible at all levels;

— to develop further on national databases as the gaps in knowledge and information will become visible.

Apart from gathering monitoring data, the questionnaire is used to obtain an overview of as much (grey) literature, scientific publications, reports and other information as possible on the subjects covered.

Based on the information obtained, the following products are foreseen:

— the database containing the data and indicators for the theme ecosystem quality;
— GIS maps on indicators for the subjects eutrophication, harmful substances, oil pollution;
— GIS map on the sensitivity of the water system based on the assessment of the GIS information with additional data (reports, GISCO database);
— fact sheets of coastal zones and estuaries, with the main indicators for the respective themes, additional information and sensitivity.

Indicators

The importance of a common set of indicators was stressed at the European Conference of Ministers of the Environment in Aarhus in June 1998. Indicators can play a vital part in focusing and illuminating the significance of environmental change and the progress of sustainability. Providing the data and information to support widely agreed key indicator sets in a consistent and timely way should be one main objective of the improvement of monitoring and data gathering. Indicators are quantified information, which help to explain how things are changing over time or vary spatially.

In the longer term there is a link with the development of the indicator report produced by the ETC/MCE while in the short term there is a definite link with annual indicator reports.
The indicators will be updated at regular intervals.

The number of indicators depends on the availability of data, proposed use and possibilities for aggregating the information to a level, which still has relevance to indicate change.
It is envisaged to end up with a hierarchy of some 30 indicators.

Methodology

The testing of the indicators will be based on:
— multi-criteria analysis using the set of criteria for indicators available within the TC;
— aggregation within a theme after classification related to the reference value;
— the experience gained from 'Europe's environment: the second assessment', 'EU98' and other report and activities.

Classification of the indicators will be related to the water framework directive while the statistical trend analysis will be carried out using the Trend-Y-Detector.

DIRECTIONS FOR USE OF THIS QUESTIONNAIRE

The following directions are explanatory notes on the questionnaire, and how to fill it in. Please do not hesitate to contact the persons listed below for any question you might have. Thank you.

Selection of areas to cover

This request for data concerns coastal areas of major importance, as considered adequate by the countries. Two scale levels should be described:
(1) scale 1:8.000.000 — major coastal zones;
(2) scale 1:250.000 — individual estuaries, deltas or fjords.

We therefore ask you to fill in the questionnaire separately for each of the major coastal zones in your country. Furthermore, please choose at least two estuaries, deltas or fjords per country and fill up the following spreadsheets for each of them. The estuaries should cover the major rivers, and the lagoons/fjords could be the major ones in terms of environmental significance.

The areas chosen should be representative for the nation. Preferably, long-term time series should be available.

The coastal zones could be defined as the larger sea areas with rather uniform physical, chemical and biological characteristics. It is suggested to discuss with the ETC/MCE the proposed coastal zone delimitation. For larger river basin catchment areas, specific coastal zones may be defined, following the draft EU framework directive on water policy.

The width of the coastal zone to be covered is set to 20 km (about 12 miles). For each coastal water system to be described, a number of options exist with respect to the aggregation of data.

(1) If there is only one sampling station in the water system, the coordinates for this water system can be used.
(2) If there are multiple sampling stations, one out of two methods may be used: **2.a** — use one of the sampling stations as representative. Use coordinates for this station **2.b** — use averaged results of multiple sampling stations. A fictive point in the water system can be defined for coordinates.

Please indicate which of the three systems is used for the water system. If multiple stations are used, please indicate coordinates of contributing sampling stations separately.

With future updates of the data, the same system should be used for each water system.
If for certain coastal zones no monitoring data are available, it would still be appreciated to have these zones identified and characterised by the general information sheet and geographical representation.

For the estuaries, lagoons and fjords, more than one representative station may be necessary to cover gradient situations. For each station, a separate sheet should be filled in. We suggest not more than five stations per estuary/lagoon/fjord.

Please supply a map showing the chosen areas. If possible, submit as digital file suitable for a GIS (polygon).

Please note that information already provided through ICES/OSPAR, HELCOM or MEDPOL are not requested from the countries again.

Before you start

Before starting to fill up the sheets, please make a separate copy of this electronic file for each separate large coastal zone/estuary, lagoon, or fjord of your coastal area.
Note that this original q-blank file is read-only. Please name each file starting with the abbreviation for your country, followed by the (abbreviated) name of the water system.

Submission deadline

Please return the completed questionnaire as digital file by e-mail to the ETC/MCE by the end of April 1999.

Lay out of the file

Within this questionnaire Excel file, there are four sheets to be filled in for each coastal zone/estuary/lagoon/fjord:
— general — these are the general characteristics for the water system;
— eutrophication — theme-specific information;
— harmful substances — theme-specific information;
— oil pollution — theme specific information.

Specific directions on the separate sheets are given below. A complete overview of all parameters requested is given at the end of this direction sheet. Each sheet ends with an overview of relevant literature, reports, etc. We would welcome a summary of the reports in English, if possible on digital file.

Sheet: General

In header: Country, water system name and date filled in on first line of 'General' page will be copied to all other pages.

Description of coordinate. Please indicate type chosen. 1: Single sampling point.
2: Representative sampling point. 3: Fictional point.

Please indicate mean and maximum depth of sampling stations. Geographical coordinate system: x and y to be given in decimal degrees.

Table 1: Transparency/vertical attenuation coefficient (Kd): choose one of two methods.

Table 1: Water turnover time: general turnover time characteristics are available per regional sea: however we want it specified only for the specific coastal zone, lagoon, etc.

Table 2: Biological characteristics: for large-scale coastal zones, please use a non-detailed description/classification. For estuaries, lagoons and fjords, a more detailed description may be provided.

Sheets: Eutrophication/harmful substances/oil pollution

For most parameters, please fill in for the year indicated:
— Maximum value (MAX);
— Median value (MEDIAN); if no median values can be given, please provide the mean values;
— Minimum value (MIN);
— Number of observations (NUMBER);
— Reference value (REFERENCE).

For a number of parameters however, instead of MAX/MEDIAN/MIN, the actual annual VALUE is to be filled in.

The pages on the right hand side of the tables provide space for remarks. When printed, two pages cover four tables; first the four tables to fill in, and secondly the remarks section for those four tables. Under remarks: a short specification of the measurement methods and detection limits is requested in order to obtain an indication of the comparability of the data. We would appreciate, under remarks, a specification of the methods of analysis, and the detection limit. If standard methodologies for the regional conventions are used, you may simply refer to these. Please indicate under 'Remarks' when a change in measurement methodology has taken place for the parameter during the sample period.

Type of data aggregation to be used: Average of surface water layers 0–10 m.
Horizontal averaging: average all stations within a 'homogeneous area'.
Temporal averaging: define most appropriate period (for instance, for certain nutrients, three possibilities for one parameter are given: year-round/summer/winter. Please choose average period as used in your country).

The Reference value in the REFERENCE line: For each of the parameters asked, the (national) policy values used as evaluation criteria are to be filled in here. (So, these may be values of a certain reference station, or the evaluation values set by relevant authorities/determined by institutions.) Please fill in the value for 1985, the rest of the row will be copied automatically. For reference values, there are different types in use. Options may be background reference concentration (BRC)/target value (TAV)/threshold value (TRV).

This is the preferred order of choice, so please provide background reference values whenever available. Otherwise: TAV or TRV. If not then use EAC's: ecological assessment criteria may be given. These ranges have been formulated by OSPAR to identify potential areas of concern. Please indicate the type of reference provided in the right hand corner of each table.

As for input data: atmospheric data is not asked for. If considered relevant, they will be retrieved via the other Topic Centers or via CAMP databases (comprehensive atmospheric monitoring programme).

On all three sheets, the final table requests for an overview of relevant (grey) literature, scientific publications, reports and other information relevant to the subject. Sheet numbers are E-31, HS-49 and OP-9.

Especially of value would be the information where national data or parts of this, which is entered in this questionnaire, has been described and assessed/evaluated. The information will be used to support the data evaluation, for instance detection of trends in the development of eutrophication, and the causes for the state of the environment.

Sheet: Eutrophication

General remark: please indicate in the relevant tables which periods are considered 'spring' and 'summer' for those parameters. For winter, please use the January–February two month period. For summer and spring, please use the two or three months with least production.

Tables E-6/E-7/E-8: Nitrate/Nitrite/Nitrate + Nitrite. Please fill in either E-6 and E-7, or E-8 only. If you fill in E-6 and E-7, a total will be calculated in E-8. If you have summed values only, you may overwrite the sum formula in E-8.

Table E-10: Ratio Total N/Total P: automatically calculated from Tables E-1 and E-4. Error message will disappear when Tables 1 and 4 have values.

Table E-11: Ratio Nitrate + Nitrite/Phosphate: automatically calculated from Tables E-6 and E-7, or E8. Error message will disappear when Tables 6 and 7, or 8 have values.

Table E-12: Oxygen. Please give values at bottom layer. Please indicate measuring depth. The period to cover here is September to October. Please specify depth of measurement.

Table E-14: Algal blooms. Algal blooms occur when algae grow very fast and one or a few species accumulate in high numbers into dense patches in the euphotic zone. For algal blooms, a number of possibilities exist to describe these. In the table this is reflected in three lines: the surface cover, the frequency of algal blooms, and the maximum number of cells/l measured in a given year. Please select appropriate line(s), depending on the way this is measured. Type of monitoring determines the units. Suggestions for further differentiation using remote sensing data and data assimilation techniques are appreciated.

Tables E-15/E-16/E-17: Toxic algae. Please use a separate table for each of three dominant species, and specify species names under remarks. It is acknowledged that from year to year, the species composition may vary. However, it is requested to fill in the questionnaire for those three species that have been observed regularly, and for which long time series are available. Under remarks it could be mentioned when in certain years other species were prevalent. Furthermore, exceptional events may be listed in the last worksheet of this excel file.

Tables E-19/E-20: Diatom/Flagellate ratio. The calculation should be based on biovolume/l for each group. Please specify the two months of spring, for summer use May to September (five months).

Table E-21: Chlorophyll a. For summer, please use the five month period from May to September.

E-22/E-23/E-24/E-25: Sea grasses and seaweeds. These plants can both be measured in two ways: surface cover, and depth of occurrence. Please indicate appropriate method of measurement.

Tables E-26/E-27: Microphytobenthos/Soft bottom macrozoobethos. As for dominant species, please select those species which have been found dominant over the period specified, and then fill in the values over the period for those three species. It is not the intention to get separate values for each year based on the three dominant species for each individual year.

Tables E-28/E-29/E-30: Loads entering water system. Please state source apportionment under remarks.

Table E-30: Load Total C entering water system. Please specify organic/inorganic fractions.

Table E-31: References. Please provide an overview of literature and further information relevant for eutrophication here.

Sheet: Harmful substances

Tables HS-7, 8, 11, 12, 22, 23, 33, 34, 38, 46, 47: PAH and PCB
PAHs cover sum of: anthracine, benzo(a)anthracine, benzo(ghi)perylene, benzo(a)pyrene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, pyrene, phenanthrene. This follows the OSPAR Commission working group on concentrations, trends and effects of substances in the marine environment (SIME). If a sum of these nine is not available, please state the PAH with highest concentration covering a reasonable time series. PCBs cover sum of: CB 28, CB 52, CB 101, CB 118, CB 138, CB 153, and CB 180. This follows the OSPAR Commission working group on concentrations, trends and effects of substances in the marine environment (SIME). If a sum of these seven is not available, please state the PCB with highest concentration covering a reasonable time series. Essential is that each water system can show their trends.

Table HS-14: Radiation/Table 25: Radiation in mussel/Table 36: radiation in fish.
Please specify type of radiation measured (alpha, beta or gamma).

Tables HS-39 to HS-48: Inputs. Direct inputs are point sources or diffuse pollution in countries with large coastlines. Following OSPAR definitions, the tidal limit is the border between river and coastal area. Riverine input is the load conveyed by a river to the maritime area. Load calculations are derived from river flows and concentrations. Processes which take place in the subsequent estuarine environment, are not taken into account although they can seriously affect the actual amount. When concentration is lower then detection limit, no load estimates should be given: an upper (detection limit) and a lower value (equal to zero).

Others: The dumping of dredged material (only when large quantities are involved).

Table HS-49: References. Please provide an overview of literature and further information relevant for harmful substances here.

Sheet: Oil pollution

Table OP-3: Birds affected. Please indicate whether specific guidelines for measurement were followed, for instance OSPAR/JAMP guidelines

Table OP-4: Mammals affected. For mammals affected, please indicate way of measurement, for instance whether mammals are killed and beached, or that food supply is affected negatively.

Table OP-9: References. Please provide an overview of literature and further information relevant for oil pollution here.

