



# **Ecological Quality Objectives: Working towards a healthy North Sea**



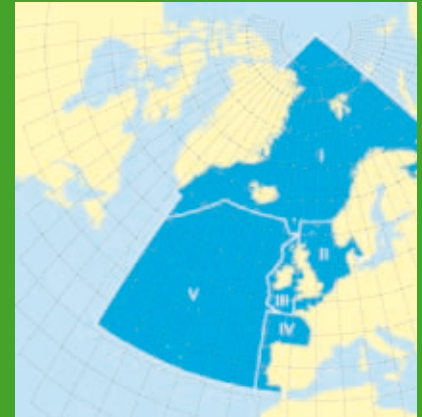
**OSPAR Commission**

for the Protection of the Marine Environment  
of the North-East Atlantic

Photo: Linda Pitkin/Foto Natura

The **OSPAR Convention** is the agreement signed by fifteen governments along the western coast and catchments of Europe, together with the European Commission, to cooperate to protect the marine environment of the North-East Atlantic. The area covered by the OSPAR Convention extends from the North Pole down to 36°N (the latitude of the Strait of Gibraltar) and from the Atlantic Coasts of Europe out to the mid-Atlantic (42°W).

OSPAR has five Regions. EcoQOs are currently applicable to region II: the Greater North Sea.



Increasing human use of the marine environment has led to the degradation of marine ecosystems. Maintaining ecosystem health is considered essential to ensure long-term sustainability and thus the socio-economic activities that depend on it. The OSPAR Commission has adopted the Ecosystem Approach for management of human activities to protect the marine biodiversity of the North-East Atlantic. This ecosystem approach also forms an integral part of the draft EU Marine Strategy Directive, which is currently under elaboration within the European Union.

Recently OSPAR agreed to implement a system of Ecological Quality Objectives in the North Sea: a set of clear environmental indicators for a healthy North Sea as part of the ecosystem approach. Achieving these objectives should lead to a healthy sea both for current and future generations.

*This brochure describes the set of Ecological Quality Objectives (EcoQOs) and is aimed at providing officials at policy level with an understanding of what EcoQOs are and how they can be applied to assess the quality of the marine environment.*

### **Ecosystem Approach and EcoQOs**

The Ecosystem Approach was firmly embedded in the agenda for the sustainable development of the North East Atlantic, as agreed by North Sea Ministers in 1997 and OSPAR in 2003. OSPAR has agreed to establish a full set of management measures that are consistent with an Ecosystem Approach by 2010.

### **OSPAR defines Ecosystem Approach as....**

*"The comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity."*



Photo: W.H. Klomp/Foto Natura

## What are EcoQOs?

The Ecosystem Approach puts people and their natural resource use practices at the centre of decision-making. However, applying these principles can sometimes be less than straightforward and operational tools need to be developed. EcoQOs are being developed to provide objectives, and thus operational tools, for the Ecosystem Approach. EcoQOs also require indicators for monitoring whether the objective is being met and whether progress is being made in the right direction or not. These indicators are an integral part of the EcoQO system.

The EcoQO system has been developed by OSPAR, in collaboration with the International Council for the Exploration of the Sea (ICES), through a pilot project in the North Sea. EcoQOs provide a means by which OSPAR Contracting Parties in the North Sea define desired qualities of the marine environment, identify how measures for management of human

impacts are working and, where there is a need, address gaps or seek improvements.

Through monitoring we can assess trends in the quality and condition of the different components and ecological mechanisms of the marine ecosystem. However, monitoring results alone do not support management, unless the desired state (or objective) for a component or mechanism has been specified. EcoQOs specify the desired state of an ecological component or mechanism and can take the form of targets (which there is a commitment to reach) or limits (which should not be breached). An EcoQO may be defined in relation to a pre-selected 'reference level' and not in absolute terms.

Monitoring in relation to EcoQOs should not only provide the desired results in a consistent and timely manner, but should also be cost-effective. The OSPAR EcoQO handbook provides recommendations for cost-effective monitoring, e.g. based upon

existing activities. A large part of the monitoring required is already ongoing under national monitoring programmes.

