

Coastal zone Management around the Southern North Sea

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Abstract

The Southern North Sea is bordered by Great-Britain, France, Belgium, The Netherlands, Germany and Denmark. The North Sea basin and its adjacent shorelines are intensively used. Management of the basin and the coastal zone is therefore essential. Because of the small scale of the area, the dense population and the big scale of the interactions, international cooperation is vital.

In this paper an overview is given of both the morphologic-physical interactions and the administrative interactions between the bordering governments.

A complicating factor in Coastal Zone Management around the Southern North Sea is that CZM is highly connected to national spatial planning and to sea defence policy. In several of the bordering countries this is not a subject of the national government, but is handled on a regional level. This makes that we are dealing with more authorities involved.

At this moment international agreement exists on most aspects of active use of the North Sea basin itself (navigation, oil and gas mining, fishery, cables, etc) and its major coastal shallow areas (like the Waddensea). However in the field of passive use (pollution by inflowing rivers, air contamination by heavy industry, risk by transport and processing of hazardous goods) still much has to be done. International agreement on the recreation along the coastal strip does not yet exist. Also the standards for coastal protection against flooding by storm surges and against chronic erosion vary in each country.

Introduction

The Southern North Sea covers the continental shelf areas of Denmark, Germany, the Netherlands, Belgium and a part of the shelf areas of the United Kingdom and France. Since the 1960s many bilateral delimitation agreements between the North Sea states were concluded. At present agreements on all continental shelf boundaries exists except for the boundary between the Netherlands and Belgium (fig. 1).

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Figure 1: The southern North Sea area

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Within the continental shelf areas of the North Sea states several administrative zones are distinguished. Member States of the European Community are empowered to maintain an exclusive 12-miles zone in which fishing is reserved to vessels which traditionally fish in the waters concerned and operate from the ports of the zone in question. Other administrative zones are related to national or local boundaries (e.g. 1 km limit in the Netherlands) or to national legislation (e.g. mining acts). Under the MARPOL convention (marine pollution), boundaries of 25 and 50 miles from the coast apply (IMO, 1987).

The water depth in the Southern North Sea is generally less than 50 meters. Over time, the sedimentation of sand and silt from the land has kept pace with the subsidence of the North Sea basin. In the Northern part of the North Sea, water depths of over 500 meters occur; there the supply of erosion material was insufficient.

In the centre of the North Sea, between approximately 55 and 56° latitude lies the Dogger Bank, a shallow zone about half the size of the Netherlands. In this famous fishing area, water depths of less than 20 meters occur. During severe storms, the waves of the Northern North Sea break here.

The bottom of the Southern North Sea consists mainly of sandy sediments reworked by the forces of tides and waves. This is, amongst others, reflected by the undulating sands and elongated sandbanks like the Norfolk and Flemish Banks.

The water in the North Sea circulates according to a fixed pattern. Atlantic water enters through the English Channel in the south and along the Scottish and English east coast in the north. Outflowing water leaves the North Sea along the Danish and Norwegian coasts. On average, the water of the entire North Sea is refreshed every one to two years. Stratification of the water in the North Sea is restricted to the deeper parts (generally more than 30 meters deep) and to the summer period.

The various water masses in the Southern North Sea are often separated by so-called fronts, transitions within a few kilometres distance. These transitions are measured in terms of salinity, temperature, nutrients and pollution. During summer these fronts are more pronounced than during winter. Well known fronts in the Southern North Sea are the Frisian Front, separating water from the Channel and the Atlantic Ocean, and the Danish Front, marking the boundary between 'continental' water and central North Sea water.

Several rivers from the European Continent and the United Kingdom flow into the Southern North Sea. The most important rivers are the Scheldt, Rhine, Meuse, Eems, Weser, Elbe, Humber and Thames (fig. 1). These rivers carry mud, nutrients and contaminants to the North Sea. Mixing of river and sea water occurs only gradually and over long distances. Water from the Rhine and Elbe rivers, for example, can be traced as far as Northwest Denmark (De Ruyter et al, 1987).