Full list of parameters

Sheet: General
TABLE 1: General characteristics
TABLE 2: Biological characteristics

Sheet: Eutrophication
TABLE E-1: TOTAL P (year-round)
TABLE E-2: TOTAL P (winter)
TABLE E-3: ORTHO-PHOSPHATE (winter)
TABLE E-4: TOTAL N (year-round)
TABLE E-5: TOTAL N (winter)
TABLE E-6: NITRATE (winter)
TABLE E-7: NITRITE (winter)
TABLE E-8: NITRATE + NITRITE (winter)
TABLE E-9: AMMONIUM (winter)
TABLE E-10: TOTAL N/TOTAL P RATIO (year-round)
TABLE E-11: NITRATE + NITRITE/PHOSPHATE RATIO
TABLE E-12: DISSOLVED OXYGEN or SATURATION
TABLE E-13: SILICATE
TABLE E-14: ALGAL BLOOMS (choose appropriate units)
TABLE E-15: TOXIC ALGAE (species 1)
TABLE E-16: TOXIC ALGAE (species 2)
TABLE E-17: TOXIC ALGAE (species 3)
TABLE E-18: PHAEOCYSTIS SP.
TABLE E-19: DIATOM/FLAGELLATE RATIO (spring — based on biovolume/l)
TABLE E-20: DIATOM/FLAGELLATE RATIO (summer — based on biovolume/l)
TABLE E-21: CHLOROPHYLL A (summer)
TABLE E-22: SEA GRASSES (cover *Zostera* sp. or *Posidonia* sp.)
TABLE E-23: SEA GRASSES (maximum depth of occurrence)
TABLE E-24: SEA WEEDS (cover)
TABLE E-25: SEA WEEDS (maximum depth occurrence)
TABLE E-26: MICROPHYTOBENTHOS (biomass)
TABLE E-27: SOFT BOTTOM MACROZOOBENTHOS (>1 mm) biomass
TABLE E-28: INPUT TOTAL P entering water system
TABLE E-29: INPUT TOTAL N entering water system

TABLE E-30: INPUT TOTAL C entering water system
TABLE E-31: Relevant literature/reports/other information on eutrophication

Sheet: Harmful substances
TABLE HS-1: Cd in sediment
TABLE HS-2: Cr in sediment
TABLE HS-3: Cu in sediment
TABLE HS-4: Hg in sediment
TABLE HS-5: Pb in sediment
TABLE HS-6: Zn in sediment
TABLE HS-7: PAH in sediment
TABLE HS-8: PCB in sediment
TABLE HS-9: TBT in sediment
TABLE HS-10: DDT in sediment (sum DDT+DDE+DDD)
TABLE HS-11: PAH in suspended matter
TABLE HS-12: PCB in suspended matter
TABLE HS-13: TBT in suspended matter
TABLE HS-14: RADIATION
TABLE HS-15: Cd IN MUSSEL dry tissue
TABLE HS-16: Cr IN MUSSEL dry tissue
TABLE HS-17: Cu IN MUSSEL dry tissue
TABLE HS-18: Hg IN MUSSEL dry tissue
TABLE HS-19: Pb IN MUSSEL dry tissue
TABLE HS-20: Zn IN MUSSEL dry tissue
TABLE HS-21: DDT IN MUSSEL dry tissue (sum DDT+DDE+DDD)
TABLE HS-22: PAH IN MUSSEL dry tissue
TABLE HS-23: PCB IN MUSSEL dry tissue
TABLE HS-24: TBT IN MUSSEL dry tissue
TABLE HS-25: RADIONUCLIDES IN MUSSEL dry tissue
TABLE HS-26: Cd IN FISH (please specify tissue)
TABLE HS-27: Cr IN FISH (please specify tissue)
TABLE HS-28: Cu IN FISH (please specify tissue)
TABLE HS-29: Hg IN FISH (please specify tissue)
TABLE HS-30: Pb IN FISH (please specify tissue)
TABLE HS-31: Zn IN FISH (please specify tissue)
TABLE HS-32: DDT IN FISH (please specify tissue) (sum DDT+DDE+DDD)
TABLE HS-33: PAH IN FISH (please specify tissue)
TABLE HS-34: PCB IN FISH (please specify tissue)
TABLE HS-35: TBT IN FISH (please specify tissue)
TABLE HS-36: RADIONUCLIDES IN FISH (please specify tissue)
TABLE HS-37: DDT IN MAMMAL (sum DDT+DDE+DDD)
TABLE HS-38: PCB IN MAMMAL
TABLE HS-39: INPUT Cd entering water system
TABLE HS-40: INPUT Cr entering water system
TABLE HS-41: INPUT Cu entering water system
TABLE HS-42: INPUT Hg entering water system
TABLE HS-43: INPUT Pb entering water system
TABLE HS-44: INPUT Zn entering water system
TABLE HS-45: INPUT DDT entering water system (sum DDT+DDE+DDD)
TABLE HS-46: INPUT PAH entering water system
TABLE HS-47: INPUT PCB entering water system
TABLE HS-48: INPUT TBT entering water system
TABLE HS-49: Relevant literature/reports/other information on harmful substances

Sheet: Oil pollution
TABLE OP-1: OIL SPILLS on surface
TABLE OP-2: COASTLINE AFFECTED
TABLE OP-3: BIRDS AFFECTED
TABLE OP-4: MAMMALS AFFECTED
TABLE OP-5: INPUT: OIL AND GAS INDUSTRY (direct)
TABLE OP-6: INPUT: ACCIDENTS
TABLE OP-7: INPUT: SHIP DISCHARGES
TABLE OP-8: INPUT: RIVERINE INPUT
TABLE OP-9: Relevant literature/reports/other information on oil pollution

For further information: contact your contact person with the appropriate ETC/MCE partner, or:
Jannette van Buuren/RIKZ
Anton van Elteren/RIKZ
Kari Nygaard/NIVA

On behalf of ETC/MCE: thank you for your cooperation!

ABBREVIATIONS USED

BRC	background reference concentration
DDD	dichlorodiphenyldichloroethylene
DDE	dichlorodiphenyldichloroethane
DDT	dichlorodiphenyltrichloroethane
dw	dry weight
EAC	OSPAR ecological assessment criteria
EU	European Union
HELCOM	Helsinki Commission (Baltic Regional Convention)
ICES	International Council for Exploration of the Sea
MAP	Mediterranean action plan
MEDPOL	Programme for the assessment and control of pollution in the Mediterranean region, part of MAP
OSPAR	Oslo and Paris Convention (Atlantic Regional Convention)
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated bifenyl
PSU	Practical Salinity Unit
RIKZ	National Institute for Coastal and Marine Management/RIKZ (Netherlands)
TAV	target value
TBT	tributyltin
TRV	threshold value
ww	wet weight

COUNTRY :	[country name]	WATER SYSTEM:	[water system name]		DATE: [date]
		COORDINATES:	[coordinates]		(decimal degrees)
		Min depth of sampling stations:		m	
DATA SUPPLIER:	[name of institute]	Max depth of sampling stations:		m	
CONTACT PERSON:					

TABLE 1: General characteristics			
Average temperature, summer	°C		Months:
Average temperature, winter	°C		Months:
Salinity	psu	practical salinity unit	
In river mouths : Cl-content	µmol/l		
Transparency (summer)	m	secchi disk depth	
Vertical attenuation coefficient (Kd)	(unitless)		
Total suspended matter (summer)	mg/l		
Total river flow contributing to water system (average)	m3/day		
Watershed area:	km2		
Geological characteristics:			
Water body width :	km		
Water body length:	km		
Water body volume:	m3		
Water body depth (mean):	m		
Water body depth (max):	m		
Freshwater input (summer and winter, or annually):	m3		
Water exchange turnover time:	month		

TABLE 2: Biological characteristics	[add more lines if necessary]
Most important habitat types in area:	-……
	-……
	-……

Examples from the questionnaires about eutrophication:

COUNTRY:	(country name)				WATER SYSTEM:		(water system name)				DATE:	(date)	
THEME: EUTROPHICATION					COORDINATES:		(coordinates)						
TABLE E-1: TOTAL P (year-round)						UNIT:	µmol/l			REFERENCE TYPE:			BRC/ TAV/ TRV
YEAR	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
MAX													
MEDIAN													
MIN													
NUMBER													
REFERENCE													
REFERENCE													
TABLE E-31: Relevant literature/reports/other information on eutrophication													
Year	author(s)			title							Pub-lisher		
				subtitle									

Appendix C: The EEA Marinebase — User guide

1. Introduction

The EEA Marinebase is implemented in Microsoft Access 97. It is a pilot version, representing a first step in collecting and combining data from various sources into a common framework for presentation of data environmental conditions. Emphasis has been on harmonising and combining data that come in different formats and have different aggregate levels and different sets of supplemental detailed information. The result is mainly a data structure, that is, a set of data tables, partly linked to code tables. The user interface in terms of queries and forms is only fragmentary, and no reports have been defined. More work will be needed to make it into a fully functional database. However, some elements are included that can be seen as a starting point. Chapter 2 describes the basic database structure, with tables and their relationships. Chapter 3 describes the few elements of the user interface that are currently included. Chapter 4 describes the data contents of the various sources that have been incorporated into the database, and how they have been prepared and transformed for inclusion into common tables. Chapter 5 shows examples of excerpt from the database.

2. Database structure

The database consists of the following tables.

- Tables with general information and data on input from land:
  - **t_General_Info** General data on natural conditions (topography, freshwater run-off, hyrdographic conditions)
  - **t_Land_Input** Data on input of pollutants and nutrients from land
- Three main data tables, each with data for one medium collected from various data sources. These tables have been structured to include the different date sources in a common format, and are linked to code tables for components, units, species, tissues, and countries. Together these tables contain the bulk of the data. These tables, which are described in more detail below in Chapter 0, are:
  - **tDATA_Biota** Data on contaminants in biota
  - **tDATA_Seawater** Data on nutrients and oxygen in seawater
  - **tDATA_Sediment** Data on contaminants in sediment
- Code tables for species, tissues, components, units, laboratories and countries. These tables are indexed and linked to the main data tables wherever relevant (see Tools|Relationships to see which links are implemented). The links preserve referential integrity, and makes easy implementation of list-box lookup on data input. At least some of the links has cascade updates (e.g. change in a species code in the species code table will propagate to all biota records for that species), but cascade delete is not implemented. The code tables are:
  - **tCODE_Country** List of country codes and names
  - **tCODE_Convention** List of international conventions (ICES, MEDPOL)

tCODE_Laboratories	List of laboratories (initial contents from ICES), linked to biota table.
tCODE_Component	List of elements and chemical compounds occurring in the main data tables.
tCODE_Unit	List of measurement units
tCODE_Species	List of species codes used in biota table
tCODE_Tissue	List of tissue codes used in biota data table

- A number of 'external' data tables, with smaller data sets of various kinds that have not been edited to the same extent, and are not linked to other tables. They require more work to be built into a more general framework and linked to code tables. The tables all have names beginning with **txDATA**. The tables are described briefly in 0, p. 47.
- A table with supplemental information about objects in the database. The table name is:

  t_Info_Database_Items

The following sections describe the most important tables in more detail, and give some information about their use in the database.

2.1. Main data tables for biota, seawater and sediment

The database has three main data tables, each of them containing data for one medium (biota, seawater, sediment), collected from the various sources.

2.1.1. Biota (tDATA_Biota)

This table contains data on contaminants in biota. It has about 700 records from individual countries, most of which are aggregates based on values from 2 to 100 samples. The data from ICES and MEDPOL, which makes up most of the data volume, were submitted as single-analysis data, and have not been aggregated at this stage, since criteria for aggregation has not been clarified (size groups, sex, etc.). The submitted data set from ICES lacks information about these parameters.

The biota table consists of the fields listed in the table below. Most of them should be described sufficiently in the table (taken from the database). The coordinate format is described more extensively in a later section.

