Topic report No 11/2000

Marine and Coastal Environment
Annual topic update 1999

Prepared by:
Marcello Peronaci, ETC/MCE Leader

Project Manager:
Anita Künitzer
European Environment Agency

European Environment Agency

Cover design: Rolf Kuchling, EEA

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European Environment Agency
Kongens Nytorv 6
DK-1050 Copenhagen K
Denmark
Tel: +45 33 36 71 00
Fax: +45 33 36 71 99
E-mail: eea@eea.eu.int
www.eea.eu.int

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1. Introduction

1.1. The European Environment Agency

The European Environment Agency (EEA) was established in 1990 by Council Regulation 1210/90, which also aims at the setting up of a European Environment Information and Observation NETwork (EIONET). EIONET consists of coordinating Institutes (National Focal Points) and expertise centres (National Reference Centres) in member countries, as well as European Topic Centres.

The mission of the Agency, derived from the main objective for the second Multiannual work programme (1999-2003), is:

to support sustainable development and to help to achieve significant and measurable improvement in Europe's environment through the provision of targeted, timely, relevant and reliable information to policy making agents and the public.

To achieve this mission EEA and its ETCs work with the EIONET partners in member countries and also cooperate actively with other Community Services, other bodies and international organisations to build synergy and avoid duplication of effort.

1.2. The European Topic Centre on Marine and Coastal Environment

The European Topic Centre on Marine and Coastal Environment (ETC/MCE) was established in 1994 with the aim to help the European Environment Agency to carry out its work programme on the issues related to marine and coastal environments.

The main objective of ETC/MCE is to provide reliable and comparable information regarding the state of the marine and coastal environment of Europe and the pressures acting on them. ETC/MCE has also the mandate to develop appropriate tools and procedures to assess the quality of the marine and coastal environment. To achieve this, an effort towards the harmonisation of reporting and assessment has been initiated by ETC/MCE and is still in progress.

The ETC/MCE consortium consists of experts from six national institutes:

- Ente Per le Nuove Tecnologie, l'Energia e l'Ambiente (ENEA), CRAM, La Spezia, Italy
- Institute Francais de Recherche pour l'Exploitation de la Mer (IFREMER), Brest and Toulon, France
- National Centre for Marine Research (NCMR), Athens, Greece
- National Environment Research Institute (NERI), Roskilde, Denmark
- National Institute for Coastal and Marine Management (RIKZ), The Hague, The Netherlands
- Norwegian Institute for Water Research (NIVA), Oslo, Norway

The ETC/MCE management committee consists of representatives from each of the partner institutions and meets in a plenary session at least twice a year to discuss the state-of-play of the activities, problems encountered and future plans.

Representatives of the Joint Research Centre are invited to participate in the management committee meetings in order to assist the ETC in planning the activities which entail cooperation.

The work to be performed by ETC/MCE in 1999 was described in the EEA multiannual work programme 1994-1999 and, more specifically, in the EEA annual work programme 1999. The activities were further specified in the technical annex to the agreement between the EEA and the topic centre and in the related work plan. In this topic update, the tasks accomplished and products prepared during the 1999 subvention are described.

Each task described in the technical annex of the work programme 1999 has been developed by a team consisting of relevant experts from the ETC/MCE consortium and led by a task leader, who is responsible for the activities and related deliverables and reports to the ETC Leader.

For further information on the ETC/MCE contact:
Marcello Peronaci (ETC Leader)
ENEA – Centro Ricerche Ambiente Marino
P.O. Box 316, 19100 La Spezia, Italy
Tel +39 0187 978111
Fax +39 0187 978293
e-mail: etc-mce@estosf.santateresa.enea.it

1.3. Main contacts

In order to help develop the activities, ETC/MCE has established direct contact with several relevant international and national organisations.

The following table 1 lists the national primary contact points: some of them are EEA National Focal Points (NFP), others are National Reference Centres (NRC).

Country	Name		Institution	Tel/fax/e-mail
Austria	Wilhelm Vogel	NFP	Federal Environment Agency	43 1 31304 3550 43 1 31304 5400 vogel@ubavie.gv.at
Belgium	Jan Voet	NFP	Interregional Cell for the Environment	32 2 649 8191 32 2 644 2391 celinair@irceline.be
Denmark	Peter Sandbeck	NRC	NERI	45 46 30 1261 45 46 30 11 14 PS@dmu.dk
Finland	Pentii Kangas	NFP	Finnish Environment Insitute	358 9 403 000 358 9 4030 11 14 pentti.kangas@vyh.fi
France	Jean Louis Weber	NFP	IFEN	33 23879 7878 33 23879 7870 jlweber@aol.com
Germany	Marina Carstens	NRC	Federal Environment Agency	49 30 89 03 28 24 49 30 89 03 22 85 marina.carstens@uba.de
Greece	Mata Aravantinou	NFP	Ministry of the Environment	30 1 864 3737 30 1 864 3737 mata@nfp-gr.eionet.eu.int
Iceland	David Egilsson	NRC	Ocean Pollution department, Environment and Food Agency	354 568 8848 354 5 68 1896

Ireland	Bronwyn Cahill	NFP	Irish Marine Institute	353 1 4745100 353 1 4757104 bronwyyn.cahill@marine.ie
Italy	Claudio Maricchiolo	NFP	ANPA, Agenzia Nazionale per l'Ambiente	39 06 5007 2177 39 06 5007 2221 maricchiolo@anpa.it
Liechtenstein	Petra Bockmuhl	NFP	National office for Forests, Nature and Landscape	41 75 236 6400 41 75 236 6414 Petra.bockmuehl@awnl.llv.li
Luxembourg	Jean Paul Feltgen	NFP	Ministere de l'Environnement	352 478 6813 352 400 410 jean-pall.feltgen@life.lu
The Netherlands	Adriaan Minderhoud	NFP	Rijksinstituut voor Volksgezonddheid en Milieu RIVM	31 30 274 2035 31 30 274 4405 Ad. Minderhoud@rivm.nl
Norway	Harald Loeng	NFP	Insitute of Marine Science, Bergen	Havforskningsinstituttet HI
Portugal	Maria Leonor Gomes	NFP	Direccao-General do Ambiente (SINAIA)	351 1 472 8200 351 1 471 9074 leonor.gomes@dga.min-amb.pt
Spain	Juan Martinez Sànchez	NFP	Ministerio de Medio Ambiente	34 1 597 58 12 24 1 597 58 57 juan.martinez@sgca.mma.es
Sweden	Ebbe Kvist	NFP	Swedish EPA	46 8 698 1000 46 8 698 1585 ebb@environ.se
United Kingdom	Andrew Franklin	NRC	CEFAS Burnham Laboratory	44 0 1621 787200 44 0 1621 784989 a.franklin@cefas.co.uk

ETC/MCE also has contacts and cooperation with the following regional marine conventions/programmes:

- OSPARCOM (Oslo and Paris Commission of the Convention for the Protection of the Marine Environment of the Northeast Atlantic)
- HELCOM (Helsinki Commission of the Convention for the protection of the Marine Environment of the Baltic Sea)
- MAP (Mediterranean Action Plan)
- AMAP (Arctic Monitoring Assessment Programme) and
- BSEP (Black Sea Environment Programme) as well as with
- ICES (International Council for the Exploration of the Sea).

Cooperation has also been established with the Space Applications Institute of the EU Joint Research Centre (JRC) in Ispra.

