

The 1999 Wadden Sea Quality Status Report

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In December 1999, a new Wadden Sea Quality Status Report was published. The main conclusions, related to the implementation of the common trilateral Targets, are given in this article.

Introduction

The last Wadden Sea Quality Status Report of the 1990s was finalized shortly before the end of the decade. After the "Development Report" of 1991 and the "1993 Quality Status Report", it is the third time that an integrated assessment report of the Wadden Sea has been published.

Some 60 persons have contributed to the QSR, many on a voluntary basis. The analysis of the chemical data was, like for the previous two reports, done by the Dutch Institute for Coastal and Marine Management (RIKZ). The work was coordinated by the Quality Status Report Group, a subgroup of the Trilateral Monitoring and Assessment Group (TMAG).

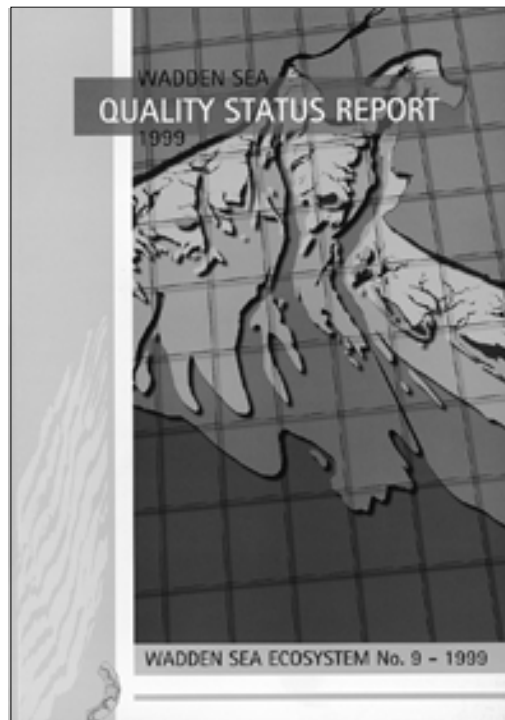
With its 260 pages, the book is more comprehensive than its predecessors. It contains chapters on protection and management, human use, climate, marine chemistry and biology.

For the first time dunes, beaches, estuaries and the offshore zone are addressed. This is because, at the Leeuwarden Conference in 1994, these habitats became part of the trilateral cooperation.

The chapter on marine chemistry covers the period 1985-1996, which is a sufficiently long period to allow for statistical analyses of trends. Also, in chapter 5, biology, several long-term series are assessed, amongst others, for chlorophyll and macrozoobenthos. Also, in this chapter, for the first time data from the Demersal Young Fish Survey (DYFS) are presented.

The overall assessment part of the QSR has been structured according to the common Targets as adopted at the Leeuwarden Conference and evaluates progress in the implementation of the Targets. Also, methodological considerations about how Targets can be evaluated are included.

The conclusions and recommendations of the QSR will be discussed in the course of this year and the results of this discussion will be submitted to the Wadden Sea Senior Officials in the framework of the preparation of the 9th Governmental Wad-



den Sea Conference (Denmark, November 2001). Some of the main conclusions are given below.

Quality of Water and Sediment

Nutrients and eutrophication

The Target of "A Wadden Sea which can be regarded as a non-eutrophication problem area" relates to the agreements within the OSPAR framework about dividing the OSPAR area into non-eutrophication problem areas, potential eutrophication problem areas and eutrophication problem areas. For the Wadden Sea, criteria to differentiate between these three categories have been elaborated in a trilateral project, the results of which will become available this spring (see also Van Beusekom, this issue) could not yet be used for the evaluation of the Target.

Phosphate levels in water have decreased significantly in most parts of the Wadden Sea whereas this is not the case for nitrate. Also, chlorophyll levels showed no decrease. As reasons for the remaining high primary production, several factors are mentioned, namely increased input of organic matter from the adjacent North Sea, delivery of phosphorus from the sediment and the fact that

nitrogen is the main limiting factor for primary production.

The N to P ratio has increased in some areas, most notably in the western Wadden Sea. The duration of *Phaeocystis* blooms in the Marsdiep did, however, not decrease. The blooming intensity of *Phaeocystis* at Norderney, expressed as number of colonies per liter, decreased in the period 1993-1996, coinciding with decreasing dissolved N and P concentrations. The proliferation of potentially toxic algal species did not increase in the first half of the 1990s.

A long-term evaluation of macrozoobenthos data from five locations in the Wadden Sea made clear that macrozoobenthos is, to a certain extent, regulated by winter severity and that, with the exception of Balgzand, no clear cause-effect relationships exists with primary productivity or eutrophic state. The observed increase since 1988 in macrozoobenthos biomass in the coastal zone off Norderney has been related to mild meteorological conditions in winter.

Natural micropollutants

For natural micropollutants, the Target "natural background concentrations" has been agreed upon. Concentrations of most heavy metals in sediment are approaching background levels. An exception is mercury, which is still three to ten times higher than background. All sediment metal concentrations are below ecotoxicological assessment criteria (EAC) ranges as developed by OSPAR. Also metal concentrations in blue mussels have decreased but are still, with the exception of zinc, above background levels. Polycyclic Aromatic Hydrocarbons (PAHs) concentrations in sediment are within the range of background levels and below EAC.

Xenobiotic substances

The Target for xenobiotic or man-made substances is that levels should be such as resulting from zero discharge. Data for PCBs, HCB, HCH and TBT have been evaluated. Concentrations of PCBs in sediment and HCB and HCH in bird eggs show a steady decrease. TBT, however, is a reason for concern. Levels in sediment of up to 1000 times EAC have been recorded.

