

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

Quality Status Report 2000
Region I Arctic Waters

Quality Status Report 2000
Region I – Arctic Waters

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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 *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 'QSR2000'). This regional report is thus part of an overall quality status assessment for the North-east Atlantic in the year 2000. The QSR2000 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 QSR2000 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 Arctic Waters

The RTT for the Arctic Waters had primary responsibility for drafting this report.

Denmark (including the Faroe Islands and Greenland), Iceland and Norway shared the work for the preparation of the report, with Norway taking the lead. The RTT functioned as an editorial group with a representative from the Institute of Marine Research in Bergen, Norway contracted a technical editor to draft the report. As of August 1999 the editorial group comprised the following persons:

Bogi Hansen (Fisheries Laboratory, Faroe Islands); Per Erik Iversen (Norwegian Pollution Control Authority), Chairman; Helgi Jensson (Environmental and Food Agency of Iceland); Jarle Klungsoyr (Institute of Marine Research, Norway), Technical Editor; Marit Nyborg (Norwegian Pollution Control Authority); and Mikkel Aaman Sørensen (Danish Environmental Protection Agency).

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Scientific support and advice provided by the secretariat of the Arctic Monitoring and Assessment Programme is also gratefully acknowledged.

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* also acting as Head of Delegation during ASMO(2)1999 which adopted this report.

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

QUALITY STATUS REPORT 2000: REGION I – ARCTIC WATERS

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.

The report presents an assessment of environmental conditions in that part of the maritime area which, for assessment purposes, is known as Arctic Waters or Region I. The area comprises the Barents Sea, the Norwegian Sea, the Iceland Sea and shelf and the south-east Greenland shelf, and the Greenland Sea. Region I also includes a sector of the Arctic Ocean.

This is the first time a quality status report has been prepared by OSPAR for the Arctic region. After an introductory chapter (Chapter 1), the report focuses on geography, hydrography and climate (Chapter 2), human activities (Chapter 3), chemistry (Chapter 4) and biology (Chapter 5). The report concludes with an overall assessment (Chapter 6).

Ecosystem characteristics

The climate in Region I is determined by the inflow of relatively warm Atlantic water. Where the Atlantic water meets the cold Arctic water to the north and west of the region, a sharp front separates the water masses. Climatic variability causes large interannual variability in ice and hydrographic conditions, which in turn affect plankton production and fish recruitment. The general circulation system within Region I is probably a major mechanism driving climate variability, both within Europe and globally.

Northern parts of the Iceland, Greenland and Barents Seas are ice-covered in winter. Most of the ice in the Barents and Iceland Seas is seasonal and melts during summer. The ice and ice-melt have significant effects on ecological conditions. Owing to these factors and to the high latitude of the region, the seasonal phytoplankton production is of short duration and limited extent. The primary production is conveyed efficiently to higher trophic levels and supports large populations of fish, marine mammals and seabirds.

Human population

Region I is sparsely populated with a total of only 2.6 million inhabitants. Their lives are closely linked to local resources, particularly in terms of their dependence on fishing and the harvesting of wildlife, which form the basis of their society, culture and economy. Other economically important activities include forestry, mining, the metals industry and petroleum exploitation.

Main human pressures

Owing to its remoteness and low population density, general

environmental conditions within Region I are good. With regard to contaminants the region is one of the cleanest within the OSPAR Convention area. However, certain activities give cause for concern such as the impact of fisheries and the widespread occurrence of persistent organic contaminants in fish and marine mammals. In this report, human pressures on the marine ecosystems have been ranked on the basis of expert judgement according to the following classes: major effects, medium effects and lesser effects.

Major effects

Fisheries

The main impacts of fisheries result from the partial removal of target species. Although management actions over recent years have resulted in improvements and in the sustainable utilization of some stocks, fishing pressure on some other stocks is so high that they are close to or beyond the limits for sustainable utilization. The effects of fishing pressure on stock size and stock interactions may coincide with climatically driven variability.

Inadequate reporting of discards makes it difficult to establish the actual catches of target and non-target species. Discards can result in increased populations of scavenging species. This is likely to have contributed to population increases for some species of seabird.

Bottom trawling affects benthic species and habitats. Studies on deepwater corals off the coast of Norway indicate that trawling can cause extensive damage and the destruction of coral reefs.

Whaling

Whaling led to the decimation of several whale species in the Arctic region. The recovery of some overexploited species has been very slow while others, such as fin and minke whales, have recovered well. It is likely that the patterns of energy flow and the dynamic properties of the ecosystems have been altered permanently by this former activity.

Medium effects

Persistent organic contaminants

An increasing number of persistent synthetic compounds have been detected in the biota, sediments, sea water and ice of Region I, indicating the global distribution of such compounds. They remain in the environment for extremely long periods due to their very low rates of degradation.

No quantitative estimates of the total input of persistent organic contaminants to Region I are available. A few local sources close to urban settlements are known. The concentrations in areas remote from human population cannot be explained by known uses or sources within the region. This implies that long-range transport from lower latitudes is important.