Use of the basin and the coastal zone

Around the North Sea several millions of people lives. There is a vast communication between all these inhabitants; they want to live in the area; they have a need for recreation,

etc. As a starting point it is wise to make an inventory of the use of the area. For a description of the use it is useful to make a distinction between the North Sea basin, the adjacent waters (like the Wadden Sea and the estuaries) and the surrounding land. This distinction in three types continues also in the (inter)national regulations, the research and the planning.

Use of space in the Southern North Sea

An impression on the present use of space of the Southern North Sea is, among others, given in the North Sea Atlas (ICONA, 1992) and in the Quality Status Report of the North Sea Task Force (NSTF, in prep).

The Southern North Sea is used very intensively, mainly for shipping, dumping, fishing, offshore industry, pipelines and cables, military activities and extraction of raw materials (e.g. sand and gravel). Some of the functional uses will be discussed briefly in this chapter. More detailed information is given in other contributions to this volume.

As an example, an overview of the use of maritime space on the Netherlands Continental Shelf in 1990 is given in figure 2.

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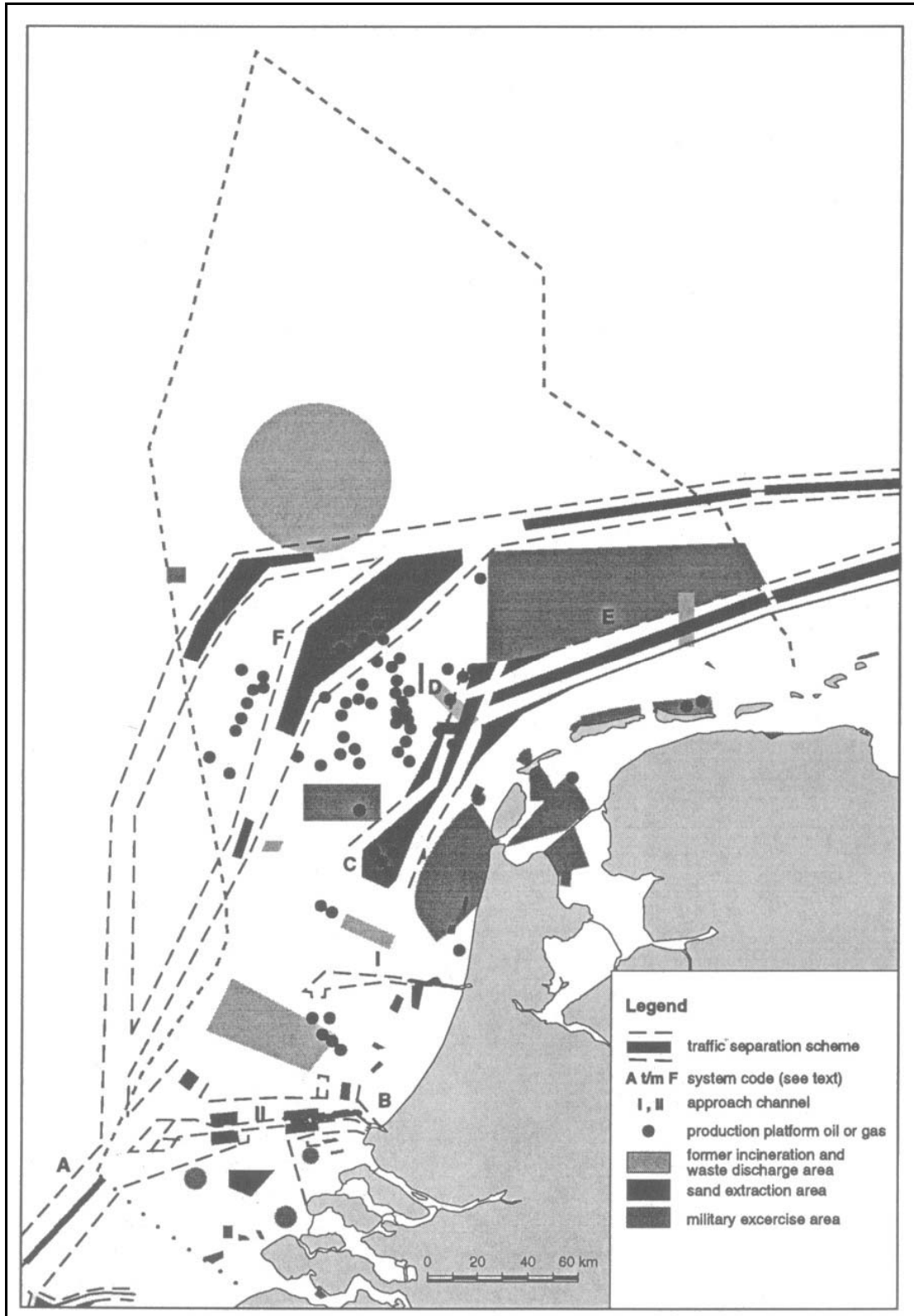


