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The trilateral Wadden Sea Plan – common management of a shared wetland

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Abstract

The Wadden Sea is a marine wetland area on the North Sea coast shared by the Netherlands, Germany and Denmark. It covers an area of about 13,500 km² and is of major international importance also for migratory birds. 10 to 12 million birds pass through this area on their migration route from the breeding grounds in Siberia, Iceland, Greenland and Northeast Canada to their wintering grounds in Europe and Africa. The vast majority of the area has been designated as nature reserves, national parks and Ramsar areas by the national authorities. In order to ensure that the area is conserved and managed as an ecological entity the three Wadden Sea countries commenced a joint cooperation twenty years ago. According to the Joint Declaration concluded between the parties in 1982 the countries declare their intention to coordinate their activities and measures to implement a number of international agreements and conventions including the Ramsar Convention for the comprehensive protection of the Wadden Sea region as a whole. In 1987 a common secretariat was established to coordinate, support and facilitate the cooperation.

In order to ensure a comprehensive joint conservation and management of the whole Wadden Sea and bridge the differences between the national legal and administrative systems in account of a.o. Art 5 of the Ramsar Convention a common Wadden Sea Plan was adopted at 1997 Wadden Sea Environmental Ministers Conference in Germany. The Trilateral Wadden Sea Plan, which is a political document rather than a legally binding instrument, is a framework for the overall Wadden Sea management. It is a statement on how the three countries envisage the future coordinated and integrated management of the Wadden Sea Area. The cornerstones of the Plan is the commonly delineated cooperation and conservation area, the shared principles and the targets. The trilateral conservation policy and management is directed towards achieving the full scale of habitat types which belong to a natural and dynamic Wadden Sea. Each of these habitats needs a certain quality (natural dynamics, absence of disturbance, absence of pollution), which can be reached by proper conservation and management. The quality of the habitats shall be maintained or improved by working towards achieving Targets which have been agreed upon for six habitat types. Targets on the quality of water and sediment are valid for all habitats. Supplementary Targets on birds and marine mammals have been adopted, as well as, Targets on landscape and cultural aspects. On the basis hereof, trilateral policy and management and trilateral projects and actions necessary for the implementation of the Targets have been developed. The case study will present the

Wadden Sea and the trilateral cooperation and review the Wadden Sea Plan as an example of transboundary cooperation on a shared wetland area.

Introduction

The Wadden Sea is a shallow marine wetland extending along the North Sea coasts of The Netherlands, Germany and Denmark. It is a highly dynamic ecosystem with tidal channels, sands, mud flats, salt marshes, beaches, dunes, river mouths and a transition zone to the North Sea - the offshore zone. Some 25 years ago, it became evident, in conjunction with an increasing awareness of the areas outstanding national and international importance, that the traditional small-scale terrestrial and species conservation was inadequate to preserve the Wadden Sea ecosystem as such. Large scale embankments, made possible by advances in technical possibilities, rapid increase in tourism in the area, harbor and industrial developments and pollution from adjacent areas endangered, or, in some cases, turned over the more or less existing balance of traditional sustainable use of the area and the sustainable development of the system.

This resulted in the protection of the Wadden Sea according to a series of national initiatives in the late 70s and during the 80s, starting with the establishment of the Wildlife and Nature Reserve in the Danish part in 1979/1982, the Wadden Sea Memorandum and Nature Reserve in the Dutch part in 1980/81, and the three National Parks in the German part from 1985 on. The Wadden Sea, from Esbjerg in Denmark in the north to Den Helder in The Netherlands in the west, is therefore now covered by an almost unbroken stretch of nature reserves and national parks. Parallel hereto talks between the three governments were initiated with the aim to achieve a comprehensive protection of the Wadden Sea as a shared ecosystem which resulted in the First Trilateral Governmental Conference on the Protection of the Wadden Sea in 1978. At the Third Governmental Conference in Copenhagen in 1982, the three governments formalized the cooperation by adopting the "Joint Declaration on the Protection of the Wadden Sea". In order to extend and strengthen the cooperation, the Common Wadden Sea Secretariat was established in 1987, following a decision at the Fourth Governmental Conference in 1985.

