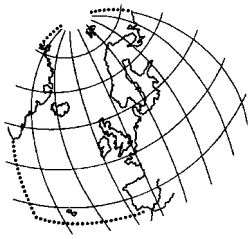
Assessment and Monitoring Series

Synergies in Assessment and Monitoring between OSPAR and the European Union

Biodiversity[1]

Volume II



OSPAR Commission

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[1] The term biodiversity is used here to address the fifth OSPAR Strategy. This document, however, focuses on biological monitoring and assessment in a broad sense, excluding eutrophication, which is covered in SIAM vol. 1.

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède et la Suisse et approuvée par la Communauté européenne et l'Espagne.

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Executive Summary/*Récapitulatif*

This report is a stocktaking and comparative analysis of the requirements in the OSPAR and the EU framework for monitoring and assessing of biodiversity in the marine environment. It aims at identifying overlaps and interactions of, and future possibilities for synergies in, biological monitoring and assessment activities in both forums. The analysis does not at this stage cover the human activities addressed by OSPAR's biodiversity strategy. A similar analysis relating to the monitoring of hazardous substances, eutrophication, radioactive substances and offshore activities in the marine environment was published in 2005.

Le présent rapport constitue un inventaire et une analyse comparative des exigences de surveillance et d'évaluation de la diversité biologique du milieu marin dans le cadre d'OSPAR et de l'Union européenne (UE). Son objectif est de déterminer les chevauchements et les interactions qui se produisent ainsi que les possibilités de futures synergies entre les activités de surveillance et d'évaluation des deux organisations. Actuellement, l'analyse ne couvre pas les activités de l'homme qui sont traitées par la Stratégie diversité biologique d'OSPAR. Une analyse similaire a été publiée en 2005 sur la surveillance des substances dangereuses, de l'eutrophisation, des substances radioactives et des activités offshore dans le milieu marin.

The report highlights that there are many connections between OSPAR work under the biodiversity strategy (on ecological quality objectives, species and habitats in need of protection and marine protected areas) and under relevant EU Directives (Birds; Habitats; Water Framework) and many areas to seek harmonisation and coherence. At present, all related monitoring programmes are under development and it is too early to make a full analysis of synergies in assessment and monitoring. However, this means that there are opportunities to design biological monitoring programmes that are coherent across countries and that will address both the requirements under the various EU Directives and the objectives of OSPAR. These would not only be cost-effective, but also contribute to a common understanding of ecosystem quality. Because many of these monitoring programmes are under development, or yet to be developed, it is an important time to seek harmonisation across the programmes, as this will become increasingly more difficult as the individual programmes settle down over time. It is therefore important that Contracting Parties/Member States do not only focus on the national implementation of separate EU Directives.

Le rapport met en évidence que de nombreux liens existent entre les travaux d'OSPAR dans le cadre de la Stratégie diversité biologique (sur les objectifs de qualité écologique, les espèces et les habitats devant être protégés et les zones marines protégées (ZMP)) et les travaux dans le cadre des directives pertinentes de l'UE (oiseaux; habitats; cadre sur l'eau) et qu'il y a lieu d'harmoniser les travaux dans de nombreux domaines. Il est prématuré, à l'heure actuelle, d'effectuer une analyse complète des synergies dans l'évaluation et la surveillance dans la mesure où tous les programmes de surveillance qui s'y rapportent sont en cours de développement. Ceci signifie cependant que l'on a la possibilité de concevoir des programmes de surveillance biologique qui soient cohérents parmi les pays et qui traitent à la fois des exigences dans le cadre des diverses directives de l'UE et des objectifs d'OSPAR. Ces programmes ne seront pas seulement économiques mais contribueront également à une connaissance commune de la qualité des écosystèmes. Un grand nombre de ces programmes de surveillance sont en cours de développement ou devront être développés et il est désormais important de s'efforcer de les harmoniser. En effet ceci risque de devenir de plus en plus difficile dans la mesure où les programmes individuels sont bien ancrés après un certain temps. Il est donc important que les Parties contractantes/Etats membres ne se concentrent pas seulement sur la mise en œuvre au niveau national de directives distinctes de l'UE.

The report highlights that there are particular needs to contribute:

a. to harmonization of terms and definitions between OSPAR biodiversity work and EU Directives in order to promote synergies in objectives at all levels (general to specific).

b. to harmonisation of biological monitoring programmes that are being developed by Contracting Parties to fulfil the requirements of EU Directives. It will also be in the interest of OSPAR itself to develop a common monitoring programme under the CEMP and to link monitoring of the general status of the ecosystem to area (MPA) specific monitoring.

b. to advertise the leading position of OSPAR and HELCOM with regard to guidelines, including quality assurance, for biological monitoring. It is therefore vital that ICES/OSPAR/HELCOM seek collaboration with Water Framework Directive groups.

c. to enhance synergies between assessment criteria of OSPAR (e.g. EcoQOs) and criteria of EU Directives.

Le rapport met en évidence le besoin de contribuer, en particulier, à:

a. l'harmonisation de la terminologie et des définitions qui sont utilisées dans les travaux d'OSPAR sur la diversité biologique et par les directives de l'UE, afin de promouvoir des synergies dans les objectifs à tous les niveaux (aussi bien généraux que spécifiques);

b. l'harmonisation des programmes de surveillance biologique qui sont développés par les Parties contractantes afin de répondre aux exigences des directives de l'UE. OSPAR aura également intérêt à développer un programme commun de surveillance dans le cadre du CEMP et d'établir des liens entre la surveillance de l'état général des écosystèmes et la surveillance propre à une zone (ZMP);

b. faire connaître le rôle primordial que jouent OSPAR et HELCOM en ce qui concerne les lignes directrices de la surveillance biologique, notamment sur l'assurance de qualité. Il est donc impératif que CIEM/OSPAR/HELCOM cherchent à collaborer avec les groupes rattachés à la Directive cadre sur l'eau;

c. accentuer les synergies entre les critères d'évaluation d'OSPAR (par exemple, EcoQO) et les critères des directives de l'UE.