Figure 2: The use of maritime space on the continental shelf of the Netherlands in 1990 (after ICONA, 1990)

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The North Sea, and especially the southern part of it, is one of the world's busiest seas for shipping. To ensure a smooth and safe movement of the shipping traffic, routing systems (i.e. separation schemes and deep water routes) are used since the late 1960s. The most important deep water channels lead from the Strait of Dover to the German Bight. Major harbour also have deep water approach routes, such as the Euro-channel to Rotterdam and the IJ-channel to Amsterdam. When required, deep water routes are maintained at the desired depth through dredging.

The Southern North Sea is rich in nutrients and contains a varied fish population. The rapid increase in catches over the past decades resulted in a threat to certain fish populations, for instance that of the herring in the 1970s. To prevent the exhaustion of species, a fishing policy has been developed by the European Community. This policy includes total allowances for certain species as well as quotations for the individual EC-Member Countries.

Exploration of the natural gas and oil reserves in the North Sea started in the 1960s. In the Southern North Sea major gas fields are present on the continental shelves of the United Kingdom and the Netherlands. An outline of the production platforms and pipelines is given in figure 3. In the Northern North Sea both gas and oil fields of importance are present on the Norwegian and UK shelves.

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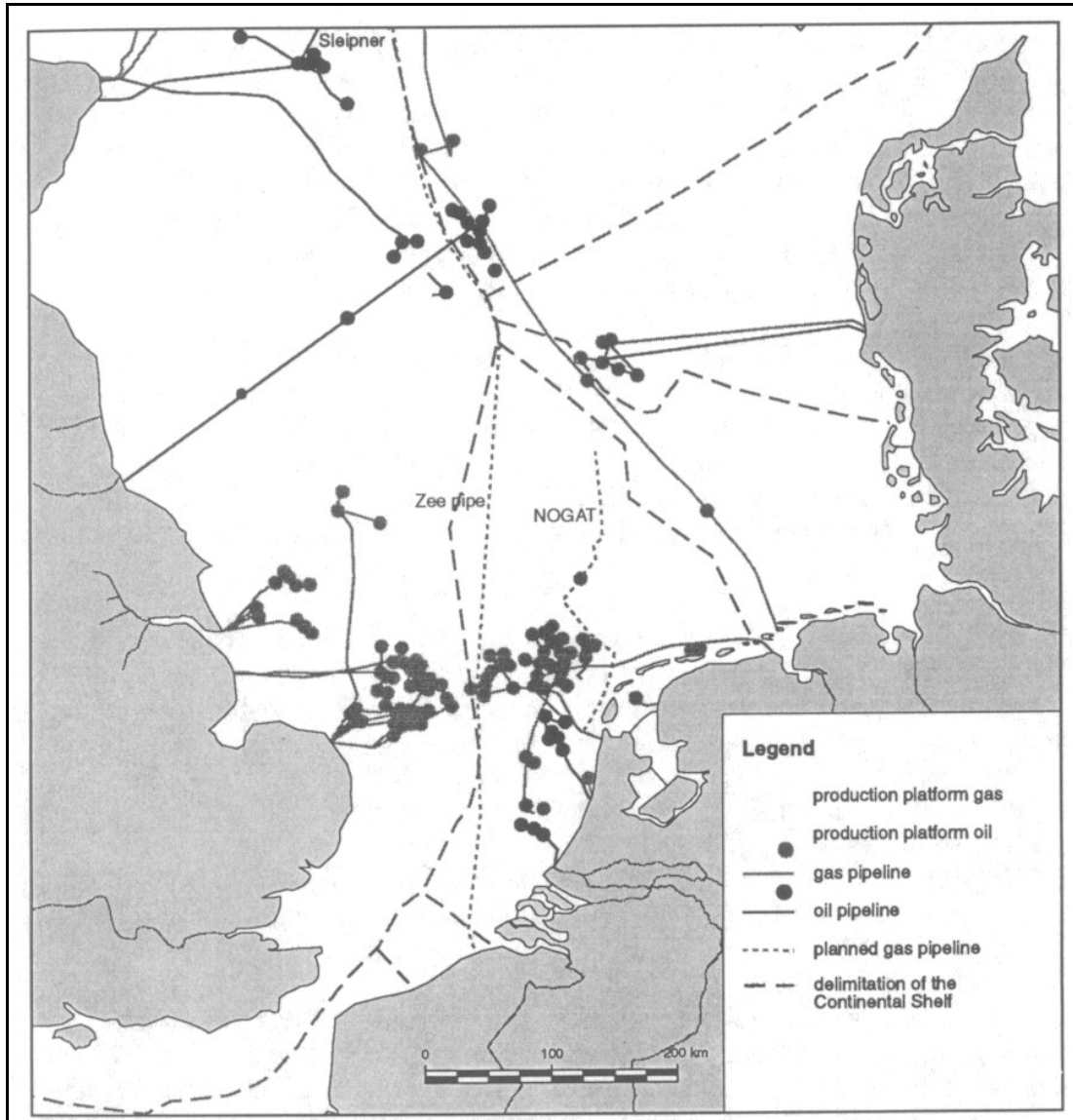


Figure 3: Production platforms and pipelines in the Southern North Sea (after ICONA, 1992)