Field#	Name	Description	Type
0	RecordTag	Unique record identification tag — created by database system	Long
1	OwnerCode	Six-letter code to country or convention providing data	Text
2	CountryCode	Three-letter ISO country code: specifies which country the location belongs to	Text
3	Area	Area description or code	Text
4	Station	Station description or code	Text
5	StationAttribute	Additional or alternative description of station or area (Greek data only)	Text
6	LonDir	Longitude direction (W: West, E: East)	Text
7	LonDeg	Longitude degrees — integral number (0–180)	Byte
8	LonMin	Longitude minutes — integral number (0–59)	Byte
9	LonSec100	Longitude hundredths of seconds — integral number (0–5 999)	Integer
10	LonFormat	Digits mn, describes longitude format (m = 0: deg, = 1: deg, min., = 2: deg, min., sec) n=num of decimals	Byte
11	LatDir	Latitude direction (S: South, N: North)	Text
12	LatDeg	Latitude degrees — integral number (0–90)	Byte
13	LatMin	Latitude minutes — integral number (0–59)	Byte
14	LatSec100	Latitude hundredths of seconds — integral number (0–5 999)	Integer

Field#	Name	Description	Type
15	LatFormat	Digits mn, describes latitude format (m = 0: deg, = 1: deg, min., = 2: deg, min., sec) n = num of decimals	Byte
16	Year	Calendar year when sample was taken — four digits	Integer
17	Month	Month when sample was taken (1–12)	Byte
18	Day	Day of month when sample was taken	Byte
19	SpeciesCode	Species code — RUBIN code (genus + species) or '(mp) XX', with XX = MEDPOL code	Text
20	TissueCode	Tissue code — ICES and/or MEDPOL code (obsolete codes references in table 'tCODE_Tissue')	Text
21	Component	Component analysed — name of element or chemical component	Text
22	Unit	Measurement unit	Text
23	NumV	Number of values (= samples) in statistical aggregate, = 1 for single values	Byte
24	MinV	Minimum value of statistical aggregate	Single
25	MaxV	Maximum value of statistical aggregate	Single
26	MedianV	Median value of statistical aggregate — or single value for numV = 1	Single
27	DetLimFlag	Detection limit flag: = BL if below detection limit (found in medianValue) (MEDPOL: Inexact)	Text
28	ReportingLab	Reporting laboratory — only for ICES data (ICES: rlabo)	Text
29	SampleNumber	Sample sequence number within station and year/date (MEDPOL SamplNo).	Byte
30	SampleDepth	Depth where sample was taken (m) — only for a few Yugoslavian data (MEDPOL: SampDepth)	Single
31	NumSpecimens	Number of specimens, if the sample is composite — for one-sample records (MEDPOL: NS)	Byte
32	LengthAvg	Average length of specimens (cm) — for one-sample records (MEDPOL: LengthAvg)	Single
33	LengthStd	Standard deviation of specimen lengths (cm) — for one-sample records (MEDPOL:LengtStd)	Single
34	WeightAvg	Average weight of specimens (g) — for one-sample records (MEDPOL:WeightAvg)	Single
35	WeightStd	Standard deviation of specimen weights (g) — for one-sample records (MEDPOL:WeightStd)	Single
36	Sex	Sex of specimens in sample:(I = indeterminate, M = male, F = female) (MEDPOL: Sex)	Text
37	Age	Age (years) (MEDPOL:Age)	Single
38	OrgMatter	% extractable organic matter (MEDPOL: EOM	Single
39	DryFreshFraction	Ratio of dry weight to fresh weight in percentage (MEDPOL: DWFW)	Single
40	SamplingLab	Sampling institution code — unique within country (MEDPOL:_INSNOS)	Byte
41	SamplingFlag	Sampling flag put by the data processing (MEDPOL: DPS)	Text
42	SamplingValidCheck	Sampling validity check (MEDPOL: ValidityS)	Text
43	NumAnalyses	Number of parameter analyses behind reported value — for MEDPOL single values (MEDPOL: NA)	Byte
44	STDAnalyses	Standard deviation if more than one analysis is made (MEDPOL: Std)	Single
45	FreshDryFlag	if fresh/dry weight result (code F = fresh weight, D = dry weight only) (MEDPOL: FW)	Text
46	AnalysisMethod	Analysis method — only in MEDPOL data (MEDPOL: AnaMethod)	Text
47	Analysisdate	Analysis date — only in MEDPOL data (MEDPOL: AnalyDate1)	Date
48	AnalysingLab	Analysing institution — unique within country (MEDPOL:_INSNOD)	Byte
49	AnalysisFlag	Data analysis flag put by the data processing (MEDPOL: DPD)	Text
50	AnalysisValidCheck	Data analysis validity check (MEDPOL: ValidityD)	Text

2.1.2. Seawater (tDATA_Seawater)

The table contains data from ICES, aggregated by ICES on a year/location basis, and data from countries, also aggregated where there is a basis for it. In many cases only single values are available within year and location, so there are also quite a few records with only single values.

The seawater table consists of the fields listed in the table below. Most of them should be described sufficiently in the table (taken from the database). The coordinate format is described more extensively in a later section.

Field#	Name	Description	Type
0	RecordTag	Unique record identification tag — created by database system	Integer
1	OwnerCode	Six-letter code to country or convention providing data	Text
2	CountryCode	Three-letter ISO country code: specifies which country the location belongs to	Text
3	Area	Area description or code	Text
4	Station	Station description or code	Text
5	StationAttribute	Additional or alternative description of station or area (Greek data only)	Text
6	Sea	Name of sea or ocean (given for Italian data only)	Text
7	Coastal Area	Name of coastal area (given for Italian data only)	Text
8	Zone_nr	Zone nr (given for Italian data only)	Byte
9	CoastDistance	Distance from coast (m) (given for Italian data only)	Integer
10	LonDir	Longitude direction (W: West, E: East)	Text
11	LonDeg	Longitude degrees — integral number (0–180)	Byte
12	LonMin	Longitude minutes — integral number (0–59)	Byte
13	LonSec100	Longitude hundredths of seconds — integral number (0–5 999)	Integer
14	LonFormat	Digits mn, describes longitude format (m = 0: deg, = 1: deg, min., = 2: deg, min., sec) n=num of decimals	Byte
15	LatDir	Latitude direction (S: South, N: North)	Text
16	LatDeg	Latitude degrees — integral number (0–90)	Byte
17	LatMin	Latitude minutes — integral number (0–59)	Byte
18	LatSec100	Latitude hundredths of seconds — integral number (0–5 999)	Integer
19	LatFormat	Digits MN, describes latitude format (M = 0: deg, = 1: deg, min., = 2: deg, min., sec) N = num. of decimals	Byte
20	Year	Calendar year of sampling	Integer
21	Season	Season as text: 'spring', 'summer', 'autumn', 'winter', 'unknown', 'year','quarter_n'	Text
22	Months	Month interval as text: 'mmm_mmm'	Text
23	MinDepth	Minimum sampling depth (m) of statistical aggregate (oxygen only)	Integer
24	Depth	Sampling depth (m) — average for statistical aggregates	Single
25	MaxDepth	Maximum sampling depth (m) of statistical aggregate (oxygen only)	Integer
26	Component	Component analysed — name of element or chemical component	Text
27	Unit	Measurement unit	Text
28	NumV	Number of values (= samples) in statistical aggregate, = 1 for single values	Integer
29	MinV	Minimum value of statistical aggregate	Single
30	MaxV	Maximum value of statistical aggregate	Single
31	MedianV	Median value of statistical aggregate — or single value for numV = 1	Single
32	MeanV	Mean value of statistical aggregate — or single value for numV = 1	Single
33	Stdev	Standard deviation of statistical aggregate — or single value for numV = 1	Single

2.1.3. Sediment (tDATA_Sediment)

This table collects all the information on contaminants in sediment. The data are in principle aggregated on date and location, but a lot of the records have only one sample behind it. For those records only the median and/or the mean has a value.

Data from ICES have been aggregated on a date/location/parameter basis (most locations have data only for one year, and for one date within year). When doing aggregation, standard deviation has been calculated only if there are at least three values behind the

aggregate, and if less than a third of the smallest values are equal or given as less than detection limit.

Median is equal to value no. k+1 if n = 2k+1, or mean of value k and k+1 if n = 2k, in a sorted sequence of valid values, including below-detection limit values.

The sediment table consists of the fields listed in the table below. Most of them should be described sufficiently in the table (taken from the database). The coordinate format is described more extensively in a later section.

Field#	Name	Description	Type
0	RecordTag	Unique record identification tag — created by database system	Integer
1	OwnerCode	Six-letter code to country or convention providing data	Text
2	CountryCode	Three-letter ISO country code: specifies which country the location belongs to	Text
3	Area	Area description or code	Text
4	Station	Station description or code	Text
5	StationAttribute	Additional or alternative description of station or area (Greek data only)	Text
6	LonDir	Longitude direction (W: West, E: East)	Text
7	LonDeg	Longitude degrees — integral number (0–180)	Byte
8	LonMin	Longitude minutes — integral number (0–59)	Byte
9	LonSec100	Longitude hundredths of seconds — integral number (0–5 999)	Integer
10	LonFormat	Digits mn, describes longitude format (m = 0: deg, = 1: deg, min., = 2: deg, min., sec) n = num of decimals	Byte
11	LatDir	Latitude direction (S: South, N: North)	Text
12	LatDeg	Latitude degrees — integral number (0–90)	Byte
13	LatMin	Latitude minutes — integral number (0–59)	Byte
14	LatSec100	Latitude hundredths of seconds — integral number (0–5 999)	Integer
15	LatFormat	Digits mn, describes latitude format (m = 0: deg, = 1: deg, min., = 2: deg, min., sec) n = num of decimals	Byte
16	Year	Calendar year when sample was taken — four digits	Integer
17	Month	Month when sample was taken (1–12)	Byte
18	Day	Day of month when sample was taken	Byte
19	Component	Component analysed — name of element or chemical component	Text
20	Unit	Measurement unit	Text
21	NumV	Number of values (= samples) in statistical aggregate, = 1 for single values	Byte
22	MinV	Minimum value of statistical aggregate	Single
23	MaxV	Maximum value of statistical aggregate	Single
24	MedianV	Median value of statistical aggregate — or single value for numV = 1	Single
25	MeanV	Mean value of statistical aggregate — or single value for numV = 1	Single
26	Stdev	Standard deviation of statistical aggregate — or single value for numV = 1	Single
27	DetLimFlag	Detection limit flag: ='BL' if below detection limit (found in medianValue) (MEDPOL: Inexact)	Text
28	% belowLimit	% of values in statistical aggregate that is flagged as 'below detection limit'	Single
29	SampleNumber	Sample sequence number within station and year/date (MEDPOL SamplNo).	Byte
30	BottomDepth	Bottom depth at sampled site (m) (MEDPOL: SampDepth)	Single
31	Sampler	Sampling equipment used	Text
32	SedDepthFrom	Top of analysed sediment layer — depth below sediment surface (cm) (MEDPOL: InterFrom)	Byte
33	SedDepthTo	Bottom of analysed sediment layer — depth below sediment surface (cm) (MEDPOL: InterTo)	Byte
34	GrainsizeAvg	Average grain size (MEDPOL: GrainsAvg)	Single
35	Fraction	Size fraction analysed	Integer

Field#	Name	Description	Type
36	FractionInexact	If fraction is inexact, GT = greater or LT = less should be entered (MEDPOL: FrInexact)	Text
37	DryWet_Ratio	Ratio of dry weight to wet weight in percentage (MEDPOL: DWWW)	Single
38	SamplingLab	Sampling institution code — unique within country (MEDPOL:_INSNOS)	Byte
39	SamplingFlag	Sampling flag put by the data processing (MEDPOL: DPS)	Text
40	SamplingValidCheck	Sampling validity check (MEDPOL: ValidityS)	Byte
41	NumAnalyses	Number of parameter analyses behind reported value — for MEDPOL single values (MEDPOL: NA)	Byte
42	STDAnalyses	Standard deviation if more than one analysis is made (MEDPOL: STD)	Single
43	DryWetFlag	if wet/dry weight result (code W = wet weight, D = dry weight only)	Text
44	AnalysisMethod	Analysis method — only in MEDPOL data (MEDPOL: AnaMethod)	Text
45	Analysisdate	Analysis date — only in MEDPOL data (MEDPOL: AnalyDate1)	Date
46	AnalysingLab	Analysing institution — unique within country (MEDPOL:_INSNOD)	Byte
47	AnalysisFlag	Data analysis flag put by the data processing (MEDPOL: DPD)	Text
48	AnalysisValidCheck	Data analysis validity check (MEDPOL: ValidityD)	Text

2.2. 'External' data tables

The database contains a number of 'external' data tables, with smaller datasets of various kinds that have not been edited to the same extent, and are not linked to other tables. They require more work to be built into a more general framework with links to code tables. The tables all have names beginning with **txDATA,** and with data source (Countries, MEDPOL) and data content indicated in the final part of the name. The tables are:

txDATA_COUNTRIES_Algae
220 records of data from various countries on algal blooms and toxic algae, with cell counts, Diatom/Flagellate ratios and area/intensity data.

txDATA_COUNTRIES_Seaweed&Seagrass
41 records on seaweed (maxdepth) and seagrass (area coverage) from Denmark and the Netherlands

txDATA_COUNTRIES_OiledBirds
42 records from Germany on % oiled of stranded birds.

txDATA_COUNTRIES_Miscellaneous
273 records of various types of observations from water: Transparency and Secchi depth (104 records), Oil spills and accidents, oil layer and tar residue (54 records), radiation (108 records), ship discharges (7 records).

txDATA_COUNTRIES_SuspendedMatter
42 records, mainly from the Netherlands, of PCB and PAH content in suspended matter.

txDATA_MEDPOL_SuspendedMatter
1 048 records of contaminant levels in suspended matter from ex-Yugoslavia for the years 1983–90.

txDATA_MEDPOL_Plankton
410 records of contaminant levels in plankton, from ex-Yugoslavia, Greece and France

2.3. Geographical information in data tables

2.3.1. Geographical coordinate format

The main data tables share a common format for geographical longitude and latitude. The various data sources have different formats for coordinates (described in more detail in Chapter 4):

— degrees with decimal fraction of up to 4 to 5 decimals;
— integral number of degrees and minutes, often with decimal fraction as hundredths of minutes;
— degrees, minutes and seconds (in some cases with decimal fraction of seconds).

Although the coordinates may not be significant to the given resolution, it can still be important to store accurate representations of the coordinate positions listed in the data sources. Both to discriminate clearly between locations, and to make them as recognisable as possible in relation to original tables and reports.

To achieve this a format has been chosen that can represent the different forms accurately. Coordinates are stored with texts and integer numbers only, to achieve safe record relations through index keys, avoiding floating point keys that could be susceptible to undetected rounding errors (e.g. dependent on floating point format chosen in forms and queries, or how formulas are written).