OSPAR have agreed to revisit this evaluation in 2007/2008 in order to take stock of further developments.

OSPAR est convenue de revoir cette évaluation en 2007/2008 afin d'inventorier les développements supplémentaires.

1. Synergies in Objectives

1.1 Biodiversity objectives at global level

United Nations Convention on Biological Diversity (CBD, Rio de Janeiro 1992): This global convention pursues three objectives, namely the conservation of biodiversity, the sustainable use of its components and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources. The conservation of biodiversity is further specified as follows:

> *to achieve significant reduction of the current rate of biological diversity loss by the year 2010*.

The CBD defines biodiversity as *the variability among living organisms from all sources, including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems.*

At the **UN World Summit on Sustainable Development (WSSD, Johannesburg 2002)** it was decided, in accordance with chapter 17 of Agenda 21 of the CBD, to promote the conservation and management of the oceans through actions at all levels, giving due regard to the relevant international instruments to:

> Develop and facilitate the use of diverse approaches and tools, including the application by 2010 of the ecosystem approach, the elimination of destructive fishing practices, the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012 and time/area closures for the protection of nursery grounds and periods, proper coastal land use and watershed planning and the integration of marine and coastal areas management into key sectors. Another relevant key commitment is to establish by 2004 a regular process under the United Nations for global reporting and assessment of the state of the marine environment.

The objectives of both WSSD and CBD are aspirational at the global level and are considered an obligation by ratifying nations.

1.2 OSPAR biodiversity objectives

The OSPAR Biological Diversity and Ecosystems Strategy expresses its objective as follows:

> "…*to protect and conserve the ecosystems and the biological diversity of the maritime area which are, or could be, affected as a result of human activities, and to restore, where practicable, marine areas which have been adversely affected*, in accordance with the provisions of the Convention, including Annex V and Appendix 3".

The Strategy has three ecosystem related elements:

- **ecological quality objectives:** in support of the ecosystem approach to the management of human activities, a pilot project on ecological quality objectives for the North Sea has been has been adopted by OSPAR in 2005 and is now in its implementation phase;
- **species and habitats:** assessments are made of species and habitats that are threatened or in decline, and programmes and measures are being developed for their protection;
- **marine protected areas:** an ecologically coherent network of well managed marine protected areas is being created.

The fourth element concerns the human activities in the OSPAR maritime area that may adversely affect it. These activities are being assessed, and programmes and measures to safeguard against such harm are being developed. This issue is not addressed in the present volume, and could be considered in future work.

The implementation of the strategy will have two approaches: one addressing the protection of identified species, habitats and marine protected areas; the other addressing the impact of identified human activities.

Under the approach addressing identified species, habitats and marine protected areas:

a. *assessments* of the species and habitats identified in the OSPAR Lists of Threatened and Declining Species and Habitats will be carried out under the Joint Assessment and Monitoring Programme;

b. on the basis of those assessments, and in accordance with a timetable agreed on the basis of them, *appropriate measures* within the sphere of competence of OSPAR will be adopted for the

protection of those species and habitats, or the attention of the competent authorities will be drawn to the need for such measures. No time frame has been specified.

c. a network of marine protected areas will be identified on the basis of the Guidelines for the Identification and Selection of Marine Protected Areas in the OSPAR Maritime Area. The network may also include areas in the OSPAR maritime area which those OSPAR Contracting Parties that are also EU Member States are required to designate as Special Areas of Conservation or Specially Protected Areas under the EU Habitats and Birds Directives. By 2010, the areas forming part of this network will be formally designated and management plans will have been adopted for them.

The OSPAR objectives are aspirational for Contracting Parties and are considered as formal national commitments.

1.3 EU biodiversity objectives

EU Biodiversity Strategy (1998): The Convention on Biological Diversity was ratified by the European Community in 1993. All Member States of the EU are contracting parties to the CBD. They have already developed their national biodiversity strategies or are in the process of doing so. Acknowledging its role to complement national efforts and integrate existing EU regulation, the European Commission adopted a communication on a EU Biodiversity Strategy in 1998, which aims *to anticipate, prevent and attack the causes of significant reduction or loss of biodiversity at the source.*

This Strategy stresses the importance of implementing EU regulation concerning the conservation of natural resources, both within protected areas (i.e. those assigned under Natura 2000, the Habitats Directive and the Birds Directive) and outside protected areas (Water Framework Directive). In addition, the Commission developed Sectoral Action Plans on the Conservation of Natural Resources, Agriculture, Fisheries, and Economic and Development Co-operation. Each Plan defines action and measures to meet the objectives defined in the European Biodiversity Strategy, and specifies measurable targets. The **Biodiversity Action Plan for the Conservation of Natural Resources** (EC Communication, 2001) aims at improving or maintaining the status of wild flora and fauna and their ecosystems and habitats. Priorities to meet this objective are application of the Habitats and Birds Directives, establishment of networks such as Natura 2000 and financial and technical support for them and formulating special action plans for threatened bird species and huntable species, which is a task of the Commission itself. In order to reverse the current trends of biodiversity loss related to management of water the Water Framework Directive should be used.Implementation via the WFD and Natura 2000 therefore potentially leaves large areas of marine environment not addressed.

The **EU Water Framework Directive** (Directive 2000/61/EC), which came into force in December 2000, establishes a new integrated framework for the protection, improvement and sustainable use of all waters, including transitional and coastal waters up to 1 nautical mile from territorial sea baselines. The key objective (Article 1) of the Directive that is most relevant to marine ecosystems is:

> *"to prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands."*

A key aim (Article 4) is that Member States will be required to achieve *"good surface water status"* and also to prevent deterioration in the quality of waters that are already "good" by 2015. The concept of surface water status is key to the environmental objectives of the Directive, and is defined with reference to the hydro-morphological, biological and physico-chemical conditions found in pristine reference sites. The Directive does not provide a quantitative measure of what constitutes good status, however it defines that the values of the biological quality elements for the surface water body type show low levels of distortion resulting from human activity, but deviate only slightly from those normally associated with the surface water body type under undisturbed conditions (Annex 1.2).