An extensive network of telecommunication cables exists between the coastal states bordering the Southern North Sea. Since the beginning of this century, some 30 cable links were established, the greater majority of these connecting the United Kingdom to the European continent. Recently several older cables that are out of use have been removed (e.g. 13 on the Netherlands Continental Shelf; ICONA, 1992).

Other human uses of the Southern North Sea include discharges of waste materials, both directly through dumping and indirectly via rivers or the atmosphere. Especially the rivers Elbe, Rhine, Thames and Weser, with their very densely populated and intensively used catchment areas, are major sources of contaminants and nutrients (Van de Kamer et al, 1993).

The area is also of great importance for recreation activities, especially bathing and sailing. Tourism and recreation continues to be a growth sector (OECD, in prep).

Land use around the Southern North Sea

The land is used very intensively, already for many centuries. Human occupation starts several millennia ago, but in the Middle Ages a considerable development started in this area. The main economic growth was in the 17th century. The inhabitants focused very much on international trade, giving a great wealth in the area. In the 19th century industrialization started. Heavy industry requires good communication and a good infrastructure, especially for bulk goods. Railroads and river transport towards the seaports became very important. The population started to grow.

At this moment nearly all functions can be found in the land area around the North Sea. In fact the area is somewhat overused. Therefore in all countries relatively strict zoning regulations are in effect.