The systems now in place are very comprehensive schemes which basically aim at an integrated conservation, management and sustainable use of the coastal wetland system. They are systems which, in terms of aims, extensiveness and complexity, are unprecedented within the three countries. Although these systems have many goals in common and resolutions of shared problems are in many cases comparable, they are also different because of the - almost inevitable - differences in legal and administrative systems between the three countries and because of different choices. The Trilateral Wadden Sea Plan, which was recently adopted at the 8th Wadden Sea Environmental Ministers Conference in 1997, bridges the differences through the formulation of shared principles, targets, policies and management a.o. in accordance with Art. 5 of the Ramsar Convention

Prior to reviewing the Wadden Sea Plan, however, it is appropriate to give briefly an overview of the Wadden Sea, the impact of man and the current national protection and management schemes.

The Wadden Sea: importance and impacts

Importance

As indicated above, the Wadden Sea is a shallow sea extending along the North Sea coasts of The Netherlands, Germany and Denmark. It is a highly dynamic ecosystem with tidal channels, sands, mud flats, salt marshes, beaches, dunes, river mouths and a transition zone to the North Sea - the offshore zone.

The area of the trilateral cooperation of the Netherlands, Germany and Denmark, the so-called Cooperation Area is 13,500 km² large. The transition zone to the North Sea covers about 4,000 km², the islands about 1,000 km², the tidal area some 7,500 km², the salt marshes and summer polders some 350 km². The four estuaries, the Varde Å, the Elbe, the Weser and the Ems have a total surface area of 260 km². Also some areas on the mainland, which are important for birds, are part of the cooperation area and cover about 250 km².

Most parts of the Wadden Sea, in particular in the Netherlands and Lower Saxony, are sheltered by barrier islands and contain smaller or wider areas of intertidal flats. Between the Weser estuary and the island Amrum, the area is relatively broad and open to the North Sea. Because of embankments only four large sheltered bays remain in the total area; the Ho Bugt in Denmark, the Jadebusen and the Leybucht in Lower Saxony and the Dollard in the Dutch-German border area. Twenty three islands with sand dunes, as well as fourteen high sands without dunes form a barrier to the North Sea.

The present form of the Wadden Sea is the result of both natural forces and action by man. Of greatest influence on the shape and functioning are the daily tides. Twice a day, on average 15 km³ of sea water enter the Wadden Sea. This doubles the volume to some 30 km³. With the water from the North Sea, large amounts of sand and silt are imported which settle in places with little water movement. During low tides, large parts of the Wadden Sea emerge. These so-called tidal flats cover about twothirds of the tidal area and are one of its most characteristic features. Nowhere in the world can such a large unbroken stretch of tidal flats be found. They account for 60 percent of all tidal areas in Europe and North Africa.

The importance of the Wadden Sea as habitat for birds, seals, shellfish and fish species stems from the high growth rate of algae, the so-called primary production. Two factors are essential for the high primary production. Because the water is shallow, there is sufficient light for algae to grow. Secondly the water of the Wadden Sea contains many nutrients which are also essential for algal growth. In addition algae is imported from the North Sea. These account for almost half of the food resources in the Wadden Sea.

The Wadden Sea ecosystem is very dynamic with regular and unexpected changes from one extreme situation to another. Factors such as temperature with the possibility of ice, salinity, storms, waves and currents vary greatly. Only species which have adapted to these extreme conditions can exist here. That is why the Wadden Sea species, and consequently the ecosystem itself, have a large potential for survival.