Some EcoQOs are linked to a single human activity and enable the evaluation of the management actions taken to regulate the activity. For example, the by-catch of harbour porpoises is linked to fishing. Other EcoQOs may indicate a change in environmental conditions that may not be a result of a single human activity. Seal populations, for example, may change due to virus infections or to habitat changes.

Where EcoQOs are met, the marine ecosystem is considered to be in a healthy condition. Where EcoQOs are not met, the responsible authorities should take appropriate steps, for example through better enforcement of regulations or research to identify causes of change and encourage preventive actions. Table 1 lists the EcoQOs being applied in a test in the North Sea.

## Example of the application of the EcoQO method

The application of the EcoQO method can be explained by a simple medical example. When a person thinks he is ill and visits a doctor there are many indicators the doctor can choose from to monitor his health. If the doctor chooses temperature as an indicator the objective (the optimal temperature for a healthy patient) is 37°C. This is an example of a target. A limit would be 41°C, when hospital care is needed. The doctor takes the temperature of the patient. If the objective is not met, the patient is diagnosed to be ill and the doctor must then take action to improve the patient's situation. If the

limit is breached, the patient must be admitted to hospital.

The same method can be applied for the sea. To measure the 'health of the sea' several ecological quality issues are chosen (such as status of marine mammals, of seabirds, of oxygen concentrations, etc.). For each issue one or more objectives can be chosen. These objectives each have an indicator that is used to assess whether the agreed Ecological Quality Objective is being met. The sea is healthy when all objectives are met. If this is not the case, measures may need to be taken to improve the situation.

## How the EcoQO system is defined:

The EcoQO system has been designed to enable OSPAR to consider different components of the marine environment and to build an overall picture of the state of the marine environment. The main Ecological Quality Issues (Table 1) that

make up the marine ecosystem in the North Sea were first defined. The next step was to identify the main impacts on these components from human uses of the sea (e.g. pollution, over fishing, eutrophication) and the indicators and monitoring system

for these impacts. For each indicator the desired level of quality has been defined, taking account of any existing policy. This is the Ecological Quality Objective (EcoQO).

*The approach to defining the EcoQO system*

### Logic of the EcoQOs

#### Ecological Quality

What are the important ecosystem components that collectively reflect a high ecological quality?

*Example: Seabirds*

**Ecological issue**

What are human impacts on this component and how can they be monitored?

*Example: Proportion of oiled common guillemots among those found dead or dying on beaches*

**Ecological Element**

What are the objectives to be achieved?  
Taking into account existing policy

*The proportion of such birds should be 10% or less of the total found dead or dying, in all areas of the North Sea*

**Ecological Quality Objectives**

*Table 1. Overview of current EcoQOs*

| Ecological Quality Issue             | Ecological Quality Objective  |
|--------------------------------------|---|
| Commercial fish species              | Maintain the spawning stock biomass above precautionary reference points for commercial fish stocks agreed by the competent authority for fisheries management.   |
| Marine mammals                       | Seal Population Trends<br>(a) There should be no decline in harbour seal population size of $\geq 10\%$ within any of nine sub-units of the North Sea.<br>(b) There should be no decline in pup production of grey seals of $\geq 10\%$ within any of nine sub-units of the North Sea.<br>Annual by-catch of harbour porpoises should be reduced to below 1.7% of the best population estimate (under review).  |
| Seabirds                             | The proportion of oiled common guillemots should be 10% or less of the total found dead or dying in all areas of the North Sea.<br>Additional seabird EcoQOs are under development for contaminant concentrations in seabird eggs, and plastic particles in seabird stomachs and local sand eel availability for black legged kittiwakes.   |
| Fish communities                     | Under development   |
| Benthic communities                  | The average level of imposex (development of male characteristics by females) in female dog whelks or other selected gastropods should be consistent with specified levels.   |
| Plankton community                   | See Eutrophication EcoQOs.  |
| Threatened and/or declining species  | Under development   |
| Threatened and/or declining habitats | Under development   |
| Eutrophication                       | All parts of the North Sea should have the status of non-problem areas with regard to eutrophication by 2010.<br>Winter concentrations of dissolved inorganic nitrogen and phosphate should remain below specified limits.<br>Maximum and mean phytoplankton chlorophyll a concentrations during the growing season should remain below specified limits.<br>Area-specific phytoplankton species that are indicators of eutrophication should remain below specified limits.<br>Oxygen concentration should remain above specified limits.<br>There should be no kills in benthic animal species as a result of oxygen deficiency and/or toxic phytoplankton species. |