The coordinates format stored in the records of data tables **tDATA_Biota**, **tDATA_Seawater** and **tDATA_Sediment** is:

Name	Access Type	Size (bytes)	Range of values
XxxDir	Text	1	N or S for latitude, E or W for longitude
XxxDeg	Byte	1	(0–90) or (0–180): degrees
XxxMin	Byte	1	0–59: minutes
XxxSec100	Integer	2	0–5 999 (= 100*seconds or 60*hundredths of minutes)
XxxFormat	Byte	1	mn: two-digit numeric code for coordinate precision

m: specifies number of items in coordinate specification,
n: number of decimals:
0: degrees, entered with n decimals (0,…,5)
1: degrees, minutes, n = number of decimals in minutes (0,…,4)
2: degrees, minutes, seconds, n=number of decimals in seconds (0,…,2)

There are two such sets of fields, with xxx = lon for longitude and xxx = lat for latitude. The format requires 6 bytes for each direction, and can represent decimal fractions down to either 100ths of seconds (<0.3 m), three-digit fraction of minutes (<2 m), or, within truncating error, five-digit decimal fraction of minutes (<1 m). The xxxFormat field can store information about the precise string format of entered coordinates, and regenerate it in output. Suitable editing forms can easily be supplied, with automatic transforms to and from the stored format.

Fields xxxMin, xxxSec100 should be set to zero if they carry no information (e.g.: Format mn = 10 will have sec100 = 0 and not blank). This makes it easy to derive numerical representation as degrees with decimal fraction for use in geographical maps, by the formula:

xxx = DirSign(xxxDir)*(xxxDeg + (xxxMin+xxxSec100/6000)/60)

where **DirSign** is a function in the module **CoordinateFunctions** which is included in the database, with values:

+1 for xxxDir='N' or 'E'

—1 for xxxDir='S' or 'W'.

The complete formula is available as a Double Function in the same module:

DecimalDegrees(xxxDir, xxxDeg, xxxMin, xxxSec100)

The xxxFormat fields could probably be replaced by a common field for longitude and latitude, but separate fields may be easier to handle in a user interface.
The coordinates could be more efficiently stored in the database as one long integer (4 bytes) with unique value Coordinate =
DirSign*((((Deg*60+Min)*60)*100+Sec100)*30+mn (Extremal values: ± 1 944 000 022, just within the range of long integers). The selected storage form is, however, closer to the primary representation for most coordinates, and less dependent on complex transformation algorithms.

The tables are indexed on the coordinates, using two index fields longitude and latitude, each composed of the

2.3.2. Area and station description

In addition to the coordinate positions given for most data, most of the data sources contain fields describing stations and locations by text items, with codes or geographical description. For a lot of locations no additional information is given. The contents and structure of text items is quite heterogeneous. Different data sets have different subsets of the following text items:
Area, Station, Attrib (= Station Attribute), Sea, Coastal Area, CoastalZone.

The use of the different text items also varies between data sets, some when the data sets are merged, each field will contain a mix of long general text descriptions and short specific codes. It has not been considered proper to force the descriptions into a common set of items without more knowledge about what lies behind the codes and texts as a basis for framework-working all the data into one standard.

2.4. General features

2.4.1. Sort order

The database has been set to General Sort Order. To change do the following:

1. Select Tools|Options from the main menu
2. On the 'General' tab; go to the combo box 'New Database Order' and select wanted language
3. Close the dialog box and select from the main menu: Tool|Database Utilities|Compact Database

2.4.2. Record Auto-numbering

All tables **tCODE...** and **tDATA...** are assigned a unique **record tag**, using the autonumber feature in Access. New records will be assigned unique numbers automatically by incrementing by 1 the maximum number previously used within the table. The record tags serve only as a persistent identification of the records within the table, and have no function in linking records in different tables. The purpose is to make bulk corrections to imported data sets easier and safer, in particular if several institutions are involved. For instance, if a need to revise a certain subset of the records is discovered, that subset can be exported by a make-table query with the record tags numbers intact. The revisions can be then done outside the database, possibly by another institution. The revised information can later be entered into the database by update queries, using the record number as link field. It should still be checked that other keys (coordinates, year, component, etc.) matches as well. Although it is still necessary to proceed with caution when doing such bulk updates, the record auto-numbers may provide a safeguard mechanism for linking correctly.

2.5. Code tables

The database contains a number of code and reference tables for species, tissues, components, units, laboratories and countries. These tables are indexed and linked to the main data tables wherever relevant (See Tools|Relationships to see which links are implemented). The links preserve referential integrity, and makes easy implementation of list-box lookup on data input.

2.5.1. Components and units

The component and unit text strings used in the main data tables have been harmonised and collected in code tables **tCODE_Component** and **tCODE_Unit**. The main data tables for biota, seawater and sediment are all linked to the component table with referential integrity and cascade update. Changes made to component codes in the component list will therefore be propagated to the data records.

The unit list is merely a collection of codes used in the three tables. It is linked to the three main data tables. It may be the basis for implementing a system for recalculation of values to common units in queries for reports, in cases where units vary through the data table (e.g. oxygen, which is found as µmol, mg/l and ml/l).

2.5.2. Species codes (tCODE_Species)

Species codes are used both in the ICES and the MEDPOL data sets on contaminants in biota. ICES uses the RUBIN code, an eight-letter code which is an abbreviation of the systematic name, normally with four letters from the genus part and three letters from the species part of the name. The ICES species list also lists English and French names and references to RUBIN List and Taxon (Fish/Invertebrates).

MEDPOL uses a code with two or three letters, normally the first letter of genus and species part of the systematic name.

The EEA coastal database uses the ICES codes all species where they are defined. For species only referred to in the MEDPOL data, the species code has been set to '(mp)

XXX', where XXX is the original MEDPOL two or three-letter code. The species code list is found in the table

tCODE_Species

This table lists the species code used in the database, together with Latin systematic name, English and/or French name. The list has been constructed by merging and harmonising the two species lists from ICES and MEDPOL. The table also contains fields that document all the codes and names used in the two sources. For a few species the English names used by ICES and MEDPOL differ, in those cases the MEDPOL name are listed in the field **EnglishName,** and the ICES name is listed in the field ICES_Special_Name. There is also a field with MEDPOL size limit specifications wherever they occur, with information extracted from the MEDPOL English description field.

An Access form **f_Species** is available for inspecting and editing the species list.
The species code table links to the data table on contaminants in biota (**tData_Biota**) through the field **SpeciesCode**. The link is defined with enforced referential integrity and cascade update.

Referential integrity means that all data records must be linked to a record in the species code table. Before a species code can be used in data records, it must be present in species code table. If not, an error message appears (use the Escape key to get out of the error sitation).

For most of the biota data reported directly from countries (owner = country code), species is not listed. Instead the data are merely classified broadly into 'Fish' or 'Mussel'. These records contain preliminary general codes ***fish*** or ***mussel*** in the species code field of the data table. These codes are also listed in the **tCOD_Species** table to provide linking to the species code table. If correct codes are later established for such data records, and the codes are already in the code tables, the data records can be edited, and will then change their link to the relevant record in the species code table. if not, the codes must first be entered into new records in the species code table.

Cascade update means that changing a species code in the table **tCODE_Species** automatically will make corresponding changes in data records linked to that **tCODE_Species** record, thus preserving relations between records. This can be used for species with the preliminary species code of the form '**(mp) XXX**' where XX is the 2-letter MEDPOL code. By replacing them with the RUBIN code (genus+species) in the **tCODE_Species** table, the data records in **tDATA_Biota** will be automatically updated with the new codes.

2.5.3. Tissue codes (tCODE_Tissue)

Two-letter tissue codes are used by both ICES and MEDPOL in data on contaminants in biota. The two tissue code lists have been compared and merged into a common list. Tissue codes are for the most part used as given in the data sources, but some harmonisation was necessary to differences between the two code systems. For data coming directly from the different countries tissue was described directly as 'muscle', 'liver' or 'flesh'. The assumedly correct tissue codes have been used for these data. The following points should be noted:

— In data on fish tissue, ICES data distinguish between MU (muscle) and TM (tail muscle), while MEDPOL has the classification FI (fillet), BM (brown muscle) and WM (white muscle). The original classification from both sources has been preserved, as there is no conflicting use of codes. Extraction of all muscle data together can be achieved by applying the search criterion **'MU' or '?M'** on tissue code.
— The MEDPOL tissue code WH (whole body) has been identified with the ICES code WO (whole organism) and the ICES terminology and code chosen.
— For kidney the ICES code (KI) has been chosen (MEDPOL uses KD).
— The Greek data for tissue 'flesh' has been identified with the ICES code MU ('muscle').
— The MEDPOL code SO (soft part...) has been identified with ICES code SB (whole soft-body). In the database, the ICES code is used, together with the English and French names from MEDPOL.
— The Dutch mussel data, with tissue given as 'Dry tissue' have been stored with tissue code SB (Soft Body), the unit is explicitly given as concentration per dry weight.
— For GI (Gill) and OV (Ovaries) the codes are the same, but the names slightly different; the ICES English name has been chosen.
— MEDPOL French names are used for all tissues defined in the MEDPOL data, even if the ICES English names have been chosen.

The tissue codes used in the EEA coastal database are defined in the table **tCODE_Tissue**. The table contains fields that describe the tissue, and documents all differences and changes listed above. The tissue code table links to the data table on contaminants in biota (**tData_Biota**) through the field **TissueCode**. The link is defined with enforced referential integrity and cascade update.
Referential integrity means that all data records must be linked to a record in the tissue code table. Before a tissue code can be used in data records, it must be present in the relevant code table. If not, an error message appears (use the escape key to get out of the error situation).

For some records in the biota data table, tissue is not currently given. These data records contain a preliminary code '—' for 'tissue unspecified'. If correct codes are established for such records, and the codes are already in the tissue code table, the data records can be edited, and will then change their relations to the code tables. If not, the codes must first be entered into new records in the tissue code tables.

Cascade update means that changing a code in the tissue code table automatically will make corresponding changes in data records linked to that **tCODE_Tissue** record, preserving relations between records.

2.5.4. Country codes and names (tCODE_Country)

Country codes are used in the database both as geographic information about stations and coordinate positions (Field: CountryCode in data tables), and as information on the how data sets have been submitted to the database (Field: Owner = convention or country name).

The different conventions (ICES, MEDPOL) use different sets of country codes. ICES uses a two-letter letter code (as file extension) and the IOC (1) alphanumeric country codes. The MEDPOL database refers to countries by three-letter country codes. There is also an international standard — ISO 3166. The codes used by ICES and MEDPOL partly follow the ISO 3166 standard, but there are some differences, and some of the codes used by ICES and MEDPOL may be in conflict with the ISO standard for other countries.

In the EEA coastal database it has been chosen to refer to countries by the 3-letter codes in the ISO 3166-1 standard. These codes are used both to indicate geographic location of stations, and as information about 'owner' of data that comes directly from the countries involved. Data that come from ICES or MEDPOL has the organisation or convention acronym as owner and a relevant country code as geographic information.

A table **tCODE_Country** lists codes with full country names, and also with fields containing codes used by ICES or MEDPOL. The ICES and MEDPOL codes are not used elsewhere in the database, but are only included in the country list table as a reference to original data sources and possibly for use in extracts and reports. Preferably, the full name should be used in reports in addition to codes, and if the ICES/MEDPOL codes are used, they should be qualified in report headings. The table below shows the content of the table **tCODE_Country** in the database. Field names are given in brackets.

Country name	ISO 3166-1 Three-letter codes (ISO code)	ISO 3166-1 Two-letter codes (ISOA2)	ISO 3166-1 Country number (ISONum)	ICES file extension (ICESExtn)	IOC code (IOC)	MEDPOL code (MEDPOL)
Albania	ALB	AL	8			ALB
Belgium	BEL	BE	56	BE	11	
Cyprus	CYP	CY	196			CYP
Germany	DEU	DE	276	GE	07	
Denmark	DNK	DK	208	DK	26	
Algeria	DZA	DZ	12			ALG
Egypt	EGY	EG	818			EGY
Spain	ESP	ES	724	SP	29	SPA
Estonia	EST	EE	233	ES	ES	
Finland	FIN	FI	246	FI	34	
France	FRA	FR	250	FR	35	FRA
United Kingdom	GBR	GB	826	UK	74	
Greece	GRC	GR	300			GRE
Ireland	IRL	IE	372	IR	45	
Iceland	ISL	IS	352	IC	46	
Israel	ISR	IL	376			ISR
Italy	ITA	IT	380			ITA
Lebanon	LBN	LB	422			LEB
Lithuania	LTU	LT	440	LT	LT	
Latvia	LVA	LV	428	LA	LA	
Morocco	MAR	MA	504			MOR
Malta	MLT	MT	470			MAT
Netherlands	NLD	NL	528	NE	64	
Norway	NOR	NO	578	NO	58	
Poland	POL	PL	616	PL	67	
Portugal	PRT	PT	620	PR	68	
Russia	RUS	RU	643	RU	RU	
Sweden	SWE	SE	752	SW	77	

(1) Intergovernmental Oceanographic Commission (Unesco). List according to ICES.