The Wadden Sea provides a multitude of transitional zones to the land, the sea and freshwater environment, which is the basis for an exceptional species richness. This includes 2,000 species of spiders, insects and other invertebrates in the salt marshes and

1,800 in the marine and brackish areas. Among these organisms, there is a high degree of ecological specialization. On the tidal flats, in contrast, only a few species of flora and fauna have adapted to the extreme environment. Of these, however, exceptionally high numbers can be found. The high biological productivity of the tidal flats is comparable with that of tropical rain forests.

The Wadden Sea is vital for about 50 bird species originating from a large part of the northern hemisphere. Among these are many rare and threatened species. The area is of international importance for at least 52 geographically distinct populations of 41 species. In about 20 populations more than half of the individuals utilize the Wadden Sea at some stage of their annual life cycle. For about 10 species almost the entire populations occur in the Wadden Sea. Every year an average of 10 to 12 million birds pass through this area on their migration route from the breeding grounds in Siberia, Iceland, Greenland and northeast Canada to their wintering grounds in Europe and Africa. They feed on the tidal flats, which are the most nutritious areas of the Wadden Sea. For more than 30 species of birds, the Wadden Sea is an indispensable reproduction area.

The impact of Man

The effects of human activities can be classified into three categories, namely pollution, disturbance and habitat destruction.

Pollution

The relatively high level of contamination of the Wadden Sea is caused by three main factors:

- a number of rivers, of which the catchment areas are highly industrialized and agronomized, flow into the Wadden Sea. The catchment area adds up to some 231,000 km². It extends to the southeast as far as the Czechian-Austrian border. Among the rivers are the Elbe and the IJssel, a tributary of the Rhine. In addition a substantial part of the Rhine water enters the Wadden Sea via the North Sea through a coastal flow along the Dutch coast;
- the Wadden Sea is a system which imports more sediments than it exports. The sediments originate almost completely from the North Sea and are carriers of heavy metals and other contaminants. Due to the net North Sea current, a substantial part of North Sea sediments -and consequently polluting substances- is deposited into the Wadden Sea;
- the Wadden Sea lies at the rim of northwest Europe. An important part of its contamination is caused by rain and dust which originate from the highly industrialized northwest and central European countries.

Rivers are by far the largest carrier of polluting substances from the land to the Wadden Sea. The German rivers Elbe, Weser and Ems, together with the Dutch IJsselmeer, discharge each year on average 60 km³ of polluted water into the Wadden Sea. The rivers transport heavy metals, PCBs and pesticides like lindane and large amounts of nutrients. The amount of polluting substances is to an important degree determined by the amount of water that is discharged by the rivers. This discharge shows large yearly fluctuations as a result of differences in rain and snowfall in the catchment areas. That is why it is so difficult to determine whether or not the pollutant loads have decreased over the past years. In the Wadden Sea itself, a general reduction in the concentration of pollutants can be observed. Since 1983 almost everywhere in the sediments of the Wadden Sea concentrations of heavy metals have decreased.

The two most important nutrients are nitrate and phosphate. Of these the concentrations of phosphate in the water of the Wadden Sea have started to decrease in the second half of the 1980s, mainly as a result of the use of phosphate free detergent and water purification. No clear reductions in the amounts of nitrate discharged into the Wadden Sea could be determined. As a result of the imbalance of the reduction of nitrate and phosphate, changes in the ratio of the concentration in the water of these two substances have occurred. There are indications that this has caused an increase in occurrence of toxic algae. It is not clear whether there are other biological consequences.

Disturbance

Disturbance is understood to be any activity which, by means of mechanical, visual or acoustical action, interferes with or influences natural behavior or processes. Disturbance of animals results in a loss of energy and can lead to lower breeding success and lower survival rates. When comparing the different causes of disturbance, some types of recreation, hunting and commercial fisheries are regarded as having the most impact.