The Tidal Area

Two categories of Targets apply to the tidal area, namely Targets for the geomorphology and Targets for the biology. It is concluded that, as a result of human interference, most notably fixed coastal constructions, but also of fisheries, dredging sand extraction and gas extraction, the ability of the sys-

tem to compensate for sea level rise may have decreased. Also, the settling conditions for fine-grained sediment may have become worse. The Target of an increased area and a more natural development of natural mussel beds, eelgrass meadows and *Sabellaria* reefs has not been reached. The decline in number and size of mature beds of the blue mussel and seagrass meadows continued in this decade.

The decrease of these structure-building communities may also influence hydrology and sedimentology in the tidal area. Because our present understanding of the hydrological and geomorphological processes and their interactions, together with the role of mussel beds and seagrass meadows, is still insufficient, there is an urgent need for further research on the interactions between sediment composition, disturbances and subsequent biotic developments.

Salt Marshes

The Targets for salt marshes are to increase the area of natural salt marshes and improve the natural vegetation structure of artificial salt marshes. Much has been achieved in the past ten years with regard to improving the natural situation in salt marshes by the reduction, or phasing out, of grazing and artificial drainage. The outbanking of summer polders has, so far, only been applied in the Dutch Wadden Sea. This practice not only increases the salt marsh area, but could also be favorable for creating new fresh-salt transitions and for maintaining the sediment balance of the tidal area.

A precise comparison of the situation regarding the natural situation of salt marshes in the different parts of the Wadden Sea is presently not possible because of a lack of actual data and common criteria. The last trilateral survey of salt marshes was carried out in 1986. It is therefore recommended to initiate on the basis a new survey of harmonized criteria.

The erosion of salt marshes does not yet seem to have increased as a result of sea level rise, bottom subsidence and higher wave energy.

Beaches and Dunes

For beaches and dunes, it is the Target to increase the natural dynamic situation and the presence of a complete natural vegetation succession. The status of the dunes in the Wadden Sea Area has been, and still is, determined by conservative measures of coastal protection which preserve directly (planting of marram grass) or indirectly (building of sand

dikes, groynes etc.) the zoning patterns. As a result, there is a relatively high percentage of intermediate stages and an underrepresentation of primary and oldest stages.

There are considerable differences in the percentage of primary dune area between the different barrier islands but, generally, it may be concluded that there is a good potential for the implementation of the Targets.

Estuaries

With regard to estuaries it has been agreed that valuable parts will be protected and that the river banks will be restored in their natural states, as far as this is possible.

Only five estuaries have remained in the Wadden Sea area (Ems, Weser, Elbe, Godel, Varde Å). As a consequence, natural transitions of fresh and salt water hardly exist in the Wadden Sea Area. The Varde Å and Godel are estuaries which have retained their natural character. The Ems, Weser and Elbe and their tributaries have been modified considerably by diking and deepening. The anthropogenic impact on these estuaries is still increasing as a result of the current deepening of the Elbe and Weser and the construction of a barrage in the Ems.

It is concluded that these estuaries are moving farther away from the Targets.

The Offshore Zone

For the offshore zone, the Target is to increase the natural morphology. It is concluded that both from physical and biological perspectives, the offshore zone and tidal area are closely connected.

It is therefore recommended that the management and protection of these two habitats be closely tuned. The evaluation of impacts in the offshore zone should also take into consideration effects in the tidal area and vice versa.

Birds

For birds, favorable conditions with regard to food availability, breeding, moulting and roosting have been set as Targets. It is concluded that the populations of many bird species in the Wadden Sea increased in the last decades and a few declined. The main factors for the increase of breeding birds are an improved protection during the breeding season, a substantial reduction in egg collection and reduced levels of pollutants.

Kentish plover and little tern populations decreased which is due to a lack of sufficient undis-

turbed breeding habitats at beaches and in primary dune areas. It is, amongst others, recommended to increase the proportion of beach habitats available for birds and to reserve the most preferred habitats, such as primary dunes, beach barriers, sand spits and shell banks, for birds.

Mammals

For the marine mammals common seal, grey seal and harbour porpoise, the Target is to have viable stocks and a natural reproduction capacity.

The population size of the common seal is much higher than before the epidemic in 1988 and the population may be regarded as viable.

The grey seal population in the Wadden Sea is relatively small. The observed growth is also due to immigration from outside the area. There is insufficient knowledge to judge whether the population is viable. Also, about the harbour porpoise too little is known about the population dynamics to be able to evaluate the Target.

Reference

De Jong, F., Bakker, J.F., van Berkel, C.J.M., Dankers, N.M.J.A., Dahl, K., Gätje, C., Marencic, H. and Potel, P., 1999. Wadden Sea Quality Status Report 1999. Wadden Sea Ecosystem No. 9. Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Quality Status Report Group. Wilhelmshaven, Germany, pp. 259.

The QSR can be obtained at the Common Wadden Sea Secretariat upon payment of DM 20 (plus mailing costs). It can also be downloaded (pdf format) from the CWSS home page (<http://cwss.www.de>).

A Dutch translation of the Report is available at the RIKZ (contact Joop Bakker, RIKZ Haren, Postbus 207, NL 9750 Haren, J.F.Bakker@rikz.rws.minvenw.nl).

A German translation of chapter 6, Conclusions and Recommendations, is under preparation and can be obtained from the BMU, Bonn (contact: Mr. Leinfelder, Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, Referat NII2, Postfach 12 06 29, D 53048 Bonn).

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