In the area a many harbours can be found, like Rotterdam, Hamburg, London, Antwerp, Amsterdam, Esbjerg, etc. Also many minor (or specialised) harbours can be found, like the ferry-harbours of Oostende and Harwich, the naval base of Den Helder and the fishing port of Hanstholm.

Concentrating on the coastal strip itself, outside the harbour areas, one can distinguish the following important functions:

- * coastal defence (protection against flooding and/or erosion)
- * natural reserve
- * recreation (including housing)
- * drinking water production (especially in the Netherlands)

Historically in the low lying countries, coastal defence was the primary function, and all other use was in fact prohibited. Because of this, in many areas nature was not disturbed. In less sensitive areas (from a point of view of flooding) much more human activities were allowed, resulting in more urbanised areas (e.g. in Belgium). At this moment it is possible to maintain the required safety levels also when the coastal strip is used by other functions. This fact causes more stress on the coastal strip. Many conflicts arise between developers and natural conservationists. In order to solve these conflicts in nearly all areas there are strict regulations on the use of the areas. In general it is not allowed to develop coastal areas when this is not a part of a regional development plan. These plans

have to be approved by authorities on various levels. Public opinion has a strong influence on this decision making process.

A great part of the dune area around the North Sea is at this moment appointed as a natural reserve. It is the intention of most authorities to concentrate tourist development to a limited number of places.

Institutional arrangements

During the second half of this century, population growth and economic development in coastal areas has increased rapidly. Many separate laws and regulations related to activities in coastal areas can be identified in the various coastal states of the Southern North Sea area. Existing laws and institutional arrangements are generally heavily oriented towards regulations, especially land use zoning. More recently also economic instruments (e.g. 'polluter-pays' principle, emission charges) are applied. The need for a good mixture of economic instruments and a tight regulatory framework is becoming evident.

Many coastal states aim at a more comprehensive planning and management in their coastal zones. However, at present there are no integrated coastal resource management policies in the countries bordering the Southern North Sea. In many countries it is even difficult to identify which ministry is primarily responsible for the implementation of coastal zone management policies and plans (OECD, in prep).

In some countries of the Southern North Sea area coastal zone issues are handled by the national governments; in other countries federal states or provinces play a major role. This will be illustrated by two examples of coastal zone issues: coastal hazards (esp. flooding and erosion) and nature conservation in coastal areas.

In England the central government (through the Minister of Agriculture, Fisheries and Food) has policy responsibility for sea defence and flood protection. The Ministry pays grants to drainage authorities, such as the National Rivers Authority, to construct flood and sea defences. Likewise, grants are paid to maritime district councils to protect their coastlines against erosion.

In Belgium, the Ministry of the Flemish Community is handling issues of coastal protection. It maintains a small governmental office for the co-ordination of coastal defence works, water infrastructure and maritime affairs. The actual projects are carried out by consultants.

In the Netherlands, the national government (through its Department of Public Works and Water Management) is concerned with coastal erosion issues. The maintenance of the sea defences is the responsibility of the local administration through the so-called Water Boards. Co-ordination of all activities related to coastal protection is on a provincial level through the so-called Provincial Consultative Bodies (Hillen & De Haan, 1993).

In the Federal Republic of Germany coastal erosion and flooding affairs are the responsibility of the federal states. As far as the North Sea is concerned, four states are involved: Bremen, Hamburg, Niedersachsen and Schleswig-Holstein.

In Denmark, coastal protection issues are handled by the national government through the Danish Coast Authority. Again, this is a rather small administrative organisation merely co-ordinating coastal protection projects.

Ecological damage to the European coastal zones is severe. The coastlines (often referred to as the 'golden fringe of Europe') involve a large variety of habitats: sanddunes and beaches, brackish water areas, salt marshes, estuaries and cliffcoasts. The ecological importance of these areas is, amongst others, illustrated by the fact that over 50% of all plant species in Western Europe occur in the coastal areas (Council of Europe, 1991). From the ecological point of view, legislation and management are primarily directed to buying vulnerable coastal areas and establishing nature reserves, national parks and the like. This is realized through both private and governmental organisations. An outline of the relevant legislation in the various European countries is given by the Council of Europe (1991).