Long-term time trends for persistent organic contaminants in Region I are very few. It is therefore difficult to assess to what extent agreed measures and bans on the use of many of these compounds have resulted in decreased concentrations within the environment. Recent studies on glaucous gull and polar bear from Bear Island and Svalbard indicate that polychlorinated biphenyls (PCBs) and other persistent organic contaminants can cause biological effects in animals living within the region.

TBT

Imposex has been observed in dogwhelk and common whelk in coastal areas of Region I as a result of exposure to tributyltin (TBT) from TBT-based antifouling paints. Banning the use of TBT on small boats has resulted in some signs of recovery.

Mariculture

There is extensive mariculture in Region I, particularly in Norway. The spread of salmon lice from farmed to wild salmon stocks is an issue of concern since heavy infection may cause large mortalities. The genetic composition of wild stocks may be affected by salmon which have escaped from farms. Bacterial diseases in fish farms are now almost absent due to the use of effective vaccines and vaccination strategies. The use of pesticides and antibiotics in mariculture has decreased during recent years and these are not considered to cause significant effects on marine biota.

Oil

The only oil-contaminated areas in Region I are estuaries and harbours close to human settlements and industrial sites. Some oil is released from offshore production platforms, shipping and the transport of oil. Potentially, a large impact may occur if there is an overlap in time and space between an accidental oil spill and migratory animals such as seabirds, which congregate within relatively small areas at certain times. The difficulties associated with taking remedial actions in such cold environments are a cause for concern.

Lesser effects

PAHs

There is no information on polycyclic aromatic hydrocarbon (PAH) inputs to Region I. Industry and urban settlements within the region are local sources. Long-range transport via the atmosphere is also likely to be of some importance. PAHs are likely to have a local impact only, such as near oil wells, metallurgical plants and urban settlements. Owing to the generally low PAH concentrations within Region I, significant biological effects are unlikely to occur.

Metals

Anthropogenic effects of metals are only apparent in some areas close to point sources. Global discharges of cadmium, mercury, lead and copper from industrialised countries have declined for some years due to policy measures.

Concentrations in Arctic sediments are mainly dependent on local geology. Cadmium and mercury occur in some seabirds and marine mammals at concentrations that may have health implications for both the animals and the human consumers. It is uncertain whether mercury poses a threat to the health of the most highly exposed marine mammals, such as pilot whales from the Faroe Islands, or to their human consumers. However, there are indications that selenium is present in concentrations that can protect against mercury poisoning.

Radionuclides

Contamination by artificial radionuclides is very low and has negligible radiological significance. Present inputs are mainly via global fallout from previous atmospheric nuclear weapons testing, fallout from the Chernobyl reactor accident and discharges from European nuclear fuel reprocessing plants. The greatest future threats to human health and the Arctic environment are associated with the potential release of radionuclides from local dumpsites and accidents within the civilian and military nuclear sectors.

Eutrophication

Population density in the land areas bordering Region I is very low and therefore the inputs of nutrients are generally low. Eutrophication is not an issue of concern for Region I.

Biological introductions

The introduction of non-indigenous species and the effects of microbiological pollution are considered insignificant problems in Region I. The only impact of this type observed is the introduction of the Kamchatka crab.

Physical impacts

Physical impacts include dredging and dumping, coastal protection and land reclamation, tourism, sand and gravel extraction and marine litter. These are all regarded as minor problems in Region I.

Gaps in knowledge

The following issues were identified as particularly important:

- there is a need to improve the scientific basis for linking climatic variability and climate change to the chemical and biological processes in Region I;
- the effect of fishing pressure may coincide with climatically driven variability and the information required to separate these processes is limited;
- the assessment process was difficult owing to limited data on trends in inputs and a lack of systematic contaminant monitoring data on geographical and temporal trends; and
- little information on the biological effects of contaminants made it difficult to draw conclusions about the impact of contaminants on the Arctic ecosystems.

Recommendations

Taking into account the human activities identified in this quality status report, their impact on the marine

environment and the evaluation of existing measures, it is recommended that the following actions be considered by the appropriate authorities:

- Environmental management and the management of living resources should be based on science and any management action will need to be under constant review and modified as the scientific basis improves.
- To ensure continued improvement in the quality of the region adequate resources should be made available to implement the OSPAR Strategies.
- To improve the management of fish stocks there is a need for the development of better assessment tools regarding the effects of discards and by-catches and the effects of interaction between fish stocks.
- There is a need for more research on the effects of fishing gear on marine habitats.
- Qualitative and quantitative information on the inputs, sources and pathways of contaminants to the region should be improved.
- Research programmes on pathways and sources should be initiated together with monitoring programmes to identify critical regions and temporal trends.
- There is a need for more information on biological effects, particularly concerning the chronic exposure of persistent organic contaminants to organisms living in the region.
- More information and research are needed on the effects of mariculture on wild stocks, in terms of possible genetic effects and the spread of parasites and diseases.
- Environmental impact studies are required in relation to oil exploitation in or near ice covered areas.
- Research is required on the implications of climate change for the marine environment.