1.4. Main objectives for 1999

1.4.1. Background

The activities carried out since 1996 by ETC/MCE can be summarised as follows:

- To support EEA on relevant matters, providing advice to specific users and representing EEA in working groups, committees, etc.
- To facilitate the exchange and possible integration of existing data and information produced by European-level regional marine conventions/programmes through the organisation of an Inter-Regional forum,
- Development of specific technical tasks on the identification of common and major threats to European marine and coastal areas, the development of a preliminary set of indicators for coastal zone characterisation and management, the description of the state and pressure of the marine and coastal environment on specific areas such as the Mediterranean Sea, the description of the marine eutrophication.

1.4.2. Objectives of ETC/MCE for 1999

ETC/MCE, in agreement with EEA, addressed the following main objectives for 1999:

- To maintain the activities of the Inter-Regional forum in order to further improve the exchange and possible integration of existing data and information produced by regional and international organisations/conventions,
- To further develop the activities developed under the previous subventions, through the completion of data collection for the coastal zones, estuaries, lagoons and fjords,
- To evaluate the state of estuarine, coastal and marine eutrophication,
- To contribute to EEA reports on indicators and on Europe's biodiversity,
- To support and represent the Agency in its activities, and to supply information to EIONET (NFPs and NRCs).

2. Progress

2.1. Cooperation between the EEA, ETC/MCE and the European marine regional conventions/actions plans

2.1.1. Background

Several marine conventions collect data around European waters. These conventions work independently. It was observed that communication between these conventions, and possibly data harmonisation and exchange, was an important objective for European marine environmental policy, and ETC/MCE was set to initiate the framework for this dialogue.

In 1995 ETC/MCE on behalf of the European Environment Agency set up an Inter-Regional forum (IRF) involving all marine conventions operating in the European seas, with the following main objectives:

- to facilitate the exchange and the possible integration of existing data and information produced by the European marine regional conventions/actions plans with EEA and ETC/MCE.
- to improve working relations and task sharing, according to EEA's mandate of providing reliable, harmonised and objective information on the state of the European environment.

The European marine regional conventions/action plans involved in the forum are OSPARCOM, HELCOM, MAP, AMAP, BSEP and ICES.

A second meeting of the forum was held in Copenhagen, November 1997, to follow up on progress after the first forum. The main objective of this forum was to stimulate agreement/consensus on common actions by the marine conventions/action plans and EEA on the following topics:

1. Activities for the development of common assessment tools (statistical tools and geographical information systems),
2. Research needs to improve assessment of environmental status (common project proposal on biological effects of contaminants and two workshops on biological effects and transport models).

2.1.2. The Third Inter-Regional Forum and follow-up meeting: preparatory work, discussion and conclusions

The third meeting of the forum was held in Venice, 27-28 September 1999 [7], and was followed by a follow-up meeting in Copenhagen in December 1999. The forum concentrated attention on the results of the inter-session, ongoing activities, namely:

- Indicators
- The use of geographical information systems and Indicators as tools for assessment;
- Harmonisation of reporting, data exchange and management

The forum examined also its role and agreed that its advisory function would be best emphasised by providing its member organisations with recommendations on issues related to assessment of the marine and coastal environment. Each member organisation would implement such recommendations acting in its own right and on a voluntary basis.

Indicators
Marine indicators can be subdivided into *ecological indicators*, which follow the DPSIR assessment framework (a conceptual chain describing the driving forces, the pressures, state, impact and response of the environment), and *headline indicators* (so called because they are designed to reach the headlines of the newspapers). A strategy for developing common indicators for marine environment in a harmonised way was discussed, and involved several steps aiming to achieve a) the conceptual identification of indicators and data requirements and b) the testing of indicators with data. A first attempt to apply the 'indicator concept' to marine environmental data was discussed, as part of the task undertaken within the ETC/MCE work programme (for detailed information on this issue, see paragraph 2.2.5). The role of indicators within the EEA mission to provide targeted, timely, relevant and reliable information was also reaffirmed and the need for the development of common indicators was stressed.

The forum agreed to further develop the concept of indicators for the marine and coastal environment, based on full coordination among all IRF partners, through the setting up of a working group involving representatives of EEA, ETC/MCE, marine conventions and JRC.

While at present each organisation independently develops its own indicators, the working group will follow the approach of developing (in a harmonised way) selected indicators of common interest and of reporting on agreed indicators only. The working group will look in detail at the marine ecological indicators developed so far by EEA, marine conventions and other international organisations. The working group will address the different types of indicators, starting with eutrophication indicators; develop the requirements for indicators; address data access for the indicators; and consider available resources [7]. This working group should have two meetings in 2000 and should report to the IRF Steering Group by the end of 2000.

Geographical Information Systems (GIS)
In order to demonstrate to the Inter-Regional forum the potential of GIS as a tool for assessment, the GIS working group designed and implemented EUMARIS, a Geographic Information System prototype. The prototype was tested on a number of environmental and socio-economic data (for details see 2):

- Environmental data: chemical, physical, biological data gathered by OSPAR and HELCOM (through ICES) and by MAP; bathymetry by GISCO and GEBCO; altimetry, hydrology by GISCO;
- Socio-economic data: administrative themes, industrial/infrastructure themes (GISCO).

The functionality and main features of GIS were discussed at the third meeting of the forum through a demonstration of the Environmental Surveillance and Information System (ENSIS) and the implementation of a prototype of a European Marine Information System (EUMARIS, implemented on a PC platform, Pentium II, WINDOWS 98, ARCVIEW3.1).

The advantages of using a GIS are described in detail in the EUMARIS report (2), and basically result from the user-friendly software, its easy manipulation and its graphic tools. In summary the advantages are:

- Various tools for manipulation, map overlay, transformation, graphic design and database manipulation are available
- Graphic and non-graphic data can be merged and related information (i.e. coastal areas, catchment basins, statistical information data, etc.)
- Analysis of two or more different time periods can be made.
- Interactive graphic design and drafting tools for cartographic design and production exist.

However it is also noted that the typology of the data sets included in a GIS is a crucial issue for the success of high quality environmental assessment. In particular, the spatial and temporal aggregation of the data can affect the results of the GIS analyses.

As an example for a GIS produced map, fig. 1 (from EUMARIS report, 2) shows the median values for nitrate concentrations, N-NO3, measured at the water surface in January and February; the concentrations of nitrate are drawn as histogram bars, where the vertical height of the bars is proportional to the amount of nitrate concentrations. The main catchment basins as well as the main rivers are also drawn (GISCO data).