In the United Kingdom, the National Trust (NGO) owns and manages over 800 km of coastline (situation 1990). Moreover, about 30% of the coasts forms part of the 'Heritage Coasts', a joint initiative of the Countryside Commission and local authorities.

In Belgium, the national government sponsors NGO's and private initiatives to buy and manage nature reserves in the coastal zone.

The Netherlands policy of nature conservation in the coastal area is outlined in the Nature Policy Plan of the central government. The most important point of action is to bring the entire coastal dune area and large parts of the intertidal zones under the Nature Conservancy Act before 1998.

The German North Sea coasts are well protected. The federal states of Schleswig-Holstein, Niedersachsen and Hamburg, responsible for nature conservation on their territories, have all established national parks.

In Denmark, the Act on Nature Conservation offers possibilities to effectively protect biotopes and contains guidelines for the protection of special zones.

The above may only serve to illustrate the variety of legislation and management in the countries bordering the Southern North Sea. In some countries the national government plays a key-role (e.g. the Netherlands). In Germany the federal states have established their own legislation and management. And in countries like Belgium the national government only coordinates activities in the coastal zone.

The adjacent waters are mainly natural reserves with an important recreational function. They are also important for fishery, but mainly in an indirect way (spawning areas). These areas are very sensitive to human action. In the past much of the adjacent water were diked and subsequently used as agricultural area. Because of the overproduction of agricultural products at this moment the need for land decreases, while open water is valued higher in public opinion.

International cooperation

International cooperation in the North Sea was a fact long before the United Nations Convention on the Law of the Sea (adopted in Montego Bay, 10 December 1992) placed

a strong emphasis on such cooperation. In fact, international cooperation covered at that moment the most important aspects of management of human uses of the area.

Cooperation started in 1969 on the topic of **pollution with oil and the prevention thereof**, shortly after the disaster with the Torrey Canyon, with the signature of the Agreement for Cooperation in dealing with Pollution of the North Sea by Oil, known as the **Bonn Agreement**. Strictly speaking, the Bonn Agreement provides the mechanism for assistance and help and its scope was limited, at least in the first version, to pollution from oil spills.

The **Conventions of Oslo** (pollution from dumping and incineration, signed in 1972) and **Paris** (pollution from land-based sources, signed in 1974) provide since the early seventies a more comprehensive framework with the aim of protecting the marine environment of the North Eastern Atlantic (incl. the North Sea).

As often is the case, a concrete example reminded the countries concerned that the unlimited dumping of (industrial) waste into the sea could lead to an unacceptable situation. This example was provided by a Dutch ship, the "Stella Maris" which, having sailed from the port of Rotterdam on 16 July 1971 to dump chlorinated waste in the North Sea, was obliged to return to port on 25 July (without carrying out her mission) because of the combined weight of public opinion and of the Governments of Norway, Iceland, Ireland, the Netherlands and the United Kingdom. Within eight months the Oslo Convention was agreed upon and signed.

At that time it was felt necessary to draw up a similar document, dealing this time not with the prevention of pollution by dumping, but with the prevention of marine pollution by discharges of dangerous substances from land-based sources, watercourses or pipelines. Negotiations on this topic resulted in the completion of the **Paris Convention** which was opened for signature in June 1974.

The ideas, implemented in the Oslo Convention were also used, with only minor changes, on a global scale in the completion of the so called **London Dumping Convention**, which was opened for signature in December 1972.

Very clearly, the early seventies was a very fruitful period for international cooperation on the prevention of marine pollution. In this period also the Convention for the Prevention of Pollution by ships, known as **MARPOL 73/78**, was signed (London, 2 November 1973).