The biological quality objectives for the assessment are fish, phytoplankton, macro algae, macrophytes, and benthic invertebrates.

Article 2 of the EU **Habitat Directive** (Directive 92/43/EEC) states:

1. The aim of this Directive shall be *to contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora* in the European territory of the Member States to which the Treaty applies.

2. Measures taken pursuant to this Directive shall be designed to maintain or restore, *at favourable conservation status,* natural habitats and species of wild fauna and flora of Community interest.

3. Measures taken pursuant to this Directive shall take account of economic, social and cultural requirements and regional and local characteristics.

Article 3(1) requires all Member States (MS) to designate a community wide network of Special Areas of Conservation (SACs). These sites should significantly contribute to the maintenance and restoration of species and habitats in Annex I and II, at a favourable conservation status. MS were required to submit candidate (cSACs) to the commission by 1995 (nearly all MS missed the deadline), agree a list of Sites of Community Importance by 1998 and report on implementation in 2000 (and subsequently every six years) with sites to be designated as SACs in 2004. The list of habitats and species in the annexes of the Habitats Directives considers only a small proportion of Europe's marine biodiversity. Monitoring of conservation status is an obligation arising from Article 11 of the Habitats Directive for all habitats (as listed in Annex I) and species (as listed in Annex II, IV and V) of Community interest. Consequently this provision is not restricted to Natura 2000 sites and data need to be collected both in and outside the SAC network to achieve a full appreciation of conservation status (DocHab-04-03/03 rev.3).

The EU **Birds Directive** (Directive 79/409/EEC) aims at *the conservation of all species of naturally occurring birds in the wild state* in the European territory of the Member States to which the Treaty applies. It covers the protection, management and control of these species and lays down rules for their exploitation (Article 1). It requires member states to take the requisite measures to maintain the population of the species referred to in Article 1 at the level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or to try to attain that level. No time frame for meeting the objective is included.

As with the Habitats Directive, a network of protected sites, Special Protection Areas (SPAs), is required to be designated under the Birds Directive. These together with SACs, make up **Natura 2000**, a pan-European network of protected areas.

The Habitat and Birds Directives implement the **Bern Convention** in Europe. The aims of the Convention are *to ensure conservation and protection of all wild plant and animal species and their natural habitats* (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species). Appendices I (flora) and II (fauna) contain vulnerable or threatened species that are strictly protected. The exploitation of wild fauna specified in Appendix III must be regulated in order to keep the populations out of danger.

The Habitat and Birds Directives do not specify what form conservation objectives should take, or what role they should play in site management, only stating that they should be the focus for assessment of the impact of a plan or project that may significantly affect a site (EU, 1979; EU, 1992).

The objectives of the EU Directives mentioned above are legally binding upon member states. All EU Directives need to be transposed to national law.

The current proposal of the European Commission for a **Marine Strategy Directive** (2005/0211 (COD)) aims at *achieving good environmental status [by the year 2021 at the latest] and to ensure the continued protection and preservation of that environment and the prevention of deterioration.* Environmental status means the overall state of the environment in marine waters, taking into account the structure, function and processes of the constituent marine ecosystems together with natural physiographic, geographic and climatic factors, as well as physical and chemical conditions including those resulting from human activities in the area concerned. With regard to ecological status there is a geographical overlap with the WFD between the baseline and 1 nautical mile seawards.

One of the key elements of the proposal is the regional approach in which each of the various European seas is considered as an entity for which in an iterative process between the member states and the Commission specific problems have to be identified and measures have to be implemented.

The **European Common Fisheries Policy (CFP)** regulates fisheries in the European waters and aims at sustainable levels of fishing. Ecosystem protection is not the main objective. However, the CFP formally embraces the concept of ecosystem-based management and requires monitoring and assessment that contain elements that can be used for OSPAR purposes. The Data Collection Regulation concerns monitoring of fish stocks under the CFP. A revision of this regulation is under way, which aims to improve the current regulation by meeting new demands generated by the need to move towards a fisheries-based management approach and towards an ecosystem-based approach and on the other hand to implement a more efficient system. It is intended to launch the revised regulation in 2007.

1.4 Other Biodiversity Objectives

IMO International Convention for the control and management of ships' ballast water and sediments (2004): The aim of the Convention is to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. The Convention has not yet entered into force.

The **Agreement on the Conservation of Small Cetaceans Of the Baltic And North Seas (ASCOBANS)** (New York, 1992) came out of the Convention on the Conservation of Migratory Species of Wild Animals (Bonn 1979), Article IV. It states under 'habitat and conservation management': work towards

a. the prevention of the release of substances which are a potential threat to the health of the animals,

b. the development, in the light of available data indicating unacceptable interaction of modifications of fishing gear and fishing practices in order to reduce by-catches and to prevent fishing gear from getting adrift or being discarded at sea,

c. the effective regulation, to reduce the impact on the animals, of activities which seriously affect their food resources, and

d. the prevention of other significant disturbance, especially of an acoustic nature.

Contracting Parties should therefore

a. assess the status and seasonal movements of the populations and stocks concerned,

b. locate areas of special importance to their survival, and

c. identify present and potential threats to the different species.

By-catches and stranded specimens and information from autopsies should be made available in an international database. A "North Sea Recovery plan" will be finalised in September 2006. One important element of the plan will be a systematic monitoring and reporting protocol on the achievement of the objectives to protect the Harbour porpoises in the North Sea.