The most is known about the effects of disturbance on birds and seals. Disturbance on seals has the worst effects in the nursery period. Unfortunately this time of the year coincides with the main tourist season. Seal pups must gain sufficient weight during the nursing period in order to be able to survive the period in which they must learn to become self-sustaining. During this time, they have to rely on their fat reserves to survive. Pups are nursed on sands during low water periods. Because this period is limited in time, interruption through disturbance results in a reduced intake of milk and subsequently less fat intake. Repeated disturbance in the nursing phase lowers the chances of survival in the subsequent phase of becoming independent.

Habitat destruction

Through the construction of dikes and other coastal defense works, a considerable part of the natural habitats of the Wadden Sea was lost. In the past 50 years some 160 km² of salt marshes was embanked, 43 km² of which between 1963 and 1990. To date 346 km² of salt marshes have remained.

One of the consequences of the construction of dikes and dams along and in rivers and river mouths has been the disappearance of natural transition zones between salt and fresh water, the so-called brackish water zones. Only one natural estuary in the Wadden Sea is left, the Varde Å in the northern Danish Wadden Sea. Another result of the construction of dikes is the increase of the difference between high and low water, caused by the loss of areas that are flooded during high water periods.

A new threat to the Wadden Sea may be caused by the increased sea level and the increased frequency and intensity of storms, both of which may be the result of the greenhouse effect. These phenomena may cause an increased erosion and submersion of salt marshes and tidal flats.

Considerable damage to bottom structures and organisms is caused by the cockle and mussel fishery. One of the most manifest results has been the destruction of old natural mussel beds.

The Wadden Sea protection: the national systems

The German coastal states of Schleswig-Holstein, Lower Saxony and Hamburg have designated their parts of the Wadden Sea as national parks in 1985, 1986 and 1990 respectively. Although it is the federal states that are responsible for nature conservation in Germany contrary to Denmark and The Netherlands, where nature conservation on sea territory is the responsibility of the national government, this responsibility is implemented in the framework of the Federal Nature Conservation Act, in which provisions for nature protected areas and national parks are laid down.

The German Wadden Sea national parks cover the area broadly defined as the Wadden Sea, i.e. predominantly the tidal area, the salt marshes and adjacent land areas, islands and estuaries. The exception to this rule is the inclusion of the major part of the islands in Lower Saxony. Whilst there are some differences between the national parks, e.g. in terms of delimitation of the area and stipulations of activities and utilization, they share some common basic features of which the most important ones are:

- a. the national parks are divided into zones (two to three) in which different activities and exploitation are allowed; the areas defined as ecologically important areas are encompassed in zone 1, the core zone, extending in the different parks from 30 to 50% of the territory, where admittance is prohibited and resource use restricted; it is the long-term policy to declare the zone 1 areas as non-use zones;
- b. national park authorities have been established in the three parks which are responsible for the implementation of the provisions of the National Park Orders and Acts, in order to ensure a unified protection and management regime within the boundaries of the Wadden Sea national parks; the jurisdiction of regional and local authorities in the framework of nature conservation has been limited or ended in the national parks.

The outset of the Dutch Wadden Sea policy differs in some essential features from the German approach. The key governmental decision on the protection of the Wadden Sea, the Wadden Sea Memorandum, adopted in 1980 and amended in 1993, is a national physical planning document for the Dutch Wadden Sea as a basis for all further planning, conservation and management for the area of all state, regional and local authorities. The Memorandum states the overall objective for the Wadden Sea policy, the policies with respect to activities and utilization of the area and general arrangements with respect to coordination of policy and management.

The Memorandum is basically implemented along two lines. Firstly, as opposed to the German policy where the regional and local jurisdiction of the area has been curtailed, the Dutch Wadden Sea has been deliberately brought under the jurisdiction of the adjacent counties and municipalities with the aim to ensure an integrated physical planning of the area down to the lowest level and with public participation in the planning phase. This has resulted in the adoption of regional planning schemes and local development plans for the Wadden Sea, which are binding for individuals.