Country name	ISO 3166-1 Three-letter codes (ISO code)	ISO 3166-1 Two-letter codes (ISOA2)	ISO 3166-1 Country number (ISONum)	ICES file extension (ICESExtn)	IOC code (IOC)	MEDPOL code (MEDPOL)
Syria	SYR	SY	760			SYR
Tunisia	TUN	TN	788			TUN
Turkey	TUR	TR	792			TUR
Ex-Yugoslavia	YUG	YU	891			EX-YUG

2.5.5. Data owner (data source)

(tCODE_Convention, qCODE_DataOwner)

Records in the three main data tables are linked to data owner in the fields OwnerCode, which can be either a country code or the acronym of a convention (ICES, MEDPOL). The two categories of data owners are kept in separate tables **tCODE_Country** (described above) and **tCODE_Convention**. They are combined by a union query **qCODE_DataOwner** into an owner list for linking with the data tables. The owner list could be linked to the Laboratory list for more detailed information, contact persons, addresses, etc. of the institutions that represent the various data owners, but this remains to be done.

2.5.6. Laboratories (tCODE_Laboratories)

The ICES biota and sediment data contained a field **rlabo** with reporting laboratory. This information has been used to assign country code to these data, through the ICES laboratory list that is available on the ICES web site. The field **rlabo** has been kept in the biota data table (Field name **ReportingLab**) where individual records have not been aggregated.

The list of laboratories from ICES, with names, addresses, etc. have been edited and is included in the database as table **tCODE_Laboratories**. Previously used codes are kept in this list in separate records, with reference to currently valid records.

The MEDPOL data have fields with numeric institution codes for analysing and sampling institution. The codes are not unique across countries, and there is no detail information about laboratories. The MEDPOL institution codes have been preserved in the biota and sediment data tables, and could in the future be linked to information in the laboratory list.

The data from separate countries have no laboratory or institution information, but institutions responsible for submitting data could be included in a list with reference to the data.

2.6. Supplemental information tables

2.6.1. ISO country list

A table **tREF_ISO_Country_Codes** contains the complete list of countries in the ISO standard, with two and three-letter codes. This is included only as background information, and not referred to from other objects in the database.

More information about the International Standard ISO 3166-1 'Codes for the representation of names of countries and their subdivisions — Part 1: Country codes' is available at the web site of the responsible Maintenance Agency in Berlin ([2]) at URL:

http://www.din.de/gremien/nas/

A complete and ISO-authorised list of country names and the corresponding ISO 3166-1 Alpha-2 code elements — the ISO country code used in the Internet — is found on their page:

http://www.din.de/gremien/nas/nabd/iso3166ma/index.html.

A list of country names, alpha-3 and numeric country codes is published with permission of the ISO-3166-1 Maintenance Agency by the United Nations Statistics Division at URL:

http://www.un.org/Depts/unsd/methods/m49alpha.html.

3. Elements of the user interface

The database contains a few queries and forms:

Queries:

qCODE_DataOwner	This combines the two tables tCODE_Convention and tCODE_Country into a common list linked to the OwnerCODE field in the data tables.
qCODE_Laboratories	This is the basis for report **Laboratories**

Forms:

f_Species	A form for inspecting and editing the species code list
f_Country	A form for inspecting and editing the country list tCODE_Country
f_Laboratories	A form for inspecting of editing in the laboratories list.
Database Information	A form for viewing and editing the table **t_Info_Database_Items** with comments to database objects.
f_Aggregate_From_Table	A form that is not linked to data, but which contains a mechanism for aggregating to specified level for a selected table with aggregates being written to a new table. The form could be used to aggregate biota data that are not already aggregates. (Build a query that selects single values as basis for aggregating, and select field MedianV as statistics field. Be sure to include location, time at some level + component **and** unit as group fields.)

([2]) DIN Deutsches Institut für Normung e. V., ISO 3166/MA, D-10772 BERLIN.

fSub_CoordinateFormat A demo of a small form that can be used as a subform in a form for editing and inspecting geographical coordinates in a user-controlled format. The code in the class module is not quite complete for making it fully functional versus actual data operated on by a form. It is included only to show how an adaptable coordinate interface can be designed.

Reports:

r_Laboratories Produces a table of laboratories

Modules:

CoordinateFunctions Implements functions for handling the described coordinate format. Details will be given in the code of the module.

4. Data sources

Data have been collected and incorporated in the database from various sources as shown in the table below:

	Nutr.	Contaminants			
	Water	Sed.	Biota	Susp. matter	Comments:
MEDPOL	X	X	X	X	plankton in separate tables: Greece and Yugoslavia, contains conc. of halogeners and metals
ICES	X	X	X		
Denmark	X				+ seaweeds_maxdepth, seagrass_maxdepth (medium = blank)
Finland	X				
France	X	X	mussels		in water: algal blooms unit: (km2/yr/number/number 106/l) Toxic algae counts, Phaeocystis sp. counts
Germany	X	X	fish liver, mussels		diatom/flagellate ratio
Greece	X	X	fish, mussels		algal bloom cell counts (unspecified)
Italy	X				oil layer, tar residue, algae, water transport (m)
Ireland	X				
Netherlands			fish muscle and liver	X	Seagrasses (ha), suspended matter as medium, in water: Phaeocystis sp. cell count, toxic algae with species, radiation
Norway	X	X			
Sweden	X	X	fish, mussel	X	

The various data are described briefly in the following pages.

4.1. ICES data

4.1.1. Biota

The submitted data table contains 62 246 single analysis contaminant records.
Date is specified for all data, with two-digit year, month and day in separate columns, and with the same information also in Access date/time format. Year is also given as four-digit

year in separate column. For 131 records with date 31 December 1984 or 1994, the four-digit year is the calendar year, while the two-digit year = next year.

There are 11 760 different combinations of date, coordinates, genus+species+tissue, and parameter. Of these 6 592 occur with multiple records (replicate samples), and the rest consist of a single sample. Among the 2 626 of the combinations with 5 or more replicates, there are 127 where more than 50 % of the records show identical values, and in 37 of these cases all records (5–25) give identical values. For such cases it is obviously the detection limit that is being reported for most of the records, with the true mean well below detection limit. Since only values are given, and no flags or qualifications are specified, the calculated statistics mean and median will tend to be upper limits ([3]).

There are 8 228 different combinations of year, coordinates, genus+species+tissue and parameter. 10 more if separated by reporting laboratory. Primary data are not identified by sample or specimen number in the data file.

4.1.2. Sediments

The data file contains 6 470 records, with 2 856 different combinations of year, location and parameter. They cover 458 different locations, most of them for only a single year (date). There are 528 combinations of locations and year, and only 15 of these have data from more than one date within a year. A total of 34 different combinations of year, location and parameter, listed in the submitted data tables with 121 records, have no observation values — all records have blank concentration value. These are not included in the final ETC database.

Only parameter name is specified, unit is not stated. The values are assumed to be weight fraction, and multiplied by 10^6 to get unit ppm. Dry weight or wet weight basis is not specified

The data are aggregated to date/location/parameter before inclusion in the database. Standard deviation is listed only if there are at least three values behind the aggregate, and if the minimum value occurs in at most a third of the records.

4.1.3. SeaWater

The ICES data within the 20 km zone consists of 19 710 records. The records are given as aggregate statistics on a yearly basis, with n (= number of values), mean, st.dev., min., median, max. There are 7 439 real aggregates with n>1 (from 2 to 49). The other records have n = 1, and are thus based on only one value — for these records stdev is given as 0, will be corrected to missing. One large group of records have only median specified, and number of values are not given.

Year (=Calendar year?) is specified for all data. Month (from_to as text 'n_m') and/or Quarter (1,...,4) are given for some records as additional information, but there are no cases of multiple records per year, location and parameter. Year is unique key — month

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([3]) Detection limit flag ought to have been included in the data. A column indicating the degree of uniformity could be included in the database and together with the number of values behind each aggregate will tell something about the resolution of the data.

and quarter is just optional information. For oxygen, sampling depth is specified with min., mean and max.

4.1.4. Geographical information and coordinate format in ICES data

Geographical location is given only by coordinates in the ICES data, no stations codes are specified. Countries have been inferred by field rlabo (reporting laboratory) using the list of laboratories available on the ICES web site.

- **Water:** Latitude and longitude as decimal numbers, degrees with fractional part + square size (20 x 20k). Negative sign of longitude for western coordinates. The fractional part resolves into whole minutes — so seconds is not specified.
- **Biota:** Coordinates given as latitude and longitude, with degrees, minutes, and whole 100-part of minutes + E/W letter. Coordinate format: 7
- **Sediment:** Latitude and longitude are given in degrees, minutes and whole 100-parts of minutes + letter E-W for east/west longitude. Coordinate format: 7

4.2. MEDPOL

The MEDPOL has submitted data only on metals and halogeners. For seawater there are only data on metals. These have not been included in the database. Tables for codes on country, matrix, parameter, species and tissue were also included.

4.2.1. Contaminants in biota

Biota data from location within the European 20-km coastal zone makes up 33 945 records. Locations are identified by coordinates, area and/or station. All three sets of information are necessary to distinguish between locations. A large part of the data are for individual specimens, the rest is composite samples, with number of specimens given. The records contain information about specimen size (length, weight) and age, and in some cases sex. For a portion of the records the reported value is based on more than one analysis of the same sample (number of analyses in column NA), in those cases the analysis standard deviation is also given. A number of records have flag for 'Below limit of detection', with the detection limit as reported value ([4]). Basis (Fresh/Dry) is given in a Field FW.

4.2.2. Sediment

Sediment data has 3 925 records, all different combinations of locations, years and parameter/unit. Some records have >1 analysis, with analysis st.dev, and a number of records have flag for 'Below limit of detection'. The data contains information about sediment depth interval, sampling method, fraction measured (with LT/GT-flag), and water content. Basis (Fresh/Wet) is given in a Field WW. There are no cases of multiple records within location and year, so aggregation is not an issue for these data.

The sediment data tables contain a few records where no parameter has been specified (and where no value is given). The records are shown below: For two stations in the Yugoslavian data from MEDPOL (Area YU14, Station 10E and Area YU13, Station 8E), coordinates are missing. The MEDPOL data include three records containing no information on contaminants, these have been deleted. The records are:

([4]) Changed from negative value.

Owner	Country Code	Area	Station	StationAttribute	LonDir	LonDeg	lonMin	lonSec100	latDir	latDeg	latMin	latSec100	Year
MEDPOL	EX-YUG	YU11	3		E	18	41		N	42	25		1986
MEDPOL	EX-YUG	YU14	9		E	19	17	0	N	41	53	2 400	1986
MEDPOL	EX-YUG	YU13	7		E	19	5	0	N	42	6	4 200	1986

For halocarbons in suspended matter there is a single record from Turkey, Station STA1, sample date 96.01.01, containing no data value, and with no parameter code specified.

4.2.3. Date and time in MEDPOL data

All MEDPOL data have full sampling date in Access date/time format and as a text item.

Analysis date given as additional information, also for all data in duplicate format: as Access date/time format and as text. For a lot of data analysis date = sampling date. Year is also given in a separate column in the MEDPOL data. In most records this year is equal to the sampling date, but there are a number of records with a difference of 1 or –1, and a few records with larger differences. In the biota tables there are records where the year column gives a year 6 or 7 years after the sample date. In a majority of the records were year is given as sample year-1, the sample date is in January or April. In a majority of cases where the year is given as sample year+1 the sample is from months July to December. There are quite a few exceptions to this pattern, however. In any case the differences do no appear to be due to a consistent use of a non-calendar year for aggregating data. The Year column from MEDPOL is kept in a separate column labelled MEDPOL_YEAR_COLUMN in addition to the year derived from date. This column is blank for data from other sources and is only kept for reference to the original data source.

4.2.4. Geographical information and coordinate format in MEDPOL data

Country, area and station specified (for all data?). The same station may have different sets of coordinates for different records, even for same type of data. Some stations have data for more than one type of data (biota, sediments, plankton, suspended matter and seawater).

The data tables contain Latitude and longitude in degrees, minutes, seconds, with a column containing a letter for direction (N|S, E|W) (fields xxxxDEGR, xxxxMINU, xxxxSEC, xxxSITU, with xxxx=LATI and LONG, respectively). In a large part of the records, however, seconds have not been specified (missing value code -9).

4.3. Data from individual countries

The data tables from most of the countries contain data from more than one medium (seawater, sediment, biota). Data are specified according to medium, species, tissue and component in slightly different ways.

Biota samples only specified broadly (mussel, fish), mostly no species are given. Tissue is unspecified, or specified as dry tissue (mussel), liver or muscle for fish. Values are given mostly as aggregates, with number, min., max. and median (in some cases number=1). Data from individual countries have mostly been reported as aggregates. The exception is Irish data from Dublin bay, which are reported as single values only. For this data set there is only one case where more than one value belong to the same station within one year, and then there are only two values. The number of values behind each real aggregate value varies from more than 1 000 down to only 2 values. Min., max. and median are most commonly reported, in some cases arithmetic mean is given instead of median, and in a few cases both are given.

For 'pseudo-aggregates' based on only one value reporting practice varies: in most cases the value is reported as median, and in other cases as mean value, seldom as both. For some such cases the value is also listed in the min.and max. column. There are some records that obviously represent real aggregates, since min.<median<max., but where the number of values is not specified. Standard deviation is only listed for some of the Norwegian data.

Data for mussels from France seem to be listed with wrong unit specified, as the table below indicates. It has been assumed that the correct unit is mg/kg for the listed values.