1.5 Comparison of the nature of objectives

The high-level objectives under global conventions, EU directives and the OSPAR convention are defined at different levels of abstraction and in different terms. Hence it is difficult to interpret or compare them. The OSPAR objective concerns general ecosystem status, including biological diversity, and the protection of areas under threat. These elements are also addressed by the following conventions and directives:

a. Ecosystem status is related to the objectives of the WFD and the EMS, which are in turn expressed as 'good surface water status' and 'good environmental status'.

b. The protection of biodiversity is related to the CBD objective and it's EU translation into a Biodiversity Strategy. Elements of biodiversity, *i.e.* birds, marine mammals and harmful organisms and pathogens, are addressed by the Birds Directive, ASCOBANS and the IMO Ballast Water Convention respectively.

c. Finally, the protection of areas relates to the objectives of the Habitats and Birds Directives.

In conclusion, at this high level of abstraction synergies in objectives appear to be present. However, interpretation of these objectives and translation into indicators can vary widely. For instance, a key question when identifying targets for conservation objectives under the Habitat Directive is whether 'favourable conservation status (FCS)' describes more or less than the current status, and so whether the objective is to maintain or restore. Also under the OSPAR objective regarding MPAs (to protect, conserve and restore species, habitats and ecological processes which are adversely affected) it is not clear how far the current status and the desired status lie apart.

In addition, current policy frameworks apply very different reference conditions to assess health of the ecosystem. Existing measures such as the Water Framework Directive are implemented by, among other things, defining good water quality as a state relative to its unimpacted reference condition. In the Habitats Directive the current condition of sites and features may be considered to be 'favourable', unless there is evidence to the contrary, and that the objectives are to maintain the current status. These are not equivalent standards, and they cannot easily be substituted for each other to bring consistency to the process of determining what constitutes a healthy ecosystem (Rogers *et al*., 2005).

As interpretation and translation of the main objectives for the protection of biodiversity is currently under way in both OSPAR and the EU Directives, it is advisable to seek a coherent and common set of terms and definitions in order to promote synergies in objectives at all levels.

2. Synergies in monitoring for biodiversity

2.1 OSPAR biodiversity monitoring

Currently, the only biological monitoring included in the OSPAR Co-ordinated Environmental Monitoring Programme (CEMP) concerns eutrophication. The compilation of inventories of national monitoring programmes for threatened and declining Species and Habitats and for the Ecological Quality Objectives (North Sea area only) is under way. In the next two years the need for harmonisation of monitoring of advanced EcoQOs will be investigated.

The EcoQO system includes commercial fish, marine mammals, seabirds, fish communities, benthic communities, plankton communities, threatened and/or declining species, threatened and/or declining habitats and the integrated parameters for eutrophication.

The initial list of threatened and/or declining species and habitats contains invertebrates, birds, fish, reptiles, mammals and a diverse selection of habitats.

The OSPAR MPAs will be selected to best represent the range of species, habitats and ecological processes in the OSPAR maritime area. These may include the following features:

a. Habitats: both benthic and pelagic habitats.

b. Species: both wide-ranging and highly mobile species, for which MPA's can protect a part of their life history, and species which are sessile or have low mobility in their adult phase.

c. Ecological processes: These link the physical and biological environment and, in some cases, result in a strong biological response in a confined geographical area which could be appropriate for MPA selection.

Monitoring programmes for MPAs will be developed in the future, focused on the selected features.

2.2 EU Directives biodiversity monitoring

The **Water Framework Directive** requires Member States to monitor phytoplankton, macroalgae, angiosperms, benthic invertebrate fauna and supporting physico-chemical quality elements like nutrients, turbidity, salinity etc. as part of the determination of ecological status, and to assess hydromorphological changes. Monitoring frequencies are related to the degree of risk that a water body will fail to meet good ecological status. Surveillance monitoring is the minimal requirement with operational and investigative monitoring being required where a water body is at risk of failing to meet good status. Minimum surveillance monitoring frequencies are given in the Directive.

Article 17(1) of the **Habitats Directive** states that every six years from the date of expiry of the period laid down in Article 23, Member States shall draw up a report on the implementation of the measures taken under this Directive. This report shall include in particular information concerning the conservation measures referred to in Article 6 (1) as well as evaluation of the impact of those measures on the conservation status of the natural habitat types of Annex I and the species in Annex II and the main results of the surveillance referred to in Article 11. The report, in accordance with the format established by the scientific committee that implements the Directive, shall be forwarded to the European Commission and made accessible to the public.

This Article requires Member States to prepare a report by June 2000, and every six years afterwards, on the measures taken to achieve the conservation of SACs, and also to undertake an evaluation of the effect of these measures on the conservation status of Annex I habitats and Annex II species.

Monitoring of SACs is needed in order to carry out this evaluation. The main results of the wider surveillance of the listed habitats and species carried out under Article 11 are also to be included in the report. In addition to the requirements of the Habitats Directive, Article 8 of the EU Water Framework Directive will require Member States to ensure the establishment of programmes for monitoring the status of protected areas (including SACs). The purpose of such monitoring is to gauge whether the water-related ecological requirements (e.g. the water quality) of the SACs are being met (JNCC Marine Monitoring Handbook, Davies *et al*. 2001).

2.3 Global biodiversity monitoring

Under the CBD no specific monitoring is required. The state of the marine environment will be evaluated through a global assessment, based on regional assessments. Preparations to organize this process are ongoing.

2.4 Comparison of biodiversity monitoring

Although it is critical to identify synergies in monitoring between OSPAR and EU, it is too early to make any substantive comparison. For a useful comparison information is required on the selection of parameters, and spatial and temporal coverage of monitoring schemes. At the moment for the European seas no monitoring programmes for OSPAR, the WFD or Natura 2000 sites are fully established to enable such comparisons. However, the EU directives have strong legal frameworks for the regular reporting of the ecological status of the target components, habitats and species.

A major problem of matching the monitoring and reporting requirements of the European Directives with that of OSPAR is the regional scope as the jurisdiction of the WFD ends 1 nm behind the base line of each territorial state. A second regional difference is that the biogeographic areas of the Habitats Directive are not congruent to the river basins defined according to the WFD and that the water body types of the WFD do not match the defined habitats of the Habitats Directive. Therefore, synergies in the monitoring programmes can be expected mostly to be achieved through an effective sample design, which reduces effort and costs.