The second line of implementation is the designation of the major part of the tidal area and the salt marshes of the Dutch Wadden Sea as a State Nature Monument under the Nature Conservation Act. The Nature Monument determines that, without permission, it is prohibited to undertake activities which destroy and damage the protected area

including its flora and fauna. A management plan has recently been adopted by the state and regional authorities to ensure the implementation of policies in management and the necessary coordination between sector interests.

The Danish conservation and planning scheme for the Wadden Sea is a mixture of the German and Dutch approach. The Danish part of the Wadden Sea was designated as a Wildlife and Nature Reserve in 1979/1982 and amended in 1992, encompassing a zoning system comparable in certain aspects with the German system. In addition, the Wadden Sea, major parts of the Wadden Sea islands and the adjacent marsh land have been designated as Ramsar Site and a Special Protection Area according to the EC Bird Directive, which appoints the area with a priority position for regional and sectoral planning and which furthermore has special implications according to national legislation and administrative regulations.

The large majority of the Wadden Sea has been designated as a Ramsar Area. In The Netherlands and German section of the Wadden Sea the Ramsar Areas equal the Wadden Sea nature reserves and national parks. Only the Schleswig-Holstein Ramsar Area also includes nature reserves on the islands and the adjacent mainland outside the national park. The Danish Wadden Sea Ramsar Site includes as mentioned an area which is substantially larger than the Wadden Sea nature reserve.

The trilateral Wadden Sea cooperation

The national Wadden Sea protection systems have indeed many objectives in common, above all, their fundamental objective of aiming at the protection and sustainable development of the Wadden Sea as a wetland area of national and international importance. However, it appears also from the description above that there are significant differences with regard to the delimitation of the national protection schemes and the Ramsar Areas. A review of the regulations would also bring further differences to the surface.

As indicated above, relatively early, it was politically recognized that the three countries should coordinate their efforts on the protection of the Wadden Sea to ensure a comprehensive, consistent and coordinated management of the Wadden Sea as a shared system.

Already in 1974, a draft Convention on the Conservation of the Wadden Sea Region was prepared by the International Union for Conservation of Nature and Natural Resources (IUCN) and submitted to the governments of the three Wadden Sea states. The proposed convention was a framework for the protection of the Wadden Sea as a whole, establishing an arrangement for intergovernmental cooperation. It was, however, not accepted by the concerned states in essence, it can be assumed, at the time, because of the lack of legal protection measures on the national level in conjunction with the binding character of the proposed convention according to international law. Judged by modern standards of environmental protection, the convention was by no means a "shocking" proposal, but it introduced some new elements in conservation like the landward buffer-zone concept and the introduction of a joint commission for the management of the area.

In the years which followed, the governments were reluctant to embark on agreements which entailed elements of international legally binding arrangements. As stated above, the breakthrough in the cooperation came with the adoption of the Joint Declaration in 1982, notably also after the first steps towards a national protection had been taken. And the Ramsar Convention played an essential role in seeking an arrangement would bridge the formal differences and express the political commitment to cooperate on the protection of the Wadden Sea. The three countries had ratified a.o. the Ramsar Convention and were hence legally committed to implement its provisions. If in accordance with Art. 5 the Wadden Sea countries would consult on a coordinated implementation of the Ramsar Convention with respect to the Wadden Sea that would contribute to a comprehensive protection it was conceived at that time.

According to the Joint Declaration, the governments declared their intention to consult each other in order to coordinate their activities and measures to implement a number of international legal instruments with regard to the comprehensive protection of the Wadden Sea region as a whole. The international legal instruments mentioned are the Ramsar Convention on Wetlands, the Bonn Convention on the conservation of migratory species, the Bern Convention on the conservation of European wildlife and natural habitats, and the relevant EC Directives in particular the EC- Bird Directive.

