OSPAR Commission

for the Protection of the Marine Environment

of the North-East Atlantic

Quality Status Report 2000

Region V Wider Atlantic

Quality Status Report 2000
Region V – Wider Atlantic

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FOREWORD

The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention 1992) requires that Contracting Parties shall 'take all possible steps to prevent and eliminate pollution and shall take the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected'.

To provide a basis for such measures, the Contracting Parties are required to undertake and publish at regular intervals joint assessments of the quality status of the marine environment and of its development. These assessments should also evaluate the effectiveness of measures taken and planned for the protection of the marine environment and should identify priorities for action.

The Ministerial Meeting at which the OSPAR Convention was signed also issued an action plan for the OSPAR Commission, with a commitment to prepare a quality assessment of the whole maritime area by the year 2000. A comprehensive quality status report on this scale has not previously been produced.

To implement these commitments the OSPAR Commission decided, in 1994, to subdivide the maritime area into five regions and to prepare, coordinated by the Environmental Assessment and Monitoring Committee, five detailed quality status reports. As a result, five regional task teams were set up to produce reports for the following areas (see inset in ***Figure 1.1***): Region I (Arctic Waters), Region II (Greater North Sea), Region III (The Celtic Seas), Region IV (Bay of Biscay and Iberian Coast) and Region V (Wider Atlantic). It was agreed that these reports should be developed in a scientifically sound manner and should be based upon an assessment plan and a scientific programme (covering monitoring, research and the use of assessment tools). It was also agreed that the information contained in the reports should reflect the outcome of the appropriate quality assurance procedures.

In 1995 the OSPAR Commission adopted a Joint Assessment and Monitoring Programme, to take over and build upon experience gained through its former Joint Monitoring Programme and the Monitoring Master Plan of the North Sea Task Force.

The findings of the five regional quality status reports ('the regional QSRs') form the basis of a holistic quality status report for the entire maritime area (the 'QSR 2000'). This regional report is thus part of an overall quality status assessment for the North-east Atlantic in the year 2000. The QSR 2000 will represent an integrated summary of the quality status of the entire OSPAR maritime area and will both fulfil the commitment made by the parties to the 1992 Convention and provide a basis upon which the future work programmes of the Commission can be decided. In the Sintra Statement, which concluded the 1998 Ministerial Meeting of the OSPAR Commission, importance was attached to the outcome of the QSR 2000 as a basis for identifying and prioritising future tasks at the Ministerial Meeting of the OSPAR Commission to be held in 2003.

The term 'OSPAR Commission' is used in this report to refer to both the OSPAR Commission and the former Oslo and Paris Commissions. The 1972 Oslo Convention and the 1974 Paris Convention were superseded by the 1992 OSPAR Convention when it entered into force on 25 March 1998.

The conclusions and recommendations contained in this report draw attention to problems and identify priorities for consideration within appropriate fora as a basis for further work. Within its sphere of competence, the OSPAR Commission will decide what follow up should be given to these conclusions, recommendations and priorities for action. The rights and obligations of the Contracting Parties are not therefore affected by this report.

THE PARTICIPANTS

Framework

The Environmental Monitoring and Assessment Committee (ASMO) has overall responsibility for the preparation of periodic quality status reports, assisted by a working group, the Assessment Coordination Group (ACG). ASMO outlined the basic arrangements for the quality status reports in the Joint Assessment and Monitoring Programme (JAMP). Further scientific and technical arrangements were prepared by ACG. Regional Task Teams (RTTs) were set-up for each of the regions of the maritime area. The lead countries for the respective RTTs were responsible for providing logistical support to the RTT.

Information relating to the entire maritime area was prepared in 1996 – 1998 by the following OSPAR working groups: the Working Group on Inputs to the Marine Environment (INPUT), the Working Group on Impacts on the Marine Environment (IMPACT), the Working Group on Concentrations, Trends and Effects of Substances in the Marine Environment (SIME) and its Ad Hoc Working Group on Monitoring (MON). This information constituted the basis of the five regional quality status reports, and was supplemented by relevant national information as appropriate.

Regional Task Team for the Wider Atlantic

The RTT for the Wider Atlantic had primary responsibility for drafting this report. The RTT worked under the leadership of Portugal and Iceland.

The report was drafted by Martin Angel working under the direction of an editorial committee. The editorial committee was chaired by Helgi Jensson (Iceland) and included Mário Alves (Portugal), Stig Carlberg (Sweden), Theresa Crossley (UK), Hartmut Heinrich (Germany), Paulo Machado (Portugal), Graça Noronha (Portugal), Maria Pitta Groz (Portugal), Roald Saetre (Norway) and Jan Visser (Netherlands). The committee met six times. Åke Hagström (Denmark), Janet Pawlak (ICES), Roland Salchow (Germany) and Teresa Vinhas (Portugal) were either observers or participants at one of the committee meetings.