Another problem is that national monitoring programmes that are being developed under EU Directives will not necessarily be harmonised, as this has not yet been considered by the EC. It will be in the interest of OSPAR, and also of the EU Directives, including the Marine Strategy, to develop a common monitoring programme under the CEMP and to link monitoring of the general status of the ecosystem to area (MPA) specific monitoring.

3. Synergies in monitoring guidelines, including quality assurance, for biodiversity

3.1 OSPAR guidelines for biological monitoring

The JAMP Guidelines on quality assurance for biological monitoring in the OSPAR area (OSPAR Agreement 2002-15) serve as an example for EU Directives. These guidelines are primarily developed for monitoring of eutrophication indicators, but can be used for other biological monitoring as well. The ICES/OSPAR/HELCOM Steering Group on Quality Assurance of Biological Measurements (SGQAB) keeps the need for improvement of these guidelines under review (*cf.* ICES, 2004).

3.2 EU guidelines for biological monitoring

The EU Directives only provide high-level guidance. Monitoring and assessment should be undertaken using relevant international (ISO, CEN or standards from regional conventions) or national standards where international standards do not exist. Annex 1 presents an overview of existing international standards and standards under development.

3.3 Comparison

Where new monitoring programmes are being developed, there is a chance of improving the comparability of data and monitoring methods across countries and across EU Directives and OSPAR monitoring programmes. There are serious concerns about the lack of harmonisation between the Habitat Directive and the WFD, for instance regarding the parameters chosen and the sampling design. The Guidance on Monitoring for the Water Framework Directive (2003, CIS Working Group 2.7 on monitoring) highlights the need for the development of standards for biological monitoring.

4. Synergies in Biodiversity Assessment

4.1 OSPAR biodiversity assessment criteria

The Bergen Declaration (2002) of the Fifth North Sea Ministerial Conference announced a commitment to an ecosystem approach to management of the North Sea by identifying and taking action on influences, which are critical to the health of the North Sea ecosystem. As part of this, the Ministers made a commitment to further develop and use the ecological quality objectives (EcoQOs) as a tool for setting clear operational

environmental objectives directed towards specific management and serving as indicators for the ecosystem health. These EcoQOs have been developed through OSPAR with advice from ICES.

An Ecological Quality (EcoQ) is defined as "[a]n overall expression of the structure and function of the marine ecosystem taking into account the biological community and natural physiographic, geographic and climatic factors as well as physical and chemical conditions including those resulting from human activities***."*** An Ecological Quality Objective (EcoQO) is the desired level of an Ecological Quality; such a level may be set in relation to a reference level. The current EcoQOs are listed in Annex 2. The EcoQOs are in different stages of development and there is no guidance on how the complete set will be used for the assessment of the overall quality of the marine ecosystem. Essentially there are two classes within the EcoQO system: meeting or not meeting the Objective. The action to be taken when a quality element does not meet the Objective depends on whether this is expressed as a target, limit or indicator.

4.2 EU biodiversity assessment criteria

Water Framework Directive: The Member States develop classification tools for all quality elements (phytoplankton, macroalgae, angiosperms, macrozoobenthos and fish) in their national water types. A classification tool consists of five classes from high to good, moderate, poor and bad. In defining the overall assessment of a water body, the principle "one out all out" is used, this means that all quality elements in a water body have to have at least the good status for an overall assessment of good. In the geographical areas (North East Atlantic, Baltic Sea, Mediterranean Sea and Black Sea) intercalibration takes place to assure international agreement on the assessments of the national water bodies. The aim of the WFD is to reach at least good status for all water bodies in 2015 or in 2027 at the latest.

Birds and Habitats Directives: The Habitats Committee adopted a reporting format in 2005 (EC, 2005) but during the preparation of the format by the Scientific Working Group of the Habitats Committee it was agreed that further guidance was necessary both to aid completion of the forms and to clarify some of the terms used in order to harmonise reports across the EU. Thereby, one of the most urgent tasks is to develop a common understanding on how "favorable reference values" should be established. Definitions exist in the Directive but it has long been recognized that interpretation is extremely difficult and clarity required; this is particularly true for marine definitions and guidance for the assessment of marine features is still pending.

For the overall assessment of the "conservation status" of habitats and species a matrix was developed. It should be completed for each biogeographical region in which the habitats and species are present and finally classifies the results in three categories as either 'Green', 'Amber', 'Red' or 'Unknown'. The latter category is used when insufficient information is available to allow for 'expert judgement'.

4.3 Comparison

There are opportunities for the ecological classification tools developed under WFD to be used in marine SAC condition assessments. WFD surveillance monitoring of the wider marine environment is likely to provide information to assess favourable conservation status in addition to WFD ecological status information. EcoQOs have the potential to fit into the EMS system as indicators for good environmental status. EcoQ elements seem to complement the quality elements of the WFD, possible overlaps concern benthic communities and plankton communities.

5. Synergies in reporting

5.1 OSPAR reporting schedule

The OSPAR JAMP Strategy, agreed in June 2003 and revised in 2005, commits Contracting Parties to a number of biodiversity assessments, which are summarised in Table 1 below.

Table 1. OSPAR biodiversity assessment scheme

Year	*Assessment Number*	*Assessment Title*
2005	BA-1	An assessment of the pilot project on ecological quality objectives for the North Sea
2008	BA-3	An assessment of the changes in the distribution and abundance of marine species in relation to changes in hydrodynamics and sea temperature
2009	BA-2	Evaluation of the results of the EcoQO system as a contribution to the development of the Quality Status Report 2010.
	BA-4	An assessment of the status of the species and habitats that have been placed on the OSPAR List of threatened and/or declining species and habitats, in the light both of the relevant selection criteria and relevant agreed ecological quality objectives.
2010	AA-2	An assessment of the quality status of the OSPAR maritime area and of its sub-regions.