## EcoQO on Oiled Guillemots

### Lead Country: The Netherlands

*When oil slicks occur at sea, seabirds may become oiled, die and get washed ashore. Common Guillemots have been selected as an indicator species for oil pollution as a whole because they are highly vulnerable to such pollution and are sufficiently abundant and widespread to allow sufficient sample sizes to be measured each winter in all countries around the North Sea. Systematic beached bird surveys (BBS) provide information regarding species composition and the percentage of birds that have oil on them. In most countries bordering the North Sea, BBS have been conducted since the early 1960's, to study temporal and spatial trends in seabird mortality.*

#### **The Ecological Quality Objective is:**

The average proportion of oiled Common Guillemots in all winter months (November to April) should be 10% or less of the total found dead or dying in each of 15 areas of the North Sea over a period of at least 5 years.

Currently, in most parts of the North Sea, over 50% of the Guillemots found dead on beaches are oiled. Stricter enforcement of current regulations, in combination with further measures to minimise chronic oil pollution at sea (for example, prevention, education and effective oil recovery) will be required to reduce oil related mortality among guillemots and other seabirds.

#### **Monitoring and reporting: What North Sea countries have to do**

It is recommended that monitoring for this EcoQO is conducted by volunteers to reduce

the costs through already established and existing networks. Each North Sea country should appoint a national coordinator to be responsible for organising the participation of volunteers and evaluating the national monitoring results. The monitoring protocols and the reporting format are described in the EcoQO Handbook. The Netherlands, as the lead country, has also appointed an international coordinator.

Data have to be collected between November and April and summaries of results should be forwarded by the national coordinator to the international coordinator before June each year. The international coordinator evaluates the results from all the countries and prepares, by July, an annual report, indicating the situation regarding oiled guillemots in the North Sea, for submission to OSPAR.



Photo: Rijkswaterstaat



Photo: Florian Graner/Seapics.com

### EcoQO implementation: The next steps

So far, eleven EcoQOs have been elaborated and are ready for implementation. Additional EcoQOs are under development. A phased implementation approach is being followed. The North Sea countries will implement the current eleven EcoQOs until 2009, in a 'testing and learning phase'. This involves monitoring, assessing the data and reporting (for details see EcoQO on Oiled Guillemots). A first evaluation of the results of the application of the North Sea EcoQO system is planned in 2008. In 2009, a further evaluation of the EcoQO implementation will be conducted and used as the basis for deciding which EcoQOs will be adopted and applied in the North Sea. The results of the 2009 evaluation will contribute to the next OSPAR Quality Status Report to be published in 2010.

OSPAR recognises that the first eleven EcoQOs do not cover all the main ecosystem components or human impacts in the North Sea and will continue to develop additional EcoQOs in parallel with the initial implementation. Work on each additional EcoQO will be carried out by a designated 'lead country';

and is coordinated by the Biodiversity Committee of OSPAR. For each additional EcoQO the lead country will prepare an 'Implementation Document' describing the monitoring methods and reporting procedures to be applied by all relevant North Sea States. Once agreed these 'Implementation Documents' will be included in the OSPAR EcoQO Handbook, and the EcoQO will be implemented.

### Are EcoQOs applicable in other regions of the North-East Atlantic?

The eleven North Sea EcoQOs are not necessarily relevant across the wider OSPAR area. The main ecosystem components and human impacts and the best means of monitoring differ between OSPAR regions. For example, the Common Guillemot cannot be used as the basis for an EcoQO in Spain and Portugal as it is not abundant there. Similarly, certain species are key features of other OSPAR Regions but are not present in the North Sea. (e.g. loggerhead turtles).

However, the EcoQO system can be used in other regions. The EcoQOs system will be tailored to suit the main priorities and issues of each Region and EcoQOs will be designed to match the best means of monitoring within each region.