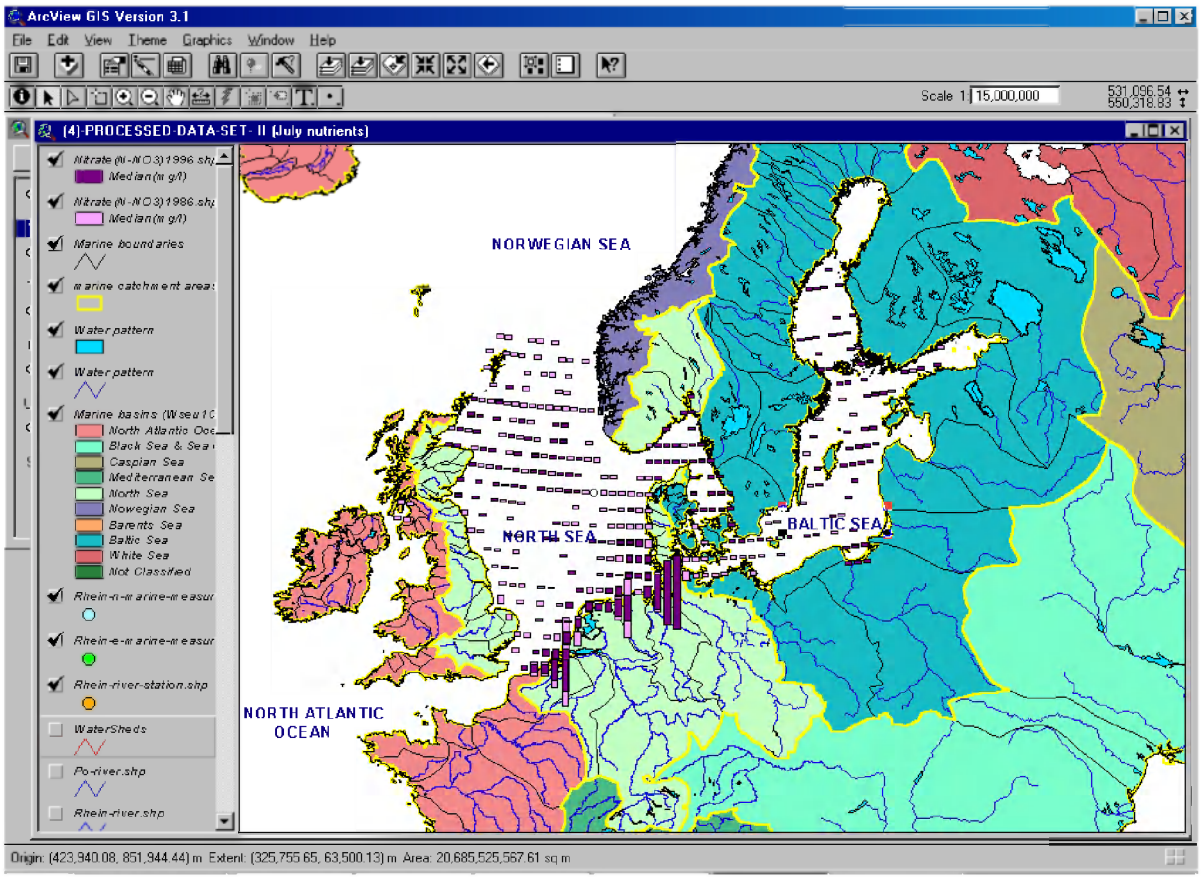


Figure 1: Nitrate concentrations measured at the surface for two reference years

During the third forum meeting it was concluded that GIS is a useful tool to support environmental assessment, testing of conceptual models and complex analyses, although the level of spatial and temporal data aggregation must be appropriate to the processes under investigation.

The forum decided to broaden the working group on GIS to interested GIS users, adding representatives of the marine conventions and JRC to EEA and ETC/MCE, in order to elaborate common requirements and functional specifications. The main aim of the GIS WG should be to evaluate the use of GIS for assessments of different types of indicators, e.g. combining pressure, state and impact indicators on eutrophication and assessing their relationships, with emphasis on data organisation and modelling rather than on hardware/software products. Although each future GIS system would meet the specific needs of the organisation requesting it, the organisations should be able to exchange data, metadata, summary statistics, trends, information layers, etc.. A close cooperation with the other WGs (data availability, access and management – indicators) since inception of work was recommended. The forum also decided that eutrophication will be the first issue to be investigated (Report if the Third IRF follow-up meeting, December 1999).

This working group should report to the forum steering group by the end of 2000.

Data availability, access and management

One of the tasks of ETC/MCE for 1999 was 'to identify the existing monitoring actions, reporting systems and procedures and recommend a work-plan to improve in the short, medium and long term harmonisation of reporting at European/regional seas level, based on existing information and data flows from both international organisations and national sources in order to have the best available data for comparison'.

In preparation of the third meeting of the forum, a report on harmonisation of reporting and data exchange was prepared [3]. In order to improve the whole 'reporting system', three main components must be considered and harmonised:

(i) data needs and data definitions,
(ii) data production, and
(iii) data management and exchange.

With regard to (i), a first practical example of harmonisation is shown in Table 2, where a tentative list of priority topics/environmental issues of common interest for EEA and the marine conventions is listed; these issues are identified on the basis of the reports on Europe's environment: the second assessment. Table 3 on the other hand lists the possible corresponding potential data contributions of the marine conventions.

Table 2: Tentative list of topics/environmental issues of common interest for the EEA and the marine conventions (3)

Main topic/environmental issue	Sub-topic/environmental issue
1. Socio-economic drivers	1.1. Population and urban development 1.2. Tourism 1.3. Agriculture 1.4. Fisheries and aquaculture 1.5. Industry and energy 1.6. Transport growth
2. Waste	2.1. Offshore industry waste 2.3. Litter in the marine environment
3. Chemicals/hazardous/harmful substances (pressure and state)	3.1. Metals 3.2. Organics 3.3. Hydrocarbons/Oil 3.4. Radioactivity 3.5. Others
4. Chemicals/hazardous/harmful substances (biological effects)	4.1. ...
5. Eutrophication	5.1. Nutrients 5.2. Eutrophication effects
6. Flora, fauna, habitats and biotopes (state and impact)	6.1. Toxic phytoplankton 6.2. Marine mammals 6.3. Non-native/introduced species 6.4. Habitat changes 6.5. Coastal erosion 6.6. Biodiversity changes 6.7. ...
7. Response policy	7.1. Input reduction 7.2. Emission reduction 7.3. Integrated coastal zone management

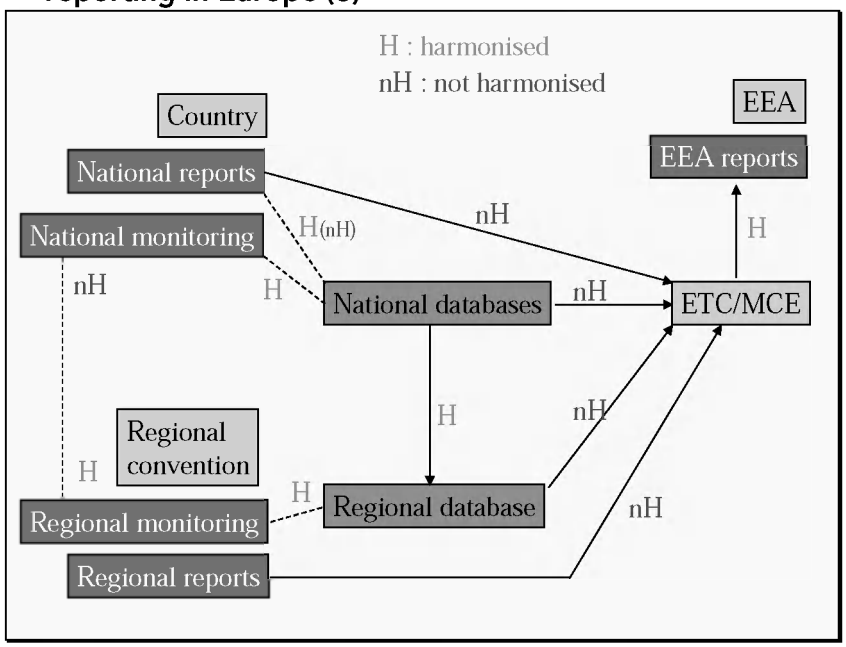
Table 3: Potential data contribution from the regional conventions (3)

Topic	AMAP	HELCOM	OSPARCOM	UNEP MAP	BLACK SEA
1.1. Population					
1.2. Tourism					
1.3. Agriculture					
1.4. Fisheries		✓	✓		
1.5. Industry		✓	✓		
1.6. Transport		✓		✓	✓
2.1. Ind. waste			✓	✓	
2.3. Litter		✓	✓		✓
3.1. Metals	✓	✓	✓	✓	✓
3.2. Organics	✓	✓	✓	✓	✓
3.3. Hydrocarbons/oil	✓	✓	✓	✓	✓
3.4. Radioactivity	✓	✓	✓		
3.5. Others		✓	✓		
4.1. Biol. effects		✓	✓	✓	
5.1. Nutrients		✓	✓	✓	✓
5.2. Eutr. effects		✓	✓	✓	✓
6.1. Toxic phytop.		✓	✓		
6.2. Mammals	✓	✓	✓	✓	
6.3. Non-native sp.		✓	✓	✓	
6.4. Habitat changes		✓	✓	✓	✓
6.5. Coast. erosion					
6.6. Biodiversity		✓	✓	✓	✓
7.1. Input reduction		✓	✓	✓	✓
7.2. Emission reduc.		✓	✓		
7.3. ICZM					✓

With regard to (ii), this should be based on the definition of a common agreed list of environmental issues. However it will probably be necessary to also make some adjustments among the national monitoring programmes in order to reduce the potential lack of comparability with the objective of improving or complementing existing programmes to help achieve EEA needs.