The last OSPAR quality status report was published in 2000, hence it currently has a 10 year period. The other assessments on the list above are first-time assessments and no agreements have been made yet on repetitive assessment schemes.

5.2 EU Reporting Schedule

Under the **Water Framework Directive** an initial report on characterisation is required by December 2004 (Article 5). The characterisation report includes an assessment of the likelihood that surface water bodies will fail to meet the environmental quality objectives set for the water body and the related pressures and impacts. The characterisation process is to be reviewed by at least 2013 and every six years thereafter.

In addition to the characterisation reports, the Directive requires the production of River Basin Management Plans (Article 13) by 2009. This is to be reviewed in 2015 and every 6 years thereafter. All of these WFD reports will incorporate information on trophic status and pressures and impacts.

Habitat Directive: MS were required to submit candidate (cSACs) to the commission by 1995 (many missed the deadline), agree a list of Sites of Community Importance by 1998 and report on implementation in 2000 (and subsequently every six years) with sites to be designated as SACs in 2004. The reporting scheme has been delayed by one year. The review process requires continual monitoring of habitats and species against a defined conservation status.

Birds Directive: Every three years the Commission will prepare and transmit a composite report to the Member States based on information submitted by the Member States on the application of national provisions introduced.

5.3 Comparison

In the absence of a common biological monitoring programme, OSPAR does not have a regular reporting scheme. However, it is important to note that WFD and Habitats/Birds Directives reporting is mandatory for Member States, whereas reporting under the conventions is voluntary. OSPAR/HELCOM have been informed that national monitoring programmes are likely to be adapted to suit the requirements of WFD and thus may result in existing stations/time series being lost. Hence it is vital that ICES/OSPAR/HELCOM are proactive in seeking collaboration with WFD groups.

6. Outlook

There are many connections between OSPAR work under the biodiversity strategy and under EU Directives and many areas to seek harmonisation and coherence. At present, all programmes are under development and it is too early to make a full analysis of synergies in assessment and monitoring. If Contracting Parties/Member States only focus on the national implementation of separate EU Directives, they will miss opportunities to design biological monitoring programmes that are coherent across countries and that will address both the requirements under the various EU Directives and the objectives of OSPAR. This would not only be cost-effective, but also contribute to a common understanding of ecosystem quality. Because many of these monitoring programmes are under development, or yet to be developed, it is an important time to

seek harmonisation across the programmes, as this will become increasingly more difficult as the individual programmes settle down over time.

7. References

Davies, J., Baxter, J., Bradley, M., Khan, J., Murray, E., Sanderson, W., Turnbull, C. & Vincent, M. (2001) Marine Monitoring Handbook. Joint Nature Conservation Committee, Peterborough (UK Marine SACs Project).

EC (2005) Assessment, monitoring and reporting of conservation status – Preparing the 2001-2006 report under Article 17 of the Habitats Directive. DocHab-04-03/03 rev.3, Note to the Habitats Committee, DG Environment, Brussels, 15 March 2005.

ICES (2004) Biological monitoring: General guidelines for quality assurance. Ed. by H. Rees. ICES Techniques in Marine Environmental Sciences, No. 32. 44 pp.

Rogers, S.I., M. Tasker, and D. Whitmee (2005) A draft technical paper to support the development of marine ecosystem objectives for the UK. CEFAS, JNCC, DEFRA.

Annex 1: International Standards (CEN, ISO) and Guidelines (HELCOM, JAMP) for marine biological parameters (coastal and transitional waters) - overview of existing standards and standards under develpoment (italic – older standards)

Quality Assurance

Standards

- ISO 8466-1 (1990, Ed. 1): Water quality - Calibration and evaluation of analytical methods and estimation of performance characteristics - Part 1: Statistical evaluation of the linear calibration function
- ISO 8466-2 (2001, Ed. 2): Water quality - Calibration and evaluation of analytical methods and estimation of performance characteristics - Part 2: Calibration strategy for non-linear second-order calibration functions
- ISO/TR 13530(1997, Ed. 1): Water quality - Guide to analytical quality control for water analysis
- prEN 14996 (under Approval: 2007-02): Water quality - Guidance on assuring the quality of biological and ecological assessments in the aquatic environment

Guidelines

- Manual for Marine Monitoring in the COMBINE Programme of HELCOM, PART B. General Guidelines on quality assurance for monitoring in the Baltic Sea: http://sea.helcom.fi/Monas/CombineManual2/PartB/BFrame.htm
- JAMP guidelines on Quality Assurance for biological monitoring in the OSPAR area (ASMO 2002)

Sampling, general

Standards

- *ISO 5667-1 (1980, Ed. 1): Water quality - Sampling - Part 1: Guidance on the design of sampling programmes*
- *EN 25667-1 (1993): Water quality - Sampling - Part 1: Guidance on the design of sampling programmes (ISO 5667-1: 1980)*
- prEN ISO 5667-1 (rev., under Development: 2005-01): Water quality - Sampling - Part 1: Guidance on the design of sampling programmes (ISO 5667-1: 1980; EN 25667-1: 1993)
- *ISO 5667-2 (1991, Ed. 2): Water quality - Sampling - Part 2: Guidance on sampling techniques*
- EN 25667-2 (1993): Water quality - Sampling - Part 2: Guidance on sampling techniques (ISO 5667-2: 1991)
- *ISO 5667-3 (2003, Ed. 3): Water quality - Sampling - Part 3: Guidance on the preservation and handling of water samples*
- EN ISO 5667-3 (2003): Water quality - Sampling - Part 3: Guidance on the preservation and handling of water samples (ISO 5667-3: 2003)
- ISO 5667-9 (1992, Ed. 1): Water quality - Sampling - Part 9: Guidance on sampling from marine waters
- ISO 5667-14 (1998, Ed. 1): Water quality - Sampling - Part 14: Guidance on quality assurance of environmental water sampling and handling
- ISO 5667-15 (1999, Ed. 1): Water quality - Sampling - Part 15: Guidance on preservation and handling of sludge and sediment samples
- *ISO 5667-19 (2004, Ed. 1): Water quality - Sampling - Part 19: Guidance on sampling of marine sediments*
- EN ISO 5667-19 (2004): Water quality - Sampling - Part 19: Guidance on sampling in marine sediments (ISO 5667-19: 2004)