A workshop was held in Lisbon in October 1998 to review and assess the preliminary drafts of the first five chapters and to make recommendations for the contents of Chapter six. The experts participating at the workshop and contributing extensively to the content of the report included Volkert Dethlefsen (Germany), Eduarda Goulart (Portugal), Willem Helder (Netherlands), Peter Koltermann (Germany), Ricardo Santos (Portugal), Gerd Schriever (Germany), Thomas Soltwedel (Germany), Roland Wollast (Belgium) and Walter Zenk (Germany). Hans Alexandersson (Sweden) contributed a paragraph on meteorology and Philip C. Reid (UK) a paragraph on climate change. A wide range of helpful comments were received from participating countries at all stages of the drafting.

The committee was particularly grateful to the UK's Department of Environment, Transport and the Regions for funding Martin Angel's work and to the European Union and the Portuguese Government for funding the Lisbon workshop.

ACG and ASMO – representation by Contracting Parties

Chairmen of ACG: Ben van de Wetering (1994), Frank van der Valk (1995), Philip C. Reid (1996 – 1999).
Chairmen of ASMO: Georges Pichot (1994 – 1997), Roland Salchow (1998 – 2000).
Contracting Parties' delegates to ACG 1994 – 1999:
Belgium: Mia Devolder, Georges Pichot*, Wilfried Vyncke; Denmark: Jens Brøgger Jensen*, Henning Karup, Mikkel Aaman Sørensen; EC: Patrick McCutcheon*; France: Pascale Babillot, Marcel Chaussepied, Philippe Maire*, Jean-Marie Massin; Germany: Hartmut Heinrich*, Roland Salchow; Iceland: Helgi Jensson*; Ireland: Rick Boelens, Jacqueline Doyle*; The Netherlands: Lisette Enserink, Frans Feith, Kees Kramer, Bob Oudshoorn, Folkert Post*, Frank van der Valk, Carien van Zwol; Norway: Per Erik Iversen, Hein Rune Skjoldal, Rune Vistad*; Portugal: Antonio Macieira Antunes, Maria E. F. Avila Goulart, Graça Noronha, Irene Pereira, Joaquim Pissarra, Tereza Vinhas*; Spain: Victor Escobar, Pilar García, Argeo Rodríguez de León*; Sweden: Stig Carlberg, Sverker Evans*, Ingrid Jansson; United Kingdom: Mike Burn, John A. Campbell, Stephen Churley, Theresa Crossley*, John M. Davies, Andrew Franklin, Andrew J. Osborne, Philip C. Reid.
* also acting as Head of Delegation during ASMO(2) 1999 which adopted this report.

Observer organisations attending meetings of ACG and ASMO 1998 – 1999

Arctic Monitoring and Assessment Programme (AMAP), European Environment Agency (EEA), International Council for the Exploration of the Sea (ICES), Secretariat of the North Sea Conferences, Conseil européen des fédérations de l'industrie chimique (CEFIC), European Fertilizer Manufacturers Association (EFMA), Euro Chlor, World Wide Fund for Nature (WWF).

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OSPAR COMMISSION FOR THE PROTECTION OF THE MARINE ENVIRONMENT OF THE NORTH-EAST ATLANTIC

QUALITY STATUS REPORT 2000: REGION V – WIDER ATLANTIC

EXECUTIVE SUMMARY

Introduction

This report is one of five regional quality status reports prepared by the OSPAR Commission as part of its commitment to produce the first quality status report of the North-east Atlantic by the year 2000.

Region V, the Wider Atlantic, extends between 62° N and 36° N and from 42° W to 10° W off Iberia and France and the 200 m depth contour off Ireland and the British Isles.

The report is based upon the most recent information available from the scientific literature and, where available, national and international sources. The report was prepared by a Regional Task Team comprising representatives from Germany, Iceland, Norway, Portugal, Sweden and UK.

The physical environment

Region V represents the deep waters of the North-east Atlantic. Its topography ranges from continental slopes, through the sharply fluctuating seabed associated with seamounts, banks of fragmented continental rocks and the Mid-Atlantic Ridge, to extensive areas of almost featureless abyssal plain.

Movement in the upper layers of the water column is generally from west to east and is dominated by two major circulation cells; the subpolar gyre and the subtropical gyre. There are outflows to the Nordic Seas in the north-east, and these are important in maintaining a relatively mild climate in North-west Europe. In the deeper layers there are inflows of bottom waters from the Mediterranean Sea (originating in the Southern Ocean) and, most importantly, of cold waters spilling over the shallow banks from the Nordic Seas. At intermediate depths cold water also flows in from the Labrador Sea. These cold waters mix with the ambient waters to form a water mass known as the North Atlantic Deep Water which can be identified throughout all oceans. Its formation is one of the major driving forces for the thermohaline circulation of the world's oceans. Hence the North Atlantic is a pivotal region from which climatic fluctuations are rapidly transferred to all other oceans.