As for (iii), figure 2 shows the present structure for data management and exchange of marine monitoring and reporting in Europe.

Figure 2: Data management and exchange of marine monitoring and reporting in Europe (3)



During the forum follow up, a series of steps were presented, aiming to set an ideal objective with regard to availability, access and management of data required for marine environmental assessments in a European context, and the development of the path to reach it.

Based on the presentation at the meeting, the forum decided to set up a third working group, involving representatives of EEA, ETC/MCE, marine conventions and JRC, to investigate ways and means to improve data availability, access and management of data required for marine environmental assessments in a European context, giving also special attention to the issue of data ownership. A meeting (DATASTRAT) in 2000 should aim to finalise a strategy document regarding the handling of data for marine environmental assessment.

This working group will report to the IRF Steering Group by the end of 2000.

2.2. Major threats to the European coastal zones

One of the task of the ETC/MCE is to identify the common major threats to the European coastal zones. This is an ongoing process that ETC/MCE started in 1997 with the development of a preliminary set of indicators and which resulted in a database of data received by the member countries. Those data were used in the preparation of several main EEA reports such as *Environment in the European Union at the turn of the century* (1999), *Nutrients in European ecosystems* (2000), *Europe's Environment: the second assessment* (1998), and *State and pressures of the marine and coastal Mediterranean environment* (2000).

During 1999, ETC/MCE carried out the following activities in order to identify major threats to Europe's coastal zones:

1. gathered the available data on marine environmental indicators both from international and national organisations;
2. developed a structured database (MARINEBASE);
3. produced thematic maps of the characterisation of the environmental state and pressures on the European coastal zones;
4. continued the development and tested the preliminary system of indicators for the coastal zone, already proposed by ETC/MCE in previous years;
5. performed a specific study on the evaluation of eutrophication in community waters.

2.2.1. Completion of data collection for the coastal zones

A questionnaire was prepared by ETC/MCE, taking into account previous experiences in data collection, and the data already gathered by the Topic Centre.

The overall objective of this questionnaire was the collection at European level of marine environmental data appropriate as indicators of the state and pressure of coastal ecosystem quality. The importance of a common set of indicators was stressed at the European Conference of Ministers of the Environment in Aarhus in June1998. Indicators are quantified information, which help to explain how things are changing over time or vary spatially. Indicators can play a vital part in focusing and illuminating the significance of environmental change and the progress of sustainability.

The information obtained was to be used for the following purposes:

- EEA reporting;
- development of databases on coastal typology and on environmental indicators for the themes relevant in EU policy regarding water quality: eutrophication, harmful substances, oil pollution;
- To produce information readily accessible to the public via the Internet;
- To build a common basis of knowledge to be developed further at the national level, as the gaps and differences in knowledge and information become visible.

It was decided to include in the questionnaire a large number of parameters –in order to reflect possible local coverage and needs. The parameters collected are listed in Table 4:

Table 4: Parameters collected in the questionnaire

A) Eutrophication

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

B) Harmful substances

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

C) Oil pollution

1: OIL SPILLS on surface
2: COASTLINE AFFECTED
3: BIRDS AFFECTED
4: MAMMALS AFFECTED
5: INPUT: OIL AND GAS INDUSTRY (direct)
6: INPUT: ACCIDENTS
7: INPUT: SHIP DISCHARGES
8: INPUT: RIVERINE INPUT

The indicator questionnaire was sent to each EEA member country and to the marine conventions and action plans. It was requested that the countries choose coastal areas of major importance and at least two estuaries, deltas or fjords, preferably where long-term time series were available. The countries were required to provide the data at two scale levels: 1:8 000 000 for the major coastal zones, and 1:250.000 for individual estuaries, deltas or fjords. The coastal zones were defined as the larger sea areas with rather uniform physical, chemical and

biological characteristics. The width of the coastal zones was limited to 20 km (about 12 miles) from outer coastline.

For most parameters the questionnaire required the minimum, median and maximum values over a year (or in some cases, a season), except for parameters that are only measured once, which often is the case for harmful substances in sediment and biota in which case the actual yearly measurements were requested. The period requested was1985-1997.

Data are stored in a database (MARINEBASE) and available on CD-ROM [6].

Eutrophication parameters (Table 4a)
The parameters chosen for eutrophication were those, which are usually associated with eutrophication, either as possible precursors (such as nutrients) or as possible affected variables (such as chlorophyll-a, diatom/flagellate ratio, seaweeds, toxic algae). The spatial data aggregation requested in most cases was the horizontal average of the stations in the surface water layer (0 -10 m).

Dissolved nutrients were chosen to be reported for the winter months, since this is the period with lowest algae production and therefore the best time of the year to look for high concentrations which can subsequently lead to eutrophication. Oxygen was requested for bottom waters, since it is often a good indicator for eutrophication: in fact excessive algal growth may result in large biomass sinking to the sea floor, whose decomposition can render the bottom waters hypoxic/anoxic (i.e. with low or zero oxygen concentration). The countries were asked to report oxygen values for the autumn period (September – October) to identify possible residual effects in the oxygen consumption caused by the decomposition of the algal biomass, which bloomed during the summer.

Harmful substances (Table 4b)
The values for harmful substances are from sediments and biota, since these matrices tend to accumulate harmful substances.

The list of heavy metals was based on the international conventions lists of priority 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 monitoring variables of the marine monitoring program (JMP) of the OSPAR Commission.

PAHs cover the sum of: anthracine, benzo[*a*]anthracine, benzo[*ghi*]perylene, benzo[*a*]pyrene, chrysene, fluoranthene, indeno[1,2,3-*cd*]pyrene, pyrene, phenanthrene. This choice also follows OSPAR's marine monitoring programme variables.

Oil pollution (Table 4c)
Oil pollution parameters include measures of the pressure indicators (number of oil spills, etc.) as well as indicators of the impact of pollution (e.g., birds, mammals affected). There was little response to this part of the questionnaire, since monitoring of the requested parameters was not usually long-term. Therefore oil pollution indicators were not further developed.

2.2.2. Results of the questionnaire

The experience in gathering data from the coasts of Europe indicated that the availability of data varies widely depending upon the existence and extent of the monitoring programme. The marine conventions have been a major source in this gathering of data, especially for providing harmonized and therefore comparable data.

In addition the EIONET national reference centres have been very helpful when possible 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 EEA.

Most of the data have been made available by the marine conventions and supplied through ICES and MAP/MEDPOL. The ICES data includes data reported to OSPAR and HELCOM.

Additional data have been made available from the national reference centres of: Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Norway and Sweden.