Macrozoobenthos/Macrophyts/Phytobenthos:

Standards

- ISO 9391 (1993, Ed. 1): Water quality - Sampling in deep waters for macro-invertebrates - Guidance on the use of colonization, qualitative and quantitative samplers
- prEN ISO 16665 (under Approval: 2005-04): Water quality - Guidelines for quantitative sampling and sample processing of marine soft-bottom macrofauna (ISO/FDIS 16665: 2005)
- prEN 15196 (under Approval: 2007-03): Water quality - Guidance on sampling and processing of the pupal exuviae of Chironomidae (Order Diptera) for ecological assessment
- prEN ISO 19493 (under Development: 2007-08): Water quality - Guidance on marine biological surveys of littoral and sublittoral hard bottom

Guidelines

- Manual for Marine Monitoring in the COMBINE Programme of HELCOM, PART C. Programme for monitoring of eutrophication and its effects, Annex C-8 Soft bottom macrozoobenthos: http://sea.helcom.fi/Monas/CombineManual2/PartC/CFrame.htm
- Manual for Marine Monitoring in the COMBINE Programme of HELCOM, PART C. Programme for monitoring of eutrophication and its effects, Annex C-9 Guidelines for monitoring of phytobenthic plant and animal communities in the Baltic Sea: http://sea.helcom.fi/Monas/CombineManual2/PartC/CFrame.htm
- JAMP eutrophication monitoring guidelines – benthos (ASMO 1997)

Phytoplankton:

Standards

- prEN 15204 (under Approval: 2005-11): Water quality - Guidance standard for the routine analysis of phytoplankton abundance and composition using inverted microscopy (Utermöhl technique)
- ISO 10260 (1992): Water quality - Measurement of biochemical parameters - Spectrometric determination of the chlorophyll-a concentration

Guidelines

- Manual for Marine Monitoring in the COMBINE Programme of HELCOM, PART C. Programme for monitoring of eutrophication and its effects, Annex C-6 Phytoplankton species composition, abundance and biomass: http://sea.helcom.fi/Monas/CombineManual2/PartC/CFrame.htm
- JAMP eutrophication monitoring guidelines – phytoplankton species composition (ASMO 1997)
- Manual for Marine Monitoring in the COMBINE Programme of HELCOM, PART C. Programme for monitoring of eutrophication and its effects, Annex C-4 Phytoplankton chlorophyll-a: http://sea.helcom.fi/Monas/CombineManual2/PartC/CFrame.htm
- JAMP eutrophication monitoring guidelines – chlorophyll a (ASMO 1997)
- Manual for Marine Monitoring in the COMBINE Programme of HELCOM, PART C. Programme for monitoring of eutrophication and its effects, Annex C-5 Phytoplankton primary production: http://sea.helcom.fi/Monas/CombineManual2/PartC/CFrame.htm

Zooplankton:

Guidelines

- Manual for Marine Monitoring in the COMBINE Programme of HELCOM, PART C. Programme for monitoring of eutrophication and its effects, Annex C-7 Mesozooplankton: http://sea.helcom.fi/Monas/CombineManual2/PartC/CFrame.htm

Fish fauna:

Standards

- CEN 230172 Water quality – Sampling of fish with gillnets
- prEN 14962 (under Approval: 2005-10): Water quality - Guidance on the scope and selection of fish sampling methods
- prEN 14757 (under Approval: 2005-08): Water quality - Sampling of fish with multi-mesh gillnets
- EN 14011 (2003): Water quality - Sampling of fish with electricity

Guidelines

- Manual for Marine Monitoring in the COMBINE Programme of HELCOM, PART C. Programme for monitoring of eutrophication and its effects, Annex C-10 Guidelines for coastal fish monitoring: http://sea.helcom.fi/Monas/CombineManual2/PartC/CFrame.htm

Annex 2: Draft overview table of the revised EcoQO system for the North Sea (BDC 06/2/6)

Ecological quality issues, related ecological quality elements and corresponding ecological quality objectives (EcoQOs), following the adoption by OSPAR 2005 of the Report on the North Sea Pilot Project on EcoQOs.
(EcoQOs are shown in italics and advanced ecological quality elements and EcoQOs are shown in bold).

Issue	Ecological quality element and related ecological quality objective (EcoQO*)*
1. Commercial fish species	(1.1) **Spawning stock biomass of commercial fish species in the North Sea** (former a) ***Above precautionary reference points[2] for commercial fish species where those have been agreed by the competent authority for fisheries management***
2. Marine mammals	(2.1) **Seal population trends in the North Sea** (former c) ***a. Harbour seal population size: Taking into account natural population dynamics and trends, there should be no decline in harbour seal population size (as measured by numbers hauled out) of ≥10% as represented in a five-year running mean or point estimates (separated by up to five years) within any of eleven sub-units of the North Sea. These sub-units are: Shetland; Orkney; North and East Scotland; South-East Scotland; the Greater Wash/Scroby Sands; the Netherlands Delta area; the Wadden Sea; Heligoland; Limfjord; the Kattegat, the Skagerrak and the Oslofjord; the west coast of Norway south of 62°N.*** ***b. Grey seal pup production: Taking into account natural population dynamics and trends, there should be no decline in pup production of grey seals of ≥10% as represented in a five-year running mean or point estimates (separated by up to five years), and in breeding sites, within any of nine sub-units of the North Sea. These sub-units are: Orkney; Fast Castle/Isle of May; the Farne Islands; Donna Nook; the French North Sea and Channel coasts; the Netherlands coast; the Schleswig-Holstein Wadden Sea; Heligoland; Kjørholmane (Rogaland).*** (2.2) **By-catch of harbour porpoises** (former e) ***Annual by-catch levels should be reduced to below 1.7% of the best population estimate***

[2] In this context 'reference points' are those for spawning stock biomass, also taking into account fishing mortality, where these have been agreed by the competent authority for fisheries management.