Photo: Suzie Eszterhas/Foto Natura

### EcoQOs in relation to European Directives

The draft EU Marine Strategy Directive (MSD) aims to achieve 'Good Environmental Status' in the marine environment by 2021 and a regional approach to implementation is recommended. Member States are required to assess the status of their marine waters, determine what constitutes Good Environmental Status (GES) in their region and establish environmental targets, monitoring programmes and measures. When fully developed, the suite of EcoQOs can facilitate the determination of GES and monitoring and reporting within the regional implementation of the proposed MSD. The experience gained by North Sea countries during EcoQO



Photo: Eric Wanders/Foto Natura



Photo: Rijkswaterstaat

implementation especially in identifying good EcoQOs, is therefore very valuable. The EU Water Framework Directive (WFD) aims to achieve at least good ecological status for all waters, including transitional and coastal waters by 2015. With respect to eutrophication, there are considerable similarities between the approach of the WFD, as outlined in the EU-eutrophication guidance, and the OSPAR integrated set of EcoQOs for eutrophication. The latter has already been harmonized with the approach regarding eutrophication specified in the WFD. Fisheries management in the North Sea lies outside OSPAR's competence

but with the European Commission and the Government of Norway. Similarly, management of international shipping lies within the competence of the International Maritime Organisation (IMO). The EcoQOs relevant to fisheries and shipping are designed to be consistent with the requirements of the Common Fisheries Policy and of IMO protocols and should help in assessing the effectiveness of measures within these frameworks. When the implementation of the EcoQOs indicates that management measures for fisheries and/or shipping are not working, OSPAR will bring it to the attention of the relevant authority.

## Why the implementation of EcoQOs should be supported

*The implementation of the suite of EcoQOs in the next few years is important for many reasons. The EcoQO system is an important indicator system for marine biodiversity with which OSPAR Contracting Parties can fulfil their reporting obligation under the OSPAR Convention, especially the preparation of the 2010 Quality Status Report. The system is already well developed and accepted by North Sea Contracting Parties. It is also a tool that can contribute to the regional implementation of the EU Marine Strategy Directive. Implementation experience in the next three years will provide the opportunity to fine-tune the current suite of EcoQOs and to continue to learn how pragmatic and cost-effective EcoQOs can be developed. An important element in the EcoQO process is well funded and adequately staffed monitoring programmes. The evaluations in 2008 and 2009 should provide the basis for further improvements in the system.*

### The advantages of the EcoQO system

1. EcoQOs increase transparency. EcoQOs assist in a) judging the overall ecological quality of the marine environment and b) consideration of individual components of the environment, for example, populations of marine mammal or seabird or the quality of the benthic community, and c) the formulation of policies for their protection and conservation.
2. The EcoQO process supports adaptive management. The EcoQO process is incremental and iterative. It allows new EcoQOs to be added and, based on implementation experience, inefficient EcoQOs to be modified or removed. Thus, the EcoQO system is designed to assist managers to continuously review the state of the environment and to then use this review to adapt management practices to achieve the maximum practicable environmental benefit.
3. EcoQOs facilitate harmonised monitoring and reporting. EcoQO implementation is intended to provide a means to harmonise
- the monitoring and reporting of ecosystem components by OSPAR Contracting Parties.
4. EcoQOs can be modified to enable regional implementation. The EcoQO system can be tailored to take into account regional issues and regional priorities within the OSPAR maritime area as well as to address the best means of monitoring within the region.
5. EcoQOs have a solid scientific basis and are the result of extensive (scientific) collaboration and stakeholder input: EcoQOs have been selected with the support of scientists, NGOs and other interested stakeholders (e.g. fisheries groups, oil industry representatives). This has provided a general acceptance of their validity by all relevant stakeholders. ICES has evaluated the scientific basis for the EcoQOs. This evaluation ensured that all EcoQOs are effective and practical, have a strong scientific basis, can be monitored without too much additional effort; and have a clear reference level or target against which the data can be evaluated.

The final suite of EcoQOs will together provide a reliable estimate of the ecosystem health within the North Sea and help achieve the objective of a healthy marine ecosystem in the North Sea.



**OSPAR Commission**  
for the Protection of the Marine Environment  
of the North-East Atlantic

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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