The resulting database (MARINEBASE) covers the Mediterranean Sea, eastern Atlantic, North Sea, Skagerrak, Kattegat and Baltic Sea.

Data from national reference centres
Fifteen countries were asked to fill in the questionnaires in this inquiry. Only those data, which were not available through the marine conventions were requested. Nine of these countries returned the questionnaires with data from their coasts, a response rate of 67 %. Of the remaining five countries, three have indicated that they did not have sufficient resources to prioritise the task, and two countries did not reply. Quite a few parameters were reported by only one or few countries. All these data exist in the database.

Table 5: Responding countries, and number of parameters reported by countries (NRC) and marine conventions (6)

		Numbers of parameters reported for:							
		Eutrophication (9*)				Harmful substances (38*)			
Countries asked for data	Reply by 1/8-99	NRC	ICES	MED POL	ICES+MED POL	NRC	ICES	MED POL 1985-	ICES+MED POL
Belgium	✓	**	8	na	8	-	15	na	15
Denmark	✓	7	9	na	9	0	13	na	13
Finland	✓	8	9	na	9	0	7	na	7
France	✓	2	7	-	7	12	10	0	10
Germany	✓	9	9	na	9	12	12	na	12
Greece	✓	9	na	-	0	25	0	8	8
Ireland***	-	-	4	na	4	-	6	na	6
Island	-	-	4	na	4	-	11	na	11
Italy	✓	7	na	-	0	0	0	3	3
Norway	✓	9	9	na	9	10	15	na	15
The Netherlands	✓	9	9	na	9	21	16	na	16
Portugal	-	-	5	na	5	-	6	na	6
Spain	-	-	7	-	7	-	14	1	15
Sweden	✓	9	9	na	9	20	15	na	15
United Kingdom	-	-	9	na	9	-	15	na	15
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

* Numbers in parentheses: Total number of single parameters asked.
** Data already reported to ICES.
*** Data received after 1 August, integrated in the data base but not discussed in the report.
na Not applicable, country not part of members reporting to the convention

Data from ICES and MEDPOL

The following tables present an overview of the data provided by ICES for eutrophication and harmful substances.

Table 6: Overview of years and countries for which eutrophication parameter are available (from ICES regarding OSPAR regions).

ICES water eutrophication data – OSPAR												
Component	Belgium	Denmark	Spain	France	Germany	Iceland	Ireland	The Netherlands	Norway	Portugal	Sweden*	United Kingdom
Tot-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
Tot-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
Chl.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

*West coast.

Table 7: Overview of years and countries for which eutrophication parameter are available (from ICES regarding HELCOM regions).

ICES water eutrophication data – HELCOM						
Component	Estonia	Finland	Latvia	Poland	Russia	Sweden*
Tot-P		85-88;92-97	94	96	92-93;95-96	85-98
PO4-P	93-96	85-88;92-97	94	85;87-93;96	92-93;95-96	85-98
Tot-N		85-88;92-97	94	96	92-93;95-96	85-98
NO3-N	93-96	85-88;92-97	94	90-93;96	93-94;96-97	85-98
NO2-N	93-94	85-88;92-97	94	90-93;96	92-93;95-96	85-98
NH4-N	93-94	85-88;92-97	94	92-93;96	92-93;95-96	85-98
SiO3-Si	94-95	85-88;92-97	94	90-91;93;96	92-93;95-96	85-98
Chl.a	93	85-87;90-97		93-94;97	90-92;94	85-98
O2	94-95	87-89;91-92;94-96	96	87-97	89-90;92;94-95	85-97

*East coast.

Table 8: Overview of year and countries for which data on harmful substances in sediments was presented by ICES.

ICES sediment toxic-substances data											
Component	Belgium	Denmark	France	Germany	Iceland	Ireland	The Netherlands	Norway	Estonia	Sweden	United Kingdom
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
SDDT							90		85		90-91
TBTIN	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

Table 9: Overview of year and countries for which harmful substances data was supplied from MEDPOL.

Heavy metals in biota								
Component	Albania	France	Greece	Italy	Malta	Spain	Turkey	Yugoslavia
Ag								
As						88-91		
Cd	92		85-89	87-89	85-90	88-91		91
Co								
Cr			85-89					
Cs								
Cu	92		85-89		85-90			89
Fe	92		85-87					
HgO						90-91		90
HgT	92		85-86	87-89	85-90	85; 88-91	85	91
Mn	92							88
Ni			85-89					
Pb	92				85-90	85;88-89		91
Rb								
Sb								
Se								
Zn	92		85-89		85-90			89

2.2.3. MARINEBASE

The data collected with the questionnaire is in a Microsoft Access 97 database. 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.

2.2.4. Thematic maps of the characterisation of the environmental state and pressures on the European coastal zones.

Based on data on eutrophication and harmful substances gathered through the questionnaire, ETC/MCE developed thematic maps showing the environmental state of major parts of Europe's coasts and of the main estuaries, lagoons or fjords (as selected by each member country).

A number of maps were produced for those parameters where sufficient data were reported. The following map shows average concentration over the entire period. These concentrations are presented in four/five classes. The classes are chosen to illustrate the variations and are not based on any internationally agreed classification. An example of thematic maps is given in figure 3.

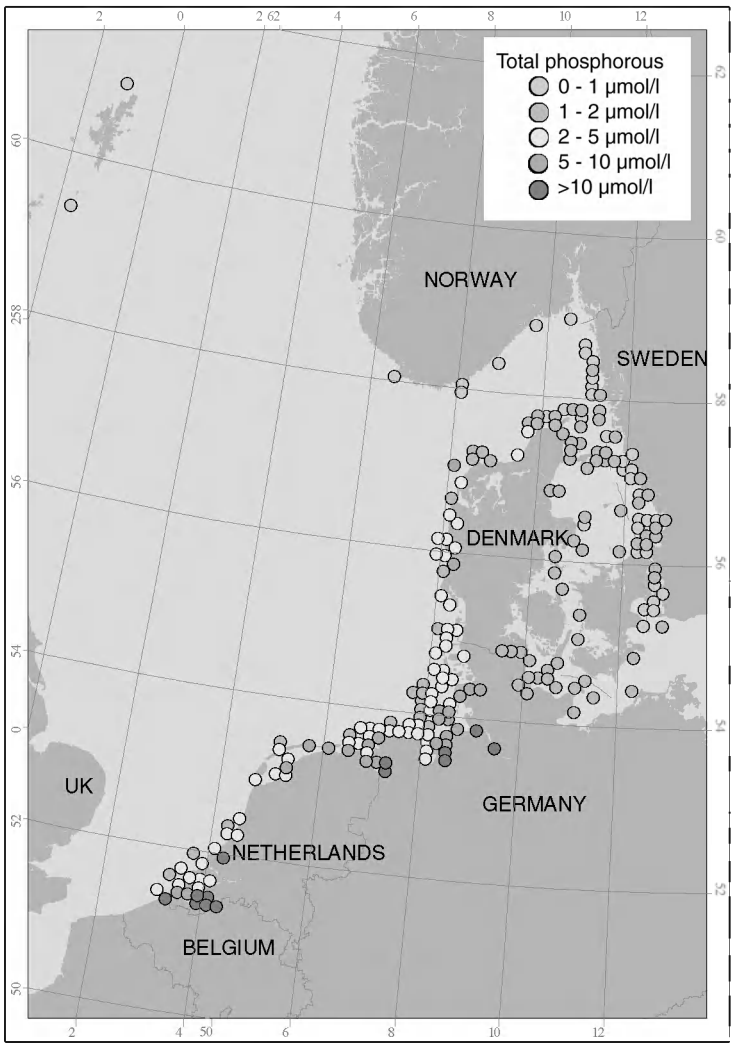


Figure 3: **Levels of total phosphorus for the coast of the Netherlands, Germany, Denmark, Sweden and Norway. Average of available winter (January and February) values for the time interval 1985 to 1998. (6)**

Data were requested from countries per coastal zone, with existing or aggregated stations representing each zone. However, few countries in Europe have defined their coastal zones (Germany and France are two exceptions). A working group within EIONET will try to solve this problem.