Another important current flows northwards along the slope to the west of the British Isles and may have continuity with a similar slope current flowing northwards along the Iberian Slope. These slope currents play a key role in carrying contaminants and biological organisms northwards and into the other OSPAR regions.

Bottom sediments vary according to the topography and the local currents. There is offshore transport of sediments from the continental margins, and in places strong currents can cause local scouring of the seabed. Where the topography is rugged, crustal rocks may be exposed, especially along the Mid-Atlantic Ridge where the seafloor was formed relatively recently. However, generally the seabed is covered with thick accumulations of sediment, derived partly from pelagic production, partly from dust blown in from the continents and partly from debris dropped from melting icebergs.

Throughout much of the region the prevailing winds are south-westerly. The winds in the region are influenced by depressions, which typically track across the region from the south-west. The frequency and violence of storms increase in winter, and from south to north. Cyclic fluctuations in atmospheric pressure between the high-pressure system centred over the Azores and the low-pressure centres over Iceland – the North Atlantic Oscillation (NAO) – provide indications that there are long-term (up to 7 years) oscillations in the weather patterns and hence in many oceanographic processes. These long-term oscillations, rather than fundamental climate change, may be responsible for some of the shifts in the weather patterns reported from other regions.

Sea surface temperatures decrease from south to north and to a lesser extent from west to east. There are marked seasonal fluctuations in sea surface temperatures associated with the seasonal fluctuations in solar radiation and stratification of the upper ocean.

Decadal variability in climate over the North Atlantic has been well documented and influences the hydrography of all five OSPAR regions. In Region V, some of these fluctuations have resulted in large-scale persistent anomalies in near-surface salinity and in sharp changes in the biological characteristics.

Human activities

Human population in the region is restricted to the Azores Archipelago. Improvements in local infrastructure resulting from European Union grants and the development of a thriving tourist industry have reversed a slow decline in population. However, tourism has created its own problems because seasonally the Islands' population can increase by as much as threefold.

The growth of the cruise industry has resulted in a considerable increase in the size of cruise ships crossing the region. Tourism is of considerable importance to the economy of the Azores. Inshore activities have increased, as has ecotourism especially whalewatching.

Fishing activities within Region V are highly diverse. Fleets include quite small vessels operating around the Azores, moderately large vessels catching deep-living stocks in a sustainable manner, and international fleets of vessels exploiting large pelagic species. A variety of vessels intermittently explore deep-living stocks throughout the region. There is a lack of compatibility between the areas and reporting procedures adopted by the various organisations seeking to regulate these fisheries. This makes it difficult, if not impossible, to obtain data for meaningful assessments of fishing effort, catch rates or for the status of

the majority of the stocks.

Other human activities which may already be having, or might be expected to have, an impact on Region V include:

- sand and gravel extraction – only around the Azores;
- shipping;
- the laying of communication cables; and
- military activities.

Chemistry

The sources of contaminants to Region V can be broadly categorised as:

- direct inputs (mainly from shipping associated with exchanges of ballast waters, permitted discharges of wastewaters and biodegradable material, and the incineration of burnable wastes at sea. Also, discharges from offshore activities and, around the Azores, municipal outfalls);
- marine accidents; and
- atmospheric inputs (which although they are low throughout most of the region are overall likely to be equivalent to inputs from all other sources).

Inputs of lead have apparently declined since the general introduction of lead-free fuel in the US. Mercury levels while generally low, can be high in top predators. Similarly, concentrations of other organic and inorganic substances remain relatively low compared to levels generally found in coastal waters. However, there are insufficient data to assess where the main sources are, or whether the levels of contamination are changing.

There is also relatively little information on levels of persistent organic contaminants in the region, including pesticides, industrial chemicals and the by-products of combustion. Data obtained mostly from the scientific literature indicate low concentrations of contaminants in deep sea organisms, but the data are highly variable and the reasons for the variations are unclear.

Similarly, very low concentrations of artificial radionuclides are detectable throughout Region V and add less than 1% to the natural background levels of radiation. They are generally considered to pose no health risk to human populations or to the oceanic ecosystem. Inputs have been decreasing.

Concentrations of dissolved nutrients are generally much lower than in other oceanic regions and exhibit a pronounced seasonal cycle. With the possible exception of very localised inshore areas around the Azores, the production cycle is either light- or nutrient-limited for all but a very few weeks of the year; hence eutrophication is most unlikely to become a problem.