All North Sea countries are Contracting Party to all the above conventions that all deal with the prevention of pollution, be it on different aspects. Other main human influences (or uses) of the North Sea are shipping, offshore industry and fisheries.

Matters regarding shipping are dealt with within the framework of the **International Maritime Organisation** (IMO). IMO is a global framework within the United Nations, aimed at promoting cooperation between states on technical matters regarding shipping.

One of the main result of the IMO-framework in the North Sea area is the Establishment of traffic separation schemes.

Three other (more regional) fora are competent on shipping matters in the North Sea:

- the **Regional Conference of Ministers on Marine Safety**. Within this forum, the Memorandum of Understanding on Port State Control (adopted in Paris, 1982) has a major place;
- The regional **Meeting on Safety of Navigation in the North Sea** (SONNOS, first meeting in 1981, all North Sea states are participating since 1987), with as a main task the coordination with regard to routing and safety of shipping;
- The **EC** and the activities developed within that framework.

In the framework of the Common Fisheries Policy (CFP) of the EC, the member states have transferred their competence in the field of fisheries to the EC (EC 170/83, 25 January 1983, the Establishing a Community System for the Conservation and Management of Fishery Resources). This implies that non North Sea coastal states (but members of the EC) participate in the negotiations relating to the North Sea.

Norway, as non-EC-member but important fishery country, and the EC have concluded an agreement on fisheries (Brussels, 27 June 1980). Under this agreement vessels from other EC-member states are allowed to fish in Norwegian waters and Norwegian vessels are allowed to fish in the exclusive EC-fisheries zone.

In contrast to shipping and fishery, Oil and gas exploitation in the North Sea takes place within the sovereign power of the coastal state. This implies that the regulation of the exploitation of the continental shelf takes place to a very large extent within national legislation. The two most important categories of restrictions on the sovereign power of a coastal state are environmental protection and safety aspects.

Environmental aspects of the operation of offshore installations fall under the scope of the Paris Commission (mainly regarding the use drilling mud and chemicals and the discharge of contaminated cuttings and production water) and the MARPOL Convention (mainly operational discharges from machine rooms). Safety aspects of the offshore industry are discussed within the framework of the IMO and, at the regional level within SONNOS.

A special problem that has environmental and safety aspects is the removal of abandoned and discussed offshore installations. Environmental aspects are discussed within the Oslo Commission and the London Dumping Convention while safety aspects are discussed within the IMO.

From the above it becomes clear that the traditional attitude of environmental management (deal with each separate problem at a time, on the assumption that if problems on a case by case basis are well solved, the total is well managed), undoubtedly resulted for the North Sea in a situation where none of the many competent international

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organizations is exclusively competent to deal in an integral way with the management of the North Sea. There is even overlap in competence between different organizations.

An initiative in Germany to improve this situation resulted in the first International Conference on the Protection of the North Sea (INSC-I, Bremen, 1984). Although the aim of the initiative (to draw up one "umbrella" convention for the protection of the North Sea) was not reached, it was the first occasion for an active and direct involvement of the political level. Final decisions were taken by competent ministers. Since then, the North Sea Conference evolved into a forum where far-reaching decisions on the prevention of pollution are taken (for instance on a 50% reduction of the input of hazardous substances between 1985 and 1995 or on the phasing out of marine incineration by 1995 as agreed at INSC-II in London, 1987), but also decisions with regard to nature conservation (Memorandum of Understanding on Small Cetaceans, INSC-III, The Hague, 1990). A regular Fourth Conference will be held in 1995 in Denmark. In December 1993, environmental and agricultural ministers of North Sea countries will jointly meet at an Intermediate Conference, especially to discuss problems related to eutrophication of the North Sea.

A forum for cooperation on the scientific level, installed by INSC-II, is the North Sea Task Force. A main task of this cooperation is the elaboration of a "Quality Status Report of the North Sea", to be published in December 1993. This report should be the basis of further political decisions to be taken by North Sea ministers in 1993 and 1995.

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