Sensitive area mapping needs to be based on nationally, or preferably internationally, accepted criteria for classification. For some parameters, such as harmful substances or oxygen in bottom waters, it may be possible to develop internationally accepted criteria at European scale, since these are related to toxic effects on biota. For other parameters such as nutrients, it may be necessary to test and develop criteria for more narrowly defined geographic areas, since factors such as freshwater input, water exchange rate, or upwelling can greatly influence an area, and thus results can vary largely within a coastal zone unit.

Therefore, as a general presentation at European level, the maps are presented with the different parameters grouped in intervals that are not based on a generally accepted classification system, but chosen to cover the large span of variation in concentrations around Europe.

2.2.5. Testing of indicators

Indicators are quantified information, which help to explain how things are changing over time and varying spatially. An important step toward the main objective of improvement of monitoring and data gathering is to agree on key indicator sets, which requires the testing of the proposed indicators. The long-term objective is to develop further an indicator database that supplies basic (indicator) information on the European coastal zones within the DPSIR assessment framework.

As a first step, a tentative list for indicators for eutrophication, harmful substances, and fisheries was drafted by ETC/MCE in 1998 (4).

On the basis of the data and information gathered through the questionnaire, ETC/MCE has tested some state and pressures indicators for eutrophication. The development for indicators for integrated coastal zone management (ICZM) followed a different approach, since there was no data collection at national or international level.

Eutrophication

The methodology used for eutrophication followed two steps:

(i) checking of data availability of descriptive parameters with potential indicator; and
(ii) testing of adequate time series and spatial coverage.

The trends in phosphate, nitrate and bottom oxygen concentrations have been taken as state indicators, while the total phosphorus and nitrogen load in coastal waters have been taken as pressure indicators [13].

Examples for state and pressure indicators are given in figures 4 and 5.

Figure 4: Trends in phosphate concentrations [1]

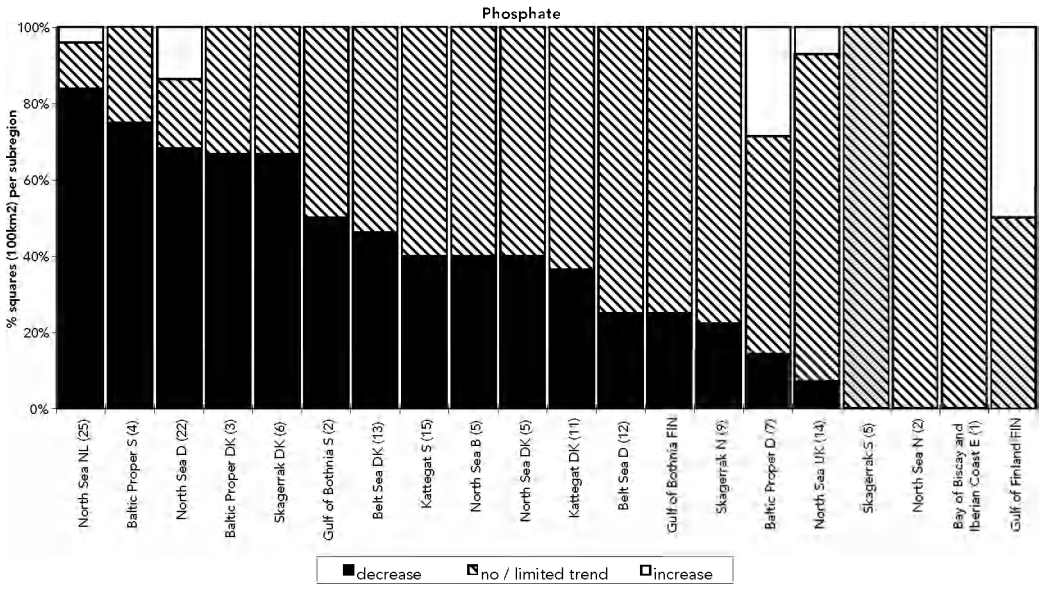
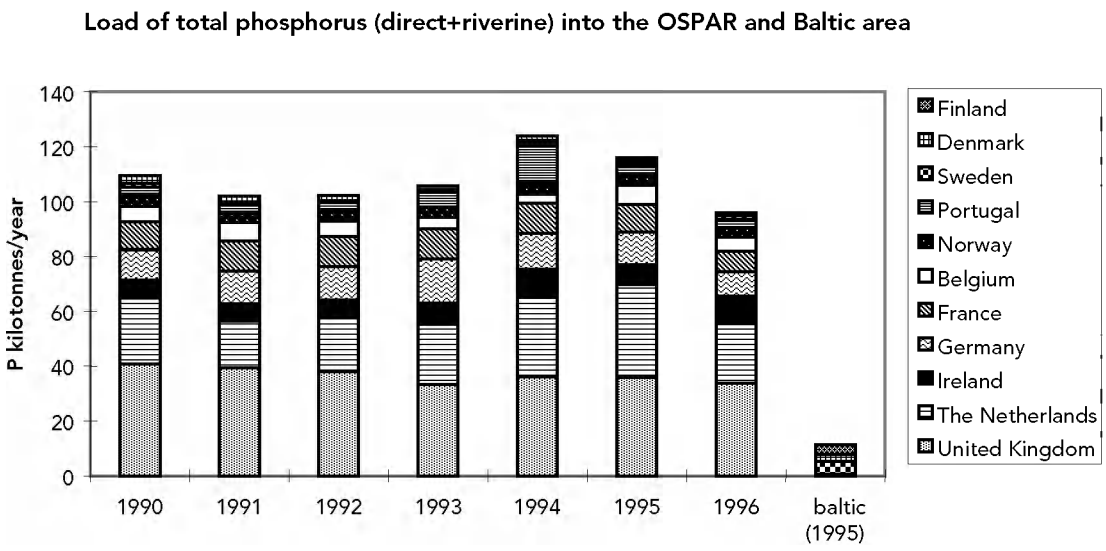


Figure 5: Trends in phosphate loads [1]



Source: OSPAR, HELCOM

Phosphate and nitrate concentrations in marine waters are useful state indicators for trend detection on the European level since they are collected by most countries and there is scientific evidence that excess of these parameters may lead to eutrophication.

On the other hand, oxygen concentration can vary markedly from day to day. Routine measurements are likely to fail to detect episodes of sudden oxygen deficit. The frequency of sampling requested in the questionnaire (seasonal averaging) does not allow for monitoring the occurrence of anoxic events in detail. The trend test, using Trend-y-detector, indicates that, under the presently used temporal aggregation of data, oxygen concentration appears to be too susceptible to natural variations to be selected as a stable indicator.

Main findings
In order to improve the building of common indicators for marine eutrophication, further work is required (for data level and indicator level).

- Nitrate and phosphate concentrations: Future work for presenting these indicators could make use of salinity data in order to compare absolute values expressed at zero salinity. These values can be compared with background concentrations. Based on the work which has been done up till now, especially for the coastal zone, a more precise set of reference values for nutrients is recommended. Effort has to be put into establishing a database for nutrients for the Mediterranean European countries, which face eutrophication problems.