Biology

Region V is subdivided into two major biogeochemical provinces in which the faunas and ecology are quite different. Superimposed upon this basic subdivision is a north–south gradient in species distributions and community diversity, and vertical gradients that result in bathymetric zonation. Pelagic faunas are twice as diverse to the south of 40º N than to the north, but their biomass shows the reverse. The benthic communities are much richer in species than the pelagic communities, and show a similar latitudinal step in species richness. Maximum species numbers are generally encountered both in the water column and on the seabed, at depths of 1 km, whereas standing crops steadily decline with depth. Deeper-living species of fish are almost without exception slower-growing, longer-lived and less fecund than their shallow-living counterparts. These characteristics make them particularly susceptible to overexploitation. In addition, there have been recent discoveries of a number of different fragile deep-sea habitats (such as hydrothermal vents, carbonate mounds and sponge communities) which are being damaged by fishing activities.

The by-catch in deep-sea fisheries tends to be high and may be posing risks to some ocean species such as whales, turtles and seabirds. Although the risks to seabirds are probably small relative to the pressures they are under at their nesting sites, the by-catch of small whales and turtles by some of the deep-water fisheries is of concern.

There have been a few introductions of non-indigenous species in the Azores, but in the offshore waters of the region, introduced species have either failed to become established or there are insufficient background data for them to be identified.

Overall assessment

The assessment shows that the quality of the marine environment in the Wider Atlantic is generally good, although it is far from pristine. Gross ecosystem effects resulting from pollution have not been detected in Region V. However, there have been recent indications that global scale changes, possibly reflecting greenhouse gas and chlorofluorocarbon (CFC) emissions, are beginning to affect the region. Measures taken to reduce direct inputs from shipping appear to have been successful, such that these discharges are now a minor issue. Even so, further improvements in the safety of marine operations should still be pursued. Offshore transport of contaminants from coastal regions occurs but, likewise, is not thought to present significant risks to the deep-water communities. The main risks appear to be associated with atmospheric inputs, many of which have sources that lie outside the OSPAR area. However, the absence of routine monitoring in the open ocean precludes confidence in this assessment. It also means that any future decline in environmental health is likely to go undetected until conditions deteriorate to unacceptable levels. For example, the lack of evidence concerning the impact of tributyltin (TBT) on the ocean communities may reflect inadequate monitoring.

Despite this general assessment of good environmental quality, several issues are highlighted as being of particular concern, either due to their present impact or to their potential future impact.

Fishing

Overexploitation of many stocks continues to occur. Levels of by-catch and discards are very high and may be causing long-term damage to some components of the ecosystem.

Evidence of mechanical damage to some fragile habitats is becoming evident. The ecological impact of removing top predators on the structure and functioning of oceanic ecosystems has not been addressed.

Habitat changes

Although the most important impact on habitats is fishing activity, changes are occurring in the physical and biological characteristics of the region that seem likely to result from the impact of greenhouse gas and CFC emissions. It seems likely that increasing carbon dioxide concentrations in the atmosphere may induce changes in other ecological processes, eventually leading to shifts in the present community balance.

Offshore industrial development

The current expansion of the hydrocarbon industries offshore, and the likely future extension of the energy industry, needs to be undertaken with care.

Radioactive contamination

Although radiological assessments imply that the risks have declined, and will continue to do so, radioactive contamination continues to be viewed with concern by some countries.

Other issues

Other issues which may affect the region as a whole include:

- shipping, including TBT inputs, marine litter and polycyclic aromatic hydrocarbons (PAHs); and
- biotoxins, polychlorinated biphenyls (PCBs) and other persistent organic contaminants.

Lack of information

A number of gaps in information have been identified. These include:

- a lack of methodology for predicting climatological change and its effect on circulation and water mass formation;
- an insufficient understanding of how the North Atlantic Oscillation influences circulation within Region V and what causes the salinity anomalies recently identified circulating around the subpolar gyre;
- a limited understanding of how long-term cycles in the physical environment affect midwater and seabed communities and processes;
- the need for a greater understanding of the links between biodiversity, productivity and other ecological processes;
- the need to combine physical, biological and chemical models for operational use;
- a lack of information on the relative contributions of anthropogenic and natural inputs for many substances. This is compounded by a lack of information on contaminant pathways to the deep ocean and an absence of good baseline data;
- an incomplete understanding of the chronic effects of long-term exposure of marine biota to contaminants;
- an inadequate basic systematic knowledge about the majority of benthic taxa (particularly the smaller organisms), the distributions and life cycles of many keystone species, and the structure and dynamics of most deep-water food webs (including the role of micro-organisms);
- insufficient data to evaluate sustainable catch rates for many deep-sea species, particularly by-catch and discard data, information on stock structure and recruitment for many of the multi-species fisheries and the life histories for many of the exploited species; and
- an understanding of the environmental impact of fishing techniques on fragile deep-sea ecosystems.