Component	Selected	Country	Unit	MinOfMIN	AvgOfMEDIAN	MaxOfMAX
Cd	Mussel	France	µg/kg dw	0.12	1.94	0.60
Cd	Mussel	Greece	µg/kg dw	0.00	691.14	3601.00
Cd	Mussel	Netherlands	µg/kg dw	500.00	3007.69	6600.00
Cd	Mussel	Sweden	µg/kg dw		647.10	
Cu	Mussel	France	µg/kg dw	3.20	8.20	38.70
Cu	Mussel	Greece	µg/kg dw	392.00	6312.28	90947.00
Cu	Mussel	Netherlands	µg/kg dw	7500.00	10876.92	40900.00
Cu	Mussel	Sweden	µg/kg dw		4735.37	
Hg	Mussel	France	µg/kg dw	0.02	0.15	0.60
Hg	Mussel	Greece	µg/kg dw	25.00	359.19	892.00
Hg	Mussel	Netherlands	µg/kg dw	100.00	207.69	1000.00
Hg	Mussel	Sweden	µg/kg dw		183.41	
Pb	Mussel	France	µg/kg dw	0.13	3.32	15.90
Pb	Mussel	Greece	µg/kg dw	45.00	2667.07	17603.00
Pb	Mussel	Netherlands	µg/kg dw	100.00	2853.85	5700.00
Pb	Mussel	Sweden	µg/kg dw		2000.80	
Zn	Mussel	France	µg/kg dw	40.00	125.37	349.00
Zn	Mussel	Greece	µg/kg dw	13357.00	139749.15	447916.00
Zn	Mussel	Netherlands	µg/kg dw	74100.00	190038.46	298600.00

Greek data are for contaminants in sediments, with some addition data on algal blooms in water and concentrations in biota. From Rhodes, St2+3, PCB have unspecified medium, but from the context it appears to be for fish (The unit is µg/kg dw as for metals in fish, and the records correspond in number and identificators to records of DDT+DDE+DDD. Tissue is not specified for this station. The table is edited by replacing blank medium with 'Fish' for PCB from St2+3 for Rhodes, Greece. A column Attribute describes type of location or gives additional information about location within area.

Irish data are from two areas: Shannon Estuary and Dublin Bay. Data from Shannon are given as aggregates, with year and season specified. Data from Dublin Bay are given as single values, with date, year and season in separate columns. Nutrient values are from November to March, all assigned to winter season. There are some inconsistencies in year; some observations from nov. and dec. assigned to winter has monitoring year = calendar year. This has been corrected to calendar year+1.

In the Swedish data, a suspiciously low values of Cr, which have assumed to be given as mg/kg:

Component	Selected	Country	Unit	MinOfMIN	AvgOfMEDIAN	MaxOfMAX
Cr	Fish	Greece	µg/kg dw	98.00	1183.24	11752.00
Cr	Fish	Sweden	µg/kg dw		100.00	
Cr	Mussel	Greece	µg/kg dw	195.00	3578.07	27570.00
Cr	Mussel	Netherlands	µg/kg dw	1300.00	2523.08	15900.00
Cr	Mussel	Sweden	µg/kg dw		1.50	

4.3.1. Date and time in data from countries

Denmark	Four-digit year, season
Finland	Four-digit year, season
France	Four-digit year, season
Germany	Four-digit year, season, months = month range
Greece	Four-digit year, season
Italy	Four-digit year, season
Shannon Estuary, Ireland	Two-digit monitoring year + date in format ddmmyy or dmmyy. Only data from nov-feb. Monitoring year = next year for November and December
Dublin Bay, Ireland	Four-digit year, month (11, 12 ,1 ,2 ,3), date and season (= winter for all months with data)
Netherlands	Four-digit year, season
Norway	Four-digit year, season, months = month range
Sweden	Four-digit year + season

Season is text, may be blank, may contain text 'year'

4.3.2. Coordinate format in data from countries

All data have area specified. Station is not always given, but coordinates are always specified if station is missing. Location is missing only in one case, for some countries coordinates are given as decimal degrees. Others have specified degrees and minutes, and then either fraction of minutes or seconds. Comments on individual countries:

- Denmark: Degrees with decimal digits — resolve into whole minutes and 100-parts of minutes.
- Finland: Three integers: degrees, minutes and minute fraction (hundredths).
- France: Degrees with decimal digits. Negative sign in separate column for western longitude. Minute fraction is whole seconds and 100-parts of minutes (few positions).

- Germany: Degrees with decimal fraction specified, almost always resolve into whole 100-parts of minutes (better than resolving into seconds, but not completely).
- Greece: Three integers: degrees, minutes and seconds, in columns North and East.
- Ireland: Degrees with decimal fraction specified, almost always resolve into whole 100-parts of minutes. Parts of data have negative sign for western longitude.
- Italy: Degrees with decimal fraction specified, resolve into whole minutes and seconds.
- Netherlands: Coordinates in degrees with decimal fraction, resolve into whole 100-parts of minutes, except for one position with 44.5 100-parts of minutes. Coordinates for Schaar van Ouden Doel given in e-mail:
  North: 48 degrees 19 minutes and 33.4008 seconds, and
  East: 4 degrees 19 minutes and 18.4050 seconds.
- Norway: Coordinates in degrees with fraction, read directly from map.
- Sweden: Degrees with decimal fraction: resolve into whole 100-parts of minutes.

5. Excerpts from the database

Table 8 shows an excerpt from an Access table containing water data from ICES.

Table 9 shows an excerpt from an Access table containing data on harmful substances in biota, supplied from ICES.

Link to the laboratory (rlabo) or the geographical coordinates in code tables, which have got 'country' included, can link the ICES data to the original country.

Table 10 and Table 11 show excerpts from Access tables containing local area water data and input data from Finland.

Table 8: Extract database table containing water data from ICES

	Record Tag	Owner Code	CountryCode	LonDir	lonDeg	lonMin	lonSec 100	lon Format	lat Dir	lat Deg	lat Min	latSec 100	lat Format
1	18276	ICES	FIN	E	21	6	0	10	N	60	3	0	10
2	8543	ICES	RUS	E	28	6	0	10	N	60	9	0	10
3	12856	ICES	GBR	W	1	30	0	10	N	60	3	0	10
4	22289	ICES	GBR	W	2	6	0	10	N	57	45	0	10
5	21916	ICES	SWE	E	12	42	0	10	N	55	51	0	10
6	9901	ICES	DNK	E	11	6	0	10	N	56	9	0	10
7	17100	ICES	DEU	E	10	18	0	10	N	54	27	0	10
8	23017	ICES	DEU	E	9	30	0	10	N	53	39	0	10
9	14756	ICES	SWE	E	11	54	0	10	N	57	9	0	10
10	12613	ICES	GBR	W	3	6	0	10	N	58	15	0	10
11	13151	ICES	BEL	E	3	18	0	10	N	51	21	0	10
12	6818	ICES	SWE	E	23	18	0	10	N	65	27	0	10

NB: The column 'season' shows the quarter number of the year.

Table 8 continues as additional columns to the right in table above.

(1)	Year	Season	Months	Min Depth	Depth	Max Depth	Component	Unit	NumV	MinV	MaxV	MedianV	MeanV	St dev
(2)	1989			88	88	88	O_2	µmol/l	1			307,73	307,73	
(3)	1992	Quarter_1					NH4-N	µmol/l	1			0,10	0,10	
(4)	1987	Quarter_1	1_2				NO3-N+ NO2-N	µmol/l				8,50		
(5)	1992	Quarter_1					SIO3-SI	µmol/l	4	3,60	4,10	3,90	3,88	0,19
(6)	1990	Quarter_1					SIO3-SI	µmol/l	5	7,80	11,10	9,10	9,32	1,10
(7)	1995	Quarter_1					NO2-N	µmol/l	1			0,25	0,25	
(8)	1989			14	17	19	O_2	µmol/l	3	212,27	230,91	220,45	221,21	7,63
(9)	1989	Quarter_1					TOT-N	µmol/l	1			564,00	564,00	
(10)	1996	Quarter_1					NO3-N	µmol/l	1			5,72	5,72	
(11)	1998	Quarter_1	1_2				NO3-N+ NO2-N	µmol/l				8,00		
(12)	1988	Quarter_1					NO3-N	µmol/l	3	75,70	161,00	85,77	107,49	38,06

Table 9: Extract database table containing data on harmful substances in biota, supplied from ICES

Record Tag	Owner Code	Country Code	lonDir	lonDeg	lonMin	LonSec100	lon Format	latDir	latDeg	latMin	latSec100	latFormat	Year	Month	Day	SpeciesCode	TissueCode	Comp.	Unit	NumV	MedianV	Rep. Lab
37609	ICES	NOR	E	29	40	0	12	N	69	56	0	12	1995	11	15	GADU MOR	LI	Cd	ppm	1	0,381	NIVA
37738	ICES	NOR	E	21	22	0	12	N	70	9	0	12	1996	2	15	GADU MOR	LI	Cd	ppm	1	0,384	NIVA
38421	ICES	DEU	E	8	30	0	12	N	54	15	0	12	1987	11	11	LIMA LIM	LI	Cd	ppm	1	0,382	BFRG
39290	ICES	ESP	W	8	49	4800	12	N	42	31	1200	12	1987	9	29	MYTI EDU	SB	Cd	ppm	1	0,381	IEOC
43891	ICES	DNK	E	12	32	0	12	N	55	55	0	12	1996	12	4	PLAT FLE	LI	Cd	ppm	1	0,385	HFLD
57164	ICES	ESP	W	6	50	0	12	N	37	5	0	12	1990	10	26	SOLE VUL	MU	Cu	ppm	1	0,384	IEOV
57170	ICES	ESP	W	6	50	0	12	N	37	5	0	12	1990	10	26	SOLE VUL	MU	Cu	ppm	1	0,381	IEOV
57719	ICES	SWE	E	17	52	2160	12	N	60	43	5580	12	1989	10	17	CLUP HAR	MU	Hg	ppm	1	0,382	MNHS
59518	ICES	SWE	E	11	50	0	12	N	57	13	2340	12	1989	9	4	GADU MOR	MU	Hg	ppm	1	0,382	MNHS
60692	ICES	NOR	E	6	34	0	12	N	60	10	0	12	1994	9	30	GADU MOR	MU	Hg	ppm	1	0,384	NIVA
66315	ICES	SWE	E	10	54	0	12	N	58	31	0	12	1988	11	30	PLAT FLE	MU	Hg	ppm	1	0,384	MNHS
66375	ICES	DEU	E	8	44	780	12	N	53	52	1800	12	1989	2	24	PLAT FLE	MU	Hg	ppm	1	0,384	BFRG
66403	ICES	DEU	E	8	16	3000	12	N	54	3	0	12	1989	8	10	PLAT FLE	MU	Hg	ppm	1	0,381	BFRG
68359	ICES	DNK	E	12	32	0	12	N	55	55	0	12	1994	10	4	PLAT FLE	MU	Hg	ppm	1	0,385	HFLD
81982	ICES	FRA	W	1	13	5400	12	N	49	28	2400	12	1990	11	6	MYTI EDU	SB	PCB	ppm	1	0,385	ICBF
83023	ICES	SWE	E	11	50	0	12	N	57	13	2340	12	1988	8	17	CLUP HAR	MU	SDDT	ppm	1	0,384	MNHS
83134	ICES	SWE	E	18	4	840	12	N	58	41	4680	12	1988	11	24	CLUP HAR	MU	SDDT	ppm	1	0,383	MNHS
83454	ICES	SWE	E	18	4	840	12	N	58	41	4680	12	1991	9	23	CLUP HAR	MU	SDDT	ppm	1	0,385	MNHS
83856	ICES	SWE	E	22	41	4440	12	N	65	35	2160	12	1995	9	24	CLUP HAR	MU	SDDT	ppm	1	0,385	MNHS
83964	ICES	SWE	E	18	4	840	12	N	58	41	4680	12	1996	10	3	CLUP HAR	MU	SDDT	ppm	1	0,381	MNHS
84200	ICES	SWE	E	11	50	0	12	N	57	13	2340	12	1994	12	5	GADU MOR	LI	SDDT	ppm	1	0,381	MNHS
93562	ICES	DEU	E	8	38	0	12	N	53	56	0	12	1986	7	2	PLAT FLE	MU	Zn	ppm	1	0,382	WGEG
93595	ICES	DEU	E	8	38	0	12	N	53	56	0	12	1986	7	2	PLAT FLE	MU	Zn	ppm	1	0,381	WGEG
95881	ICES	PRT	W	9	30	0	12	N	38	45	0	12	1990	8	31	MYTI GAL	SB	Cd	ppm	1	0,385	INIP

Table 10: Extract database table containing water data from stations in local areas in Finland