- Bottom oxygen concentrations: Oxygen deficit is a relevant parameter in assessing quality status in more detail. Since local meteorological and hydrographical conditions greatly affect the oxygen conditions, this parameter can only be judged correctly in the context of additional information. It does not appear to be an indicator for eutrophication as robust as nutrient concentrations.

Since trends may be affected by short-term (5-6 years) natural fluctuations in concentrations, longer time series should be constructed wherever older data, (before 1990), is available.

Integrated coastal zone management

Integrated Coastal Zone Management (ICZM) is a dynamic, continuous and iterative process of management with the aim of sustainable use of the coastal zone for all different interest groups, including nature.

Common problems in the European coastal zones relate to unplanned development, decline of traditional sectors, coastal erosion and lack of appropriate communications and transport networks. The different regional seas face different pressures on the coast.

ICZM is developing in recent years mainly on the regional and local level and through the European Demonstration Programme on ICZM. In the ICZM process two related approaches are important: the availability of information and communication within the administrations and sectors involved and with the public, reflecting the development of multi-disciplinary management strategies and operational programmes.

The indicator initially selected to show progress in integrated coastal zone management has been based on the above-mentioned approaches related to communication for management only. It thus serves as a potential response indicator.

No database on ICZM parameters exists presently at national or international level. Therefore additional information was needed in order to develop such an indicator. In collaboration with the NGO European Union for Coastal Conservation (EUCC) a set of questions were developed for a questionnaire, which aimed to assess the different aspects related to progress in ICZM

EUCC questions on progress in ICZM

1. What is the status of ICZM in your country or region?
2. What is the status of integrated analysis and planning for the coastal zone (land and sea)?
3. What is the status in horizontal coordination?
4. What is the progress in vertical integration of administrative bodies?
5. What is the degree of public participation?

Table 12: Criteria used to determine progress in establishing ICZM [1]

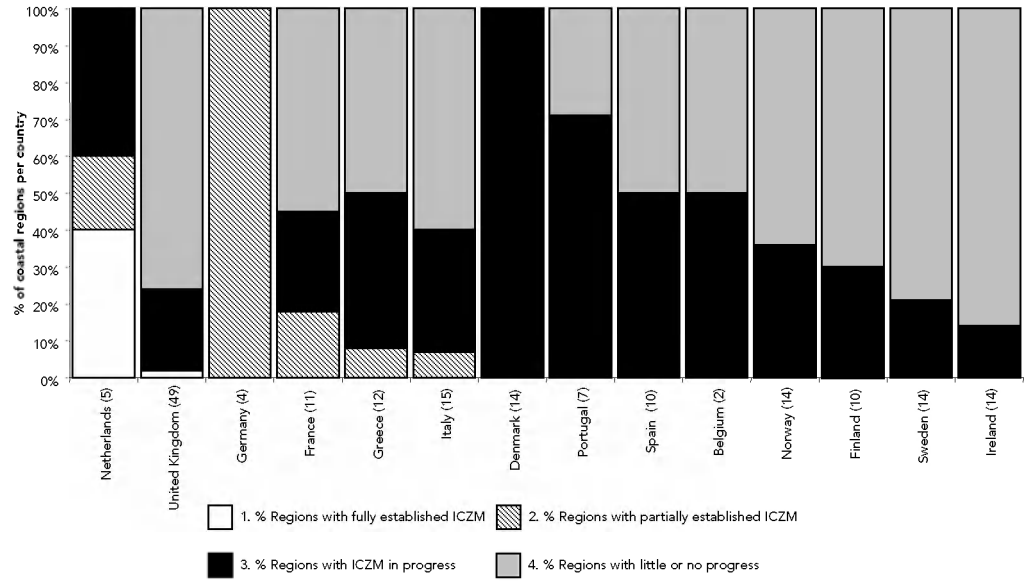
Extent of progress	Criteria
1. Fully established ICZM	Refers to those regions where ICZM is operational for the whole coastal area. In these cases, the ICZM process includes the following key elements: *Horizontal integration*: integrated approach to planning (including environmental and economic issues) *Vertical integration*: administrative bodies working together at both a state and a regional level *Public participation*: public participation or consultation in cross-sectoral planning
2. Partially established ICZM	Regions where ICZM is operational in specific areas of the coast, but not for the region's coast as a whole.
3. ICZM in progress	Regions where ICZM has reached the stage of active preparation for whole or part of the coast.
4. Little or no progress	Regions where some environment and spatial planning tools exist, but key elements of ICZM are not occurring. Regions where ICZM is not being considered.

Main findings

From 14 countries considered, ICZM was assessed for a total of 181 regions. In Figure 6 the progress in ICZM indicator as defined above, is presented and shows progress in ICZM per country and per region.

The progress in ICZM indicator needs to be developed more quantitatively than has been possible through this initial testing exercise. Collaboration with regional experts and a more detailed checklist will be developed to improve understanding of the progress made and of the problems encountered.

Figure 6: Progress in integrated coastal zone management [1]



2.2.6. Evaluation of eutrophication in marine community waters

Eutrophication has been highlighted as a major problem in many European coastal areas: therefore ETC/MCE was asked to provide a comprehensive study to evaluate the state and trends of marine eutrophication in community waters and to identify areas where further monitoring is needed.

Eutrophication is caused by excess load of nutrients (i.e. nitrogen and phosphorus) from human activities or natural causes. The main source of nitrogen load is run-off from agricultural land and the excess nitrogen enters the sea through riverine input. Atmospheric deposition of nitrogen on the sea surface may also contribute significantly. Excessive phosphorus load mainly originates from households and industry discharging raw or poorly treated wastewater to fresh waters or directly to the sea. Wastewater is a major problem especially in the Mediterranean Sea. Locally fish farming may also cause eutrophication problems. For further information on the nutrient sources see the following EEA reports: *Environment in the European Union at the turn of the century* and *Nutrients in European ecosystems.* (Environmental assessment reports No. 2 and 4)

Overload with nutrients can result in a series of adverse effects changing the ecosystem. Excessive growth of macro- and planktonic algae may cause oxygen deficiency, and lack of oxygen may cause fish to die or escape, as well as being fatal for the live of benthic organisms. Eutrophication also increases the risk of blooms of toxic phytoplankton species, which may cause death of fish and benthic fauna, or poisoning of humans.

In 1999, ETC/MCE prepared a report on *Evaluation of eutrophication in marine community waters* (to be published in 2000), using information and data gathered through the questionnaire.

Some eutrophication variables such as transparency, phytoplankton biomass, benthic vegetation and fauna, which could provide valuable information for assessing the impact of eutrophication, were not used due to scarcity of data collected; the study was therefore focused on nutrients, chlorophyll a and oxygen concentrations only, since these eutrophication-related variables are widely available and used.

2.3. State and trends

The present state of eutrophication was assessed in terms of winter nutrient concentrations, summer chlorophyll-a and late summer bottom oxygen concentrations. Nutrient concentrations provided the best spatial resolution for assessing the state of eutrophication. Analysis of the relationship between nutrients and salinity showed a consistent pattern of eutrophic conditions in areas receiving fresh water input from urban and agricultural catchments. Freshwater from areas less impacted by human activity had in general no effect on the eutrophication level of the seas. Chlorophyll-a concentrations were positively correlated with winter concentrations of both phosphate and nitrogen nutrients. Oxygen concentrations in the bottom water were not correlated with any of the other variables and the geographical pattern in hypoxia/anoxia could only be explained by the vertical stratification of the water column.

In Arctic waters with very sparsely populated drainage areas, eutrophication from fish farming in sill fjords is the major threat. However, since location of

aquaculture plants is well regulated, eutrophication is not an issue of concern in European Arctic waters.