The Joint Declaration resolved a dilemma. It is in essence a declaration of intent, stating a political commitment to work towards a common goal, but it includes a number of legally binding international instruments. It was the intention of the parties that counted rather than the legal character of the instrument. Even if a treaty or another international legal instrument had been politically acceptable - which it was not for the reasons already indicated - it can be contested whether this would have solved the problem better than the Joint Declaration at that time.

The Joint Declaration served as a catalyst in the period after 1982, and in conjunction with the establishment of a common secretariat in 1987, the trilateral Wadden Sea cooperation was intensified and extended. The Trilateral Wadden Sea Plan which was recently adopted at the 8th Wadden Sea Environmental Ministers Conference in 1997 entails a comprehensive common policy and management of the Wadden Sea.

The trilateral Wadden Sea Plan

Key elements

The Wadden Sea Plan entails policies, measures, projects and actions which have been agreed upon by the three countries. The Plan is a framework for the overall Wadden Sea management and will be revised at regular intervals. It is a statement on how the three countries envisage the future coordinated and integrated management of the Wadden Sea Area and the projects and actions that must be carried out to achieve the Targets.

The Plan is a political agreement and will be implemented by the three countries in cooperation, and individually, by the competent authorities on the basis of existing legislation and through the participation of interest groups. The implementation of the Plan shall not interfere with legislation regarding, in particular, marine navigation, management of marine navigation routes, harbor management, disaster control, sea rescue services and other aspects of internal and external security.

The Wadden Sea Plan entails a number of cardinal decisions with regard to the delimitation of the common management area, the shared principles, the targets for policy and management and the policies, management, projects and action to implement the targets.

Delimitation

The geographical range of the Wadden Sea Plan is the Trilateral Wadden Sea Cooperation Area, in short, Wadden Sea Area, which is

- the area seaward of the main dike, or where the main dike is absent, the spring-high-tide-water line, and in the rivers, the brackish-water limit;
- an offshore zone 3 nautical miles from the baseline;
- the corresponding inland areas to the designated Ramsar and/or EC Bird Directive areas;
- the islands.

The trilateral conservation area, in short the Conservation Area, is situated within the Wadden Sea Area, and consists of:

- in The Netherlands, the areas under the Wadden Sea Memorandum including the Dollard;
- in Germany, the Wadden Sea national parks and protected areas under the existing Nature Conservation Act seaward of the main dike and the brackish water limit including the Dollard;
- in Denmark, the Wildlife and Nature Reserve Wadden Sea.

It is recognized that within the Wadden Sea Area, there are areas in which human use has the priority.

The delimitation of the Wadden Sea Area attempts to bridge the formal differences in delimitation. The Wadden Sea Area is a common management area and not a protection area which allows for the implementation of trilateral agreements, measures and actions by the application of a wide range of national instruments.

Shared principles

The Guiding Principle of the trilateral Wadden Sea policy is “to achieve, as far as possible, a natural and sustainable ecosystem in which natural processes proceed in an undisturbed way”. The Principle is directed towards the protection of the tidal area, salt marshes, beaches and dunes.

In addition, seven Management Principles have been adopted which are fundamental to decisions concerning the protection and management within the Wadden Sea Area:

- the Principle of Careful Decision Making, i.e. to take decisions on the basis of the best available information;
- the Principle of Avoidance, i.e. activities which are potentially damaging to the Wadden Sea should be avoided;
- the Precautionary Principle, i.e. to take action to avoid activities which are assumed to have significant damaging impact on the environment, even where there is no sufficient scientific evidence to prove a causal link between activities and their impact;

- the Principle of Translocation, i.e. to translocate activities which are harmful to the Wadden Sea environment to areas where they will cause less environmental impact;
- the Principle of Compensation, i.e. that the harmful effect of activities which cannot be avoided, must be balanced by compensatory measures; in those parts of the Wadden Sea, where the Principle has not yet been implemented, compensatory measures will be aimed for;
- the Principle of Restoration, i.e. that, where possible, parts of the Wadden Sea should be restored if it can be demonstrated by reference studies that the actual situation is not optimal, and that the original state is likely to be re-established;
- the Principles of Best Available Techniques and Best Environmental Practice, as defined by the Paris Commission.