Record Tag	Owner Code	Country Code	Area	Station	lon Dir	Lon Deg	Lon Min	LonSec 100	lon Format	lat Dir	Lat Deg	Lat Min	latSec100	lat Format	Year	Season	Comp.	Unit	NumV	MinV	MaxV	MedianV	MeanV
721	FIN	FIN	Kymi	Kymi1	E	26	29	3540	12	N	60	24	3300	12	1993	Winter	TOT-N	µmol/l	1			45,00	
732	FIN	FIN	Kymi	Kymi1	E	26	29	3540	12	N	60	24	3300	12	1994	Winter	PO4-P	µmol/l	1			0,06	
759	FIN	FIN	Kymi	Kymi1	E	26	29	3540	12	N	60	24	3300	12	1996	Year	TOT-N	µmol/l	4	29,30	40,70	35,70	
834	FIN	FIN	Kymi	Kymi2	E	26	36	600	12	N	60	21	0	12	1990	Summer	Chl-a	µg/l	12	2,10	7,40	5,10	
837	FIN	FIN	Kymi	Kymi2	E	26	36	600	12	N	60	21	0	12	1990	Winter	PO4-P	µmol/l	6	0,81	0,81	0,81	
1004	FIN	FIN	Oulu	Oulu1	E	25	17	0	12	N	65	2	0	12	1992	Winter	TOT-P	µmol/l	2	0,26	0,39	0,32	
1024	FIN	FIN	Oulu	Oulu1	E	25	17	0	12	N	65	2	0	12	1994	Winter	TOT-N	µmol/l	1			23,60	
1028	FIN	FIN	Oulu	Oulu1	E	25	17	0	12	N	65	2	0	12	1994	Year	TOT-N/TOT-P	ratio				66,48	
1117	FIN	FIN	Oulu	Oulu2	E	25	4	0	12	N	65	4	0	12	1992	Winter	NO3-N+NO2-N	µmol/l	4	3,93	14,60	7,46	
1249	FIN	FIN	Oulu	Oulu3	E	24	36	0	12	N	65	8	0	12	1992	Year	TOT-N	µmol/l	67	17,10	29,30	19,30	
1342	FIN	FIN	Pori	Pori1	E	21	36	1500	12	N	61	35	60	12	1992		O_2	%sat	2	88,00	90,00	89,00	
1374	FIN	FIN	Pori	Pori1	E	21	36	1500	12	N	61	35	60	12	1995	Winter	PO4-P	µmol/l	1			0,55	
1552	FIN	FIN	Pori	Pori3	E	21	16	300	12	N	61	38	60	12	1988	Year	TOT-P	µmol/l	8	0,42	0,61	0,45	
1566	FIN	FIN	Pori	Pori3	E	21	16	300	12	N	61	38	60	12	1990		SIO3-Si	µmol/l	5	15,00	25,00	15,00	
6724	ICES	FIN			E	24	6	0	10	N	59	45	0	10	1997		Chl-a	µg/l	1			6,90	6,90
8560	ICES	FIN			E	21	42	0	10	N	60	21	0	10	1988	Quarter_1	NH4-N	µmol/l	1			0,40	0,40
18245	ICES	FIN			E	19	54	0	10	N	59	45	0	10	1992		O_2	µmol/l	1			260,00	260,00
18271	ICES	FIN			E	25	6	0	10	N	59	57	0	10	1989		O_2	µmol/l	1			203,18	203,18
20585	ICES	FIN			E	25	30	0	10	N	59	57	0	10	1994	Quarter_1	PO4-P	µmol/l	1			0,74	0,74
20603	ICES	FIN			E	21	18	0	10	N	60	3	0	10	1985	Quarter_1	PO4-P	µmol/l	1			0,51	0,51
20606	ICES	FIN			E	21	18	0	10	N	60	3	0	10	1995	Quarter_1	PO4-P	µmol/l	1			0,62	0,62
20701	ICES	FIN			E	21	6	0	10	N	61	9	0	10	1993	Quarter_1	PO4-P	µmol/l	1			0,35	0,35
25039	ICES	FIN			E	21	18	0	10	N	59	57	0	10	1988	Quarter_1	TOT-P	µmol/l	1			0,68	0,68
25116	ICES	FIN			E	20	54	0	10	N	60	45	0	10	1988	Quarter_1	TOT-P	µmol/l	1			0,68	0,68
25121	ICES	FIN			E	21	6	0	10	N	61	9	0	10	1988	Quarter_1	TOT-P	µmol/l	1			0,60	0,60

Table 11: Extract database table showing input of nitrogen and phosphorous to local areas in Finland

CountryCODE	Area	lonFormat	latFormat	YEAR	COMPONENT	VALUE	UNIT	% agriculture	% industrial emissions	% waste water treatment plants	% river	% point source
FIN	Kymi	12	12	1994	Tot-P	140	103 kg					
FIN	Kymi	12	12	1995	Tot-N	3369	103 kg					
FIN	Kymi	12	12	1995	Tot-P	130	103 kg					
FIN	Kymi	12	12	1996	Tot-N	2715	103 kg					
FIN	Kymi	12	12	1996	Tot-P	110	103 kg					
FIN	Kymi	12	12	1997	Tot-N	2433	103 kg					
FIN	Kymi	12	12	1997	Tot-P	96	103 kg					
FIN	Oulu	12	12	1985	Tot-N	4426	103 kg	14	8	13		
FIN	Oulu	12	12	1985	Tot-P	224	103 kg	24	12	6		
FIN	Oulu	12	12	1986	Tot-N	3841	103 kg	14	7	14		
FIN	Oulu	12	12	1986	Tot-P	191	103 kg	23	15	6		
FIN	Oulu	12	12	1987	Tot-N	4002	103 kg	15	4	13		
FIN	Oulu	12	12	1989	Tot-N	4979	103 kg	15	6	11		
FIN	Pori	12	12	1987	Tot-N	7779	103 kg				95,5	4,5
FIN	Pori	12	12	1987	Tot-P	689	103 kg				97,5	2,5
FIN	Pori	12	12	1988	Tot-N	7779	103 kg				95,5	4,5
FIN	Pori	12	12	1988	Tot-P	732	103 kg				98	2
FIN	Pori	12	12	1989	Tot-N	10537	103 kg				96,5	3,5
FIN	Pori	12	12	1989	Tot-P	500	103 kg				97	3
FIN	Pori	12	12	1990	Tot-N	12545	103 kg				97	3
FIN	Pori	12	12	1990	Tot-P	583	103 kg				98	2
FIN	Pori	12	12	1991	Tot-N	11014	103 kg				96,5	3,5

The stations data (Table 10) and area input data (Table 11) can be linked using the area column as a common 'hinge'. This is useful for analysing the correlation between input to the area and concentrations found in the recipient.

The most commonly observed components in biota and sediments, and the species most often sampled for analysis are shown in Table 12 to Table 16.

Table 12: Components and species ranked by number of observations (ICES data set)

Harmful substances in biota — ICES data					
Param	CountOfparam		Genus	species	CountOfgenus
HG	12 355		PLAT	FLE	15 199
CU	11 505		GADU	MOR	14 652
ZN	11 337		MYTI	EDU	14 186
CD	10 612		CLUP	HAR	8 616
PB	10 305		LIMA	LIM	3 007
PCB	2 812		PLEU	PLA	2 858
SDDT	1 994		CRAS	GIG	1 900
CR	1 140		MERL	MNG	464
PAH	102		LEPI	WHI	312
RA228	17		SOLE	VUL	282
RA226	17		MULL	BAR	186
CS137	17		PAGE	ERY	94
CS134	17		MYTI	GAL	90
CO60	15		MICR	KIT	76
TBTIN	1		POLL	POL	50

Table 13: Components in sediments ranked by number of observations (ICES data set)

Harmful substances in sediments — ICES data						
Param	CountOfparam					
ZN	1 262					
CU	1 257					
PB	1 209					
HG	1 106					
CD	1 089					
CR	466					
SDDT	37					
PCB	27					
TBTIN	17					

Table 14: Species ranked by number of observations (MEDPOL data set)

Heavy metals in biota — MEDPOL data		
SPECY	DESCRIP	Count of species
MB	Mullus barbatus	7 803
MG	Mytilus galloprovincialis	5 914
MC	Mactra corrallina (Syn. Mactra stultorum)	3 127
NN	Nephrops norvegicus	2 286
MS	Mullus surmuletus	1 811
DS	Diplodus sargus	1 073
EE	Engraulis encrasicolus	1 010
SP	Sardina pilchardus	982
LM	Lithognathus mormyrus (Syn. Pagellus mormyrus)	940
BB	Boops boops	673
TT	Thunnus thynnus	653
PP	Perna perna	596
PL	Parapenaeus longirostris	595
AA	Aristeus antennatus	545
NG	Nassarius gibbosulus (Syn. Arcularia gibbosula)	520
PK	Penaeus kerathurus	407
MAU	Mugil auratus	358
PGE	Pagellus erythrinus	343
NE	Neverita josephinia (Syn. Natica josephinia)	305
CG	Chamelea gallina (Syn. Venus gallina)	303
AT	Acanthocardia tuberculata (Syn. Rudicardium and Cardium tuberculatum)	275
NM	Nassarius mutabilis (Syn. Sphaeronassa mutabilis)	271
DP	Diogenes pugilator	246
SR	Siganus rivulatus	225
TRT	Trachurus trachurus	202
LD	Liocarcinus depurator (Syn. Macropipus depurator)	190
SYS	Saurida undosquamis	186
DT	Donax trunculus	177
SAR	Sarda sarda	163
UM	Upeneus moluccensis	161
CM	Carcinus mediterraneus	156
XG	Xiphias gladius	156
PGA	Pagellus acarne	142
TA	Thunnus alalunga	141
OE	Ostrea edulis	136
MM	Merluccius merluccius	133
SI	Scapharca inaequivalvis	126
AF	Aristaeomorpha foliacea	114
BBR	Bolinus brandaris (syn. Murex brandaris)	101

Table 15 Heavy metals in biota ranked by number of observations (MEDPOL data set)

Heavy metals in biota — MEDPOL data		
PAR	DESCRIP	Count of parameter
HGT	Total mercury	8 337
CD	Cadmium	7 172
PB	Lead	4 416
ZN	Zinc	3 924
CU	Copper	3 842
FE	Iron	1 440
CR	Chromium	1 416
MN	Manganese	1 330
NI	Nickel	911
AS	Arsenic	792
HGO	Organic mercury	424
CO	Cobalt	213
SE	Selenium	201
CS	Caesium	66
SB	Antimony	50
AG	Silver	27
RB	Rubidium	13

Table 16: Halogenated hydrocarbons in biota ranked by number of observations (MEDPOL data set)

Halogenated hydrocarbons in biota — MEDPOL data		
PAR	DESCRIP	CountOfPAR
DDEP	Dichloro-Diphenyl Dichloroethene pp	2 939
PCBA	Polychlorinated Biphenyls (as Arochlor 1254)	2 869
DDTP	Dichloro-Diphenyl Trichloroethane pp	2 735
DDDP	Dichloro-Diphenyl Dichloroethane pp. (same as	2 527
LIN	Lindane	909
DIE	Dieldrin	711
HCH	Hexachlorohexane (same as BHC) (excluding Lindane)	621
ALD	Aldrin	602
HCB	Hexachlorobenzene	282
PCBB	Polychlorinated Biphenyls (as Arochlor 1260)	238
HEP	Heptachlor	207
HOX	Heptachlor Epoxide (same as EPOX)	182
END	Endrin	153
DDTO	Dichloro-Diphenyl Trichloroethane op	72
DDDO	Dichloro-Diphenyl Dichloroethane op (same as TDEO)	34
DDD	opDDD + ppDDD	21
DDT	opDDT + ppDDT	21
DDEO	Dichloro-Diphenyl Dichloroethene op	20
DDTS	opDDT + ppDDT + opDDE + ppDDE + opDDD + pp	4
ENDOA	Alpha-Endosulfan	3
ENDOB	Beta-Endosulfan	3
ENDOS	Endosulfan sulphate	3
CLRDB	Beta-Chlordane	3
CLRDA	Alpha-Chlordane	3

Appendix D: Data supplied from national reference centres

Table 17: Data supplied from the national reference centre of Denmark

Denmark — number of observations in local areas														
Component	Medium	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total-P	Water	5	8	8	10	10	10	10	10	10	10	10	10	10
PO4-P	Water	1	3	3	5	5	5	5	5	5	5	5	5	5
Tot-N	Water	5	8	8	10	10	10	10	10	10	10	10	10	10
NO3+NO2	Water	1	3	3	5	5	5	5	5	5	5	5	5	5
NO3+ NO2/PO4	Water	1	3	3	5	5	5	5	5	5	5	5	5	5
Total-N/ Total-P	Water	4	5	5	5	5	5	5	5	5	5	5	5	5
SiO3-Si	Water	1	2	2	2	4	4	4	3	4	3			
O_2	Water	4	5	5	5	5	5	5	5	5	5	5	5	5
Chl.a	Water	4	5	5	5	5	5	5	5	5	5	5	5	5
Secchi	Water	2	6	5	5	5	5	5	5	5	5	5	5	5
Seagrass max. Depth	Benthos					3	3	3	3	2	2	3	3	2
Seaweed max. Depth	Benthos					1	1	1	1	1	1	1	1	1