In the Baltic Sea both the coastal zone and the open sea (including the Belt Sea) is affected by eutrophication with enhanced nutrient concentrations and related problems. The anthropogenic nutrient load is lowest in the northern forested and sparsely populated part draining into the Gulf of Bothnia, and largest in estuaries and coastal areas close to rivers draining agricultural and densely populated areas.

In the Greater North Sea eutrophication primarily affects the coastal zone. In particular, nutrient-related problems are widespread in estuaries and fjords, the Wadden Sea, German Bight, Kattegat and eastern Skagerrak.

In the Celtic Sea eutrophication is restricted to the Irish Sea and many estuaries, especially the Mersey estuary, Liverpool Bay, Belfast Lough, Cork Harbour, Dublin Bay and associated estuaries.

In the Bay of Biscay and on the Iberian Coast eutrophication problems are restricted to estuaries and coastal lagoons, especially the Bay of Vilaine, Aracachon, Ria Formosa and Huelva.

In the Mediterranean Sea eutrophication appears to be limited mainly to specific coastal and adjacent offshore areas. Several and sometimes severe cases of eutrophication are evident, especially in coastal embayments, which receive elevated nutrient loads from rivers, in combination with direct discharges of untreated domestic and industrial wastewater. Larger sea areas, especially the Adriatic, Gulf of Lion and northern Aegean Sea, have enhanced nutrient concentrations and related problems. Besides agriculture and aquaculture, discharge of raw or poorly treated wastewater is a major source of eutrophication problems in the Mediterranean Sea.

The Baltic Sea and North Sea states have already decided on a 50 % reduction in the load of nitrogen and phosphorus compared to the late 1980s. EU has also decided on measures to reduce eutrophication, e.g. the Urban Waste Water Treatment Directive (91/271/EEC) and the Nitrate Directive (91/676/EEC), and proposed a Framework Water Directive (COM (97) 49 final) which, when implemented, should have a significant effect on reducing the impact of excessive nutrients on all surface waters.

Model estimations of the ecological effects of a 50 % reduction in the phosphorus and especially the nitrogen load to the Baltic and North Sea areas show, that a significant reduction in eutrophication can be achieved, e.g. reduced phytoplankton production and less frequent incidents of oxygen deficiency.

2.4. Recommendations

The data available for analyses covers mainly the HELCOM and OSPAR areas. Data from the northern Atlantic, the Biscay and Iberian coast are sparse, and the Mediterranean Sea is generally poorly covered. The data covers mainly concentrations of nutrients, chlorophyll-a and oxygen.

It is difficult to compile a coherent data set on other eutrophication variables such as transparency, phytoplankton biomass, benthic vegetation and fauna, which could provide valuable information for assessing the state of eutrophication on a European level.

The data delivered by ICES for the coastal zones of Europe show large variations in spatial and temporal coverage. The table below summarises the conclusions on improving data availability.

Table 10: Overview of regions where data availability should be improved. [5]

Region	Recommendation
Baltic Proper	Eutrophication data from the coastal zone reaching from southern Latvia to Kaliningrad and longer time series from Estonia, Latvia, Poland and Russia should be made accessible, if possible.
Bay of Biscay	A better spatial coverage with longer time series for all eutrophication variables is required.
Belt Sea	–
Celtic Seas	Longer time series should be made accessible, if possible. Data on oxygen concentrations are needed.
Coast of Iceland	Longer time series should be made accessible, if possible. Data on oxygen and chlorophyll concentrations are needed.
Gulf of Bothnia	Longer time series for oxygen concentration should be made accessible, if possible.
Gulf of Finland	Longer time series for oxygen concentration should be made accessible, if possible.
Gulf of Riga	Longer time series for oxygen concentration should be made accessible, if possible.
Iberian Coast	A better spatial coverage with longer time series for all eutrophication variables is required.
Kattegat	–
North Atlantic	Longer time series should be made accessible, if possible. Data on oxygen concentrations and total nutrients are needed.
North Sea	Longer time series from France and Norway should be made accessible, if possible. Longer time series on oxygen concentration is required.
Skagerrak	–
English Channel	Longer time series should be made accessible, if possible. Data on total nutrients are needed. The spatial coverage of ICES data on the Brittany coast should be improved.

In general, the data provided by ICES to ETC/MCE was scarce and with the exception of a few regions inadequate for assessing state and trends of eutrophication. It is strongly recommended that EEA national reference centres should strive to report more data to ICES or EEA to allow for a more coherent analysis of eutrophication in the coastal zones of Europe.

It is also recommended that measures will be taken to initiate the collection of eutrophication data in the Mediterranean Sea and store these data in a common database.

2.5. Europe's biodiversity

EEA is planning to publish a comprehensive report on Europe's biodiversity in early 2001. During 1999 activity was directed towards defining the data requirements and data gathering. A workshop on Europe's Marine Biodiversity was held with representatives from marine conventions, in order to get an overview of all information available [8]. ETC/MCE is supporting the EEA by providing information on biodiversity in marine waters. Activity on producing the marine chapters for the report will continue in 2000.

3. Products/outputs produced by ETC/MCE in 1999

The following reports and products were delivered as draft to the EEA in 1999.

1. Annual topic update 1998
2. State and Pressures of the marine and coastal Mediterranean environment
3. Database on aggregated data for the coastline of the Mediterranean, the Atlantic coast, the North sea, Skagerrak, Kattegat and the Baltic – also including a selection of landlocked areas i.e. estuaries, deltas, lagoons and fjords
4. Harmonisation of reporting and data exchange: recommendations for improving in the short, medium and long term, procedures for harmonising reporting at European/regional seas level, based both on International and National sources
5. Proceedings of the Third Meeting of the Inter-regional forum
6. European marine information system: EUMARIS prototype.
7. MARINEBASE on CD-ROM
8. Marine Biodiversity Workshop report

4. Summary of ETC/MCE work plan 2000

EVENT/ACTIVITY	EVENT DATE	RESPONSE DEADLINE	EXPECTED OUTPUT	OUTPUT DATE
Workshops				
EEA-UNEP/MAP workshop on marine data management and data flow within the Mediterranean countries	October 2000		To provide input to improve the harmonisation, the management and the flow of data from the Mediterranean countries to the EEA, in co-operation with UNEP/MAP	
EIONET Workshop	November/ December 2000		Progress in implementation of the Work programme. Meeting report	
Draft reports for review				
Testing of system of indicators for the marine and coastal environment in Europe (eutrophication and ICZM) (89 subvention)	October 2000	December 2000	Technical report.	January 2001
Indicator testing on hazardous substances (99 subvention)	November 2000	January 2001	Technical report	February 2001
Core set of indicators (2000 subvention)	November 2000	January 2001	Technical report	February 2001
Summary report on testing of indicators (2000 subvention)	February 2001	April 2001	Technical report	May 2001
Aggregated data for the coastline of the Mediterranean, the Atlantic coast, the North Sea, Skagerrak, Kattegat and the Baltic;	October 2000	December 2000	Technical report	December 2000
Thematic maps of the characterisation of the environmental state and pressures on the European coastal zone, based on the data collected	October 2000	December 2000	Series of about 60 maps	December 2000
Data base: collection of data on European coastal zones	October 2000	December 2000	CD-ROM containing database	December 2000
Evaluation of the state of estuarine, coastal and marine eutrophication in the EU countries (99 subvention)	November 2000	January 2001	Topic report	February 2001
Fact sheets for TERM	October 2000		TERM 2001	
Fact sheets for Environmental signals	October 2000	November 2000	Environmental signals 2001	

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