Issue	Ecological quality element and related ecological quality objective (EcoQO*)*
3. Seabirds	(3.1) **Proportion of oiled common guillemots among those found dead or dying on beaches** (former f) ***The proportion of such birds should be 10% or less of the total found dead or dying, in all areas of the North Sea*** (3.2) Mercury concentrations in seabird eggs (former g) *The average concentrations of mercury in the fresh mass of ten eggs from separate clutches of common tern (Sterna hirundo) and Eurasian oystercatcher (Haematopus ostralegus) breeding adjacent to the estuaries of the Rivers Elbe, Weser, Ems, Rhine/Scheldt, Thames, Humber, Tees, and Forth, should not significantly exceed concentrations in the fresh mass of ten eggs from separate clutches of the same species breeding in similar (but not industrial) habitats in south-western Norway and in the Moray Firth* (3.3) Organohalogen concentrations in seabird eggs (former h) *For each site, the average concentrations in fresh mass of the eggs of common tern (Sterna hirundo) and Eurasian oystercatcher (Haematopus ostralegus) should not exceed: 20 ng g−1 of PCBs; 10 ng g−1 of DDT and metabolites; and 2 ng g−1 of HCB and of HCH. Sampling should be of ten eggs of each species from separate clutches of birds breeding adjacent to the estuaries of the Rivers Elbe, Weser, Ems, Rhine/Scheldt, Thames, Humber, Tees, and Forth, and in similar (but not industrial) habitats in south-western Norway and in the Moray Firth* (3.4) Plastic particles in stomachs of seabirds (former i) *There should be less than 2% of northern fulmars (Fulmarus glacialis) having ten or more plastic particles in the stomach in samples of 50–100 beach-washed fulmars found in winter (November to April) from each of fifteen areas of the North Sea over a period of at least five years* (3.5) Local sand eel availability to black-legged kittiwakes (former j) *Breeding success of the black-legged kittiwake (Rissa tridactyla) should exceed (as a three-year running mean) 0.6 chicks per nest per year in each of the following coastal segments: Shetland, north Scotland, east Scotland, and east England* (3.6) Seabird population trends as an index of seabird community health (former k)
4. Fish communities	(4.1) Changes in the proportion of large fish and hence the average weight and average maximum length of the fish community (former l)
5. Benthic communities	(5.1) **Imposex in dog whelks (*Nucella lapillus*) or other selected gastropods** (former n) ***The average level of imposex in a sample of not less than 10 female dog whelks (Nucella lapillus) should be consistent with exposure to TBT concentrations below the environmental assessment criterion (EAC) for TBT – that is, < 2.0, as measured by the Vas deferens Sequence Index, Where Nucella does not occur naturally, or where it has become extinct, the red whelk (Neptunea antiqua), the whelk (Buccinum undatum) or the netted dog whelk (Nassarius reticulatus) should be used, with exposure criteria on the same index of <2.0, <0.3 and <0.3, respectively.*** (5.2) Density of sensitive (e.g., fragile) species (9.1.5) **Kills in zoobenthos in relation to eutrophication** (former m) This EcoQO is part of the integrated subset of EcoQOs for eutrophication under issue 9. (9.1.6) Changes in zoobenthos in relation to eutrophication This EcoQO is part of the integrated subset of EcoQOs for eutrophication under issue 9.

Issue	Ecological quality element and related ecological quality objective (EcoQO*)*
6. Plankton communities	(9.1.2) **Phytoplankton chlorophyll *a*** (former q) This EcoQO is part of the integrated subset of EcoQOs for eutrophication under issue 9. (9.1.3) **Phytoplankton indicator species for eutrophication** (former r) This EcoQO is part of the integrated subset of EcoQOs for eutrophication under issue 9.
7. Threatened and/or declining species	(7.1) Presence and extent of threatened and/or declining species in the North Sea, as shown on the Initial OSPAR List (former b)
8. Threatened and/or declining Habitats	(8.1) Restore and/or maintain the quality and extent of threatened and/or declining habitats in the North Sea, as shown on the Initial OSPAR List (former s)
9. Eutrophication	(9.1) **Eutrophication status of the North Sea** Overarching EcoQO-eutro: ***All parts of the North Sea should have by 2010 the status of non-problem areas with regard to eutrophication, as assessed under the OSPAR Common Procedure for the Identification of the Eutrophication Status of the OSPAR Maritime Area (which consists of the (one-off) Screening Procedure and the (iterative) Comprehensive Procedure)*** Supporting EcoQOs-eutro: (9.1.1) **Winter nutrient (DIN and DIP) concentrations** (former t) ***Winter DIN and DIP (that is, concentrations of dissolved inorganic nitrogen and dissolved inorganic phosphate) should remain below a justified salinity-related and/or area-specific % deviation from background not exceeding 50%.*** (9.1.2) **Phytoplankton chlorophyll a** (former q) ***Maximum and mean chlorophyll a concentrations during the growing season should remain below a justified area-specific % deviation from background not exceeding 50%.*** (9.1.3) **Phytoplankton indicator species for eutrophication** (former r) ***Area-specific phytoplankton eutrophication indicator species should remain below respective nuisance and/or toxic elevated levels (and there should be no increase in the average duration of blooms*** (9.1.4) **Oxygen** (former u) ***Oxygen concentration, decreased as an indirect effect of nutrient enrichment, should remain above area-specific oxygen assessment levels, ranging from 4 – 6 mg oxygen per litre*** (9.1.5) **Kills in zoobenthos in relation to eutrophication** (former m) ***There should be no kills in benthic animal species as a result of oxygen deficiency and/or toxic phytoplankton species*** (9.1.6) Changes in zoobenthos in relation to eutrophication