Table 18: Data supplied from the national reference centre of Finland

Finland — number of observations in local areas														
Parameter	Medium	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total-P	Water	15	14	16	15	14	15	16	16	15	16	15	14	12
PO4-P	Water	6	5	6	4	5	6	7	7	7	8	5	5	3
Total-N	Water	15	14	16	15	14	15	16	16	15	16	15	15	13
NO3+NO2	Water	5	5	6	5	5	6	7	7	7	8	5	6	4
NH4-N	Water	6	5	6	5	5	6	7	7	7	8	5	6	4
NO3+NO2/ PO4 Ratio	Water	5	5	6	4	5	6	7	7	7	8	5	6	4
Total-N/ Total-P Ratio	Water	8	8	8	8	8	8	8	8	8	8	8	7	7
SiO3-Si	Water	3	3	4	3	4	4	5	5	5	5	4	5	3
O2 Sat. %	Water	7	7	6	4	7	8	8	7	7	7	7	6	6
Chl. a	Water	6	5	8	7	8	8	8	8	7	7	7	7	7

Table 19: Data supplied from the national reference centre of France

France — number of observations in local areas														
Component	Medium	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
PO4-P	Water	3	3	3	3	3	3	3	3	3	3	3	3	2
NO3-N+ NO2-N	Water	2	2	2	2	2	2	2	2	2	2	2	2	1
Algal blooms	Water			1	1	1	1	1	1	3	3	3	1	1
Phaeocystis sp.	Water											1	1	1
Toxic algae	Water	2	2	4	4	4	4	4	3	4	4	4		
Cd	Sediment							1		1			1	
Cu	Sediment							1		1			1	
Hg	Sediment							1		1			1	
Pb	Sediment							1		1			1	
Zn	Sediment							1		1			1	
PAH	Sediment									1			1	
PCB	Sediment							1		1			1	
Cd	Mussel	3	3	3	3	3	3	3	3	3	3	3	3	
Cu	Mussel	3	3	3	3	3	3	3	3	3	3	3	3	
Hg	Mussel	3	3	3	3	3	3	3	3	3	3	3	3	
Pb	Mussel	3	3	3	3	3	3	3	3	3	3	3	3	
Zn	Mussel	3	3	3	3	3	3	3	3	3	3	3	3	

Table 20: Data supplied from the national reference centre of Germany

Germany — number of observations in local areas														
Component	Medium	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total-P	Water	6	7	6	7	7	7	7	7	7	6	6	5	6
PO4-P	Water	5	6	5	6	6	6	6	6	6	5	5	4	5
Total-N	Water	6	7	6	7	7	7	7	7	7	6	6	5	6
NH4-N	Water		1		1	1	1	1	1	1	1	1		1
NO2-N	Water		1		1	1	1	1	1	1	1	1		1
NO3-N	Water		1		1	1	1	1	1	1	1	1		1
NO3-N+ NO2-N	Water		1		1	1	1	1	1	1	1	1		1
NO3+ NO2/PO4	Water		1		1	1	1	1	1	1	1	1		1
Tot-N/Tot-P	Water	6	6	6	6	6	6	6	6	6	5	5	5	5
SiO3-Si	Water	1	1	1	1	2	4	5	4	5	5	3	3	5
O2	Water	6	6	6	6	6	6	6	6	6	5	5	5	5
Chl. A	Water	1	1	1	1	1	1	1	1	1	1	1	1	1
Diatom/ Flagellate	Water			2	2	2	1		2	2				
Cd	Sediment											1		1
Cr	Sediment											1		1
Cu	Sediment											1		1
Hg	Sediment											1		1
Pb	Sediment											1		1
Zn	Sediment											1		1
DDT+DDE +DDD	Sediment		1		1	1	5	1	5	1	5	2		2
PAH	Sediment											1		1
PCB	Sediment											1		1
DDT+DDE +DDD	Fish								5	5	4	5	5	5
DDT+DDE +DDD	Mussel								3	3	4	4	3	
PAH	Mussel								1	1	1	1	1	1
Oil spills	Water							55	37	42	34	42	23	34

Table 21: Data supplied from the national reference centre of Greece

Greece — number of observations in local areas														
Component	Medium	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Algal blooms	Water	2		2	2	2	1	2	2	2		2	1	1
Chl. a	Water			4	4	4	2	4	6	9	8	15	14	15
NH4-N	Water									17	8	21	24	23
NO2-N	Water									17	14	24	30	23
NO3-N	Water									17	14	30	30	29
O2	Water									7	7	8	7	7
PCB	Water			1	1				1	1	1	1	1	1
PO4-P	Water									16	14	24	30	23
SiO3-Si	Water									10	7	13	13	10
Tot-N	Water									1	1	1	3	5
Tot-P	Water											4	2	2
Cd	Fish		1	1	1	1	1						1	1
Cr	Fish		1	2	2	2	2		2	2	2	2	2	2
Cu	Fish		1	2	2	2	2		2	2	2	2	3	3
DDT+DDE+DDD	Fish		1	2	2	1	2	2	2	2	2	2	1	2
Pb	Fish												1	1
PCB	Fish			1	1	1	1		1	1	1	1		1
Zn	Fish		1		2	2	2		2	2	2	2	3	3
Cd	Mulus barbatus												1	1
Cd	Mussel	2	2	2	2	2	2			3	3	7	7	8
Cr	Mussel	2	2	2	2	2	2		2	3	3	3	3	3
Cu	Mussel	2	2	2	2	2	2		2	3	4	4	3	4
DDT+DDE+DDD	Mussel				2	1	2	2	2	2	2	2	2	2
Hg	Mussel									3	3	5	4	5
Pb	Mussel									2	3	7	6	5
PCB	Mussel				2	1	1		2	2	2	2	2	2
Zn	Mussel	2	2	2	2	2	2		2	2	2	3	3	3
Cd	Sediment									1	5	13	20	16
Cr	Sediment									5	5	7	8	7
Cu	Sediment										4	16	15	12
DDT+DDE+DDD	Sediment												7	
Hg	Sediment									1	2	5	4	5
PAH	Sediment													1
Pb	Sediment									1	2	20	20	16
PCB	Sediment									4	3	6	6	4
Zn	Sediment									5	8	14	16	11

Table 22: Data supplied from the national reference centre of Italy

Italy — number of observations in local areas									
Component	Medium	1990	1991	1992	1993	1994	1995	1996	1997
Total-P	Water	8	26	28	13	8	8	8	54
PO4-P	Water	4	20	22	9	4	4	4	45
NO3-N	Water	4	20	22	9	4	4	4	45
NO2-N	Water	4	4	4	4	4	4	4	45
NH4-N	Water	4	20	22	9	4	4	4	45
(NO3+NO2)/PO4	Water	4	10	10	4	4	4	4	15
Chl. A	Water	6	20	20	6	4	4	4	49
Diatoms n/l	Water								20
Dinoflagellates n/l	Water								20
Diatom/Flagellate ratio	Water								37
O2	Water	10	22	24	8	4	4	4	29
Oil layer	Water		10	10	2				
Tar residue	Water		10	10	2				
Transparency	Water								18

Table 23: Data supplied from the national reference centre of Norway

Norway — number of observations in local areas													
Component	Medium	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total-P	Water			4	4		3	3	3	3	3	4	6
PO4-P	Water			4	4		3	3	3	3	3	4	6
Total-N	Water			4	4		3	3	3	3	3	4	6
NO3-N	Water			4	4		3	3	3	3	3	4	6
NH4-N	Water			4	4							4	3
SiO3-Si	Water						3	3	3	3	3	4	6
Chl. A	Water			4	4							4	7
Secchi	Water					3	3		3	3			
O2	Water			3	3	3	3		3	4	1	3	
Hg	Sediment	7				4	7	135	9	13	16		
Cd	Sediment	7				4	7	135	9	13	16		6
Pb	Sediment	7				4	7	135	9	13	16		6
Cu	Sediment	7				4	7	35	9	4			6
Zn	Sediment	7				4	7	7		4			6
Ni	Sediment	7				4	7	7					6
Cr	Sediment	7				4	7	7		4			6
PAH	Sediment	7				2	7	28	34	11			
PCB(7)	Sediment							110	9	9	19		
DDE+DDD	Sediment							105	9	9	18		

Table 24: Data supplied from the national reference centre of the Netherlands

Netherlands — number of observations in local areas														
Component	Medium	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
NH4-N	Water	5	5	5	5	5	5	5	5	5	5	5	5	5
NO2-N	Water	2	2		1	2	2	2	2	2	2	2	2	2
NO3+NO2	Water	4	4	2	4	4	4	4	4	4	4	4	4	4
NO3+NO2/PO4	Water	5	5	2	5	5	5	5	5	5	5	5	5	5
NO3-N	Water	2	2		2	2	2	2	2	2	2	2	2	2
NO3-N+NO2-N	Water	1	1		1	1	1	1	1	1	1	1	1	1
Total-N	Water	3	3	3	4	4	4	4	4	4	4	4	4	4
Total-N/Tot-P	Water	3	3	3	4	4	4	4	4	4	4	4	4	4
Total-P	Water	4	4	4	5	5	5	5	5	5	5	5	5	5
PO4-P	Water	5	5	5	5	5	5	5	5	5	5	5	5	5
SiO3-Si	Water	5	5	5	5	5	5	5	5	5	5	5	5	5
O_2	Water	5	5	5	5	5	5	5	5	5	5	5	5	5
Chl. A	Water	4	3	4	5	5	5	5	5	5	5	5	5	5
Phaeocystis sp.	Water						2	2	2	2	2	2	4	4
Toxic algae	Water						3	3	3	3	3	3	8	8
Seagrasses				2				1		1	2	2		
PAH	Mussel	1	1	1	1	1	1	1	1	1	1	1	1	1
PAH	Sediment												4	
PAH	Suspended matter				1	3	3	3	3	2	2	2	2	2
Pb	Mussel	1	1	1	1	1	1	1	1	1	1	1	1	1
Pb	Sediment												4	
PCB	Fish	1	1	1	1	1	1	1	1	1	1	1	1	1
PCB	Mussel	1	1	1	1	1	1	1	1	1	1	1	1	1
PCB	Sediment												4	
PCB	Suspended matter					2	2	2	2	2	2	2	2	2
Zn	Mussel	1	1	1	1	1	1	1	1	1	1	1	1	1
Zn	Sediment												4	
Cd	Fish	2	2	1	2	1	2	2	2	2	2	2	2	2
Cd	Mussel	1	1	1	1	1	1	1	1	1	1	1	1	1
Cd	Sediment												4	
Cr	Mussel	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr	Sediment												4	
Cu	Mussel	1	1	1	1	1	1	1	1	1	1	1	1	1
Cu	Sediment												4	
Hg	Fish	2	2	1	2	1	2	2	2	2	2	2	2	2
Hg	Mussel	1	1	1	1	1	1	1	1	1	1	1	1	1
Hg	Sediment												4	
Radiation		4	4	4	10	10	10	8	8	8	10	8	8	8

Table 25: Input data (number of stations) presented from the national reference centres

	Denmark												
COMPONENT	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total-N	3	3	2	2	4	4	4	4	4	4	4	4	4
Total-P	3	3	2	2	4	4	4	4	4	4	4	4	4
	Sweden												
COMPONENT	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
PAH			1			1	1	1	1	1	1	1	1
Total-N	1	1	1	1	1	1	1	4	4	4	4	4	4
Total-P	1	1	1	1	1	1	1	4	4	4	4	4	4
	Norway												
COMPONENT	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total-C	1			1		1	1	1	1			1	
Total-N	1			1		1	1	1	1			1	
Total-P	1			1		1	1	1	1			1	
	Germany												
COMPONENT	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Cd	2	2	2	2	2	7	4	7	8	9	11	11	11
Cr						4		4	6	7	9	9	8
Cu	2	2	2	2	2	7	4	8	8	9	11	11	11
DDT+DDE+DDD						1	1	1	1	1	1	1	1
Hg	2	2	2	2	2	7	4	8	8	9	11	11	11
PAH											2	2	1
Pb	2	2	2	2	2	7	4	8	8	9	11	11	11
PCB			1	1	1	1	3	2	2	3	3	3	2
Sum PCB:28,52, 101,138,153,180	1	1	1	1	1	1	1	1	1	1	1	1	1
TBT								1	1	2	1	2	1
Total-C	1	1	1	1	1	1	1	1	1	1	1	1	1
Total-N	2	3	3	5	5	10	11	11	11	11	11	11	11
Total-P	2	3	3	5	5	9	11	10	10	10	10	10	10
Zn	2	2	2	2	2	7	4	8	8	9	11	11	11
	Finland												
COMPONENT	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total-N	3	3	3	3	3	3	3	3	3	3	3	3	3
Total-P	3	3	3	3	3	3	3	3	3	3	3	3	3
	The Netherlands												
COMPONENT	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Cd		3	5	5	5	5	5	5	5	5	5	5	5
Cr		3	5	5	5	5	5	5	5	5	5	5	5
Cu		4	5	5	5	5	5	5	5	5	5	5	5
Hg		3	4	5	5	5	5	5	5	5	5	5	5
PAH				4	4	4	4	4	5	5	5	5	4
Pb		3	5	5	5	5	5	5	5	5	5	5	5
PCB				1					1	1	1	1	
PCB(7)				3	4	4	4	4	4	4	4	4	4
Total-N	1	5	5	5	5	5	5	5	5	5	5	5	4
Total-P	1	5	5	5	5	5	5	5	5	5	5	5	4
Zn		3	5	5	5	5	5	5	5	5	4	4	5
	France												
COMPONENT	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total-N		1	1	1	1	1	1	1	1	1	1		
Total-P					1	1	1	1	1	1	1		