Unreasonable impairments of the interests of the local population and its traditional uses in the Wadden Sea Area have to be avoided. Any user interests have to be weighed on a fair and equitable basis in the light of the purpose of protection in general, and the particular case concerned.

Targets

The trilateral conservation policy and management is directed towards achieving the full scale of habitat types which belong to a natural and dynamic Wadden Sea. Each of these habitats needs a certain quality (natural dynamics, absence of disturbance, absence of pollution), which can be reached by proper conservation and management. The quality of the habitats shall be maintained or improved by working towards achieving Targets which have been agreed upon for six habitat types. Targets on the quality of water and sediment are valid for all habitats. Supplementary Targets on birds and marine mammals have been adopted, as well as, Targets on landscape and cultural aspects.

TARGETS ON HABITAT AND SPECIES

SALT MARSHES

The habitat type salt marsh includes all mainland and island salt marshes, including the pioneer zone. Also the brackish marshes in the estuaries are considered part of this habitat type.

The following targets apply to salt marshes:

- an increased area of natural salt marsh;
- an increased natural morphology and dynamics, including natural drainage patterns, of artificial salt marshes, under the condition that the present surface area is not reduced;
- an improved natural vegetation structure, including the pioneer zone, of artificial salt marshes.

TIDAL AREAS

The tidal area covers all tidal flats and subtidal areas. The border to the North Sea side is determined by an artificial line between the tips of the islands. The borders to the estuaries are determined by the average 10 ‰ isohaline at high water in the winter situation.

The following targets are valid:

- a natural dynamic situation in the tidal area;
- an increased area of geomorphologically and biologically undisturbed tidal flats and subtidal areas;
- an increased area, and a more natural distribution and development of natural mussel beds, *Sabellaria* reefs and *Zostera* fields;

- viable stocks and a natural reproduction capacity, including juvenile survival, of the common seal and grey seal;
 - favorable conditions for migrating and breeding birds:
- = a favorable food availability;
- = a natural breeding success;
- = sufficiently large undisturbed roosting and moulting areas;
- = natural flight distances.

ESTUARIES

Estuaries include the estuaries of the rivers with a natural water exchange with the Wadden Sea. On the landward side, estuaries are delimited by the mean-brackish-water line. On the seaward side, the border is the average 10‰ isohaline at high water in the winter situation.

Estuaries will be protected and the river banks will remain, and as far as possible, be restored in their natural state.

BEACHES AND DUNES

Beaches and dunes include beaches, primary dunes, beach plains, primary dune valleys, secondary dunes and heathland behind the dunes.

The following targets apply:

- increased natural dynamics of beaches, primary dunes, beach planes and primary dune valleys in connection with the offshore zone;
- an increased presence of a complete natural vegetation succession;
- favorable conditions for migrating and breeding birds.

OFF-SHORE ZONE

The offshore zone ranges from the 3-sea-mile line to an artificial line connecting the outer tips of the islands. The border between the offshore zone and the beaches on the islands is determined by the average low-tide water mark.

The following targets apply to the offshore zone:

- an increased natural morphology, including the outer deltas between the islands;
- a favorable food availability for birds;
- viable stocks and a natural reproduction capacity of the common seal, grey seal and harbor porpoise.

RURAL AREA

The rural area includes meadows and arable land on the islands and on the mainland where there is a strong ecological relationship with the Wadden Sea.

The following target applies:

- favorable conditions for flora and fauna, especially migrating and breeding birds.

TARGETS ON THE QUALITY OF WATER AND SEDIMENT

NUTRIENTS

- a Wadden Sea which can be regarded as a eutrophication non-problem area.

NATURAL MICROPOLLUTANTS

- background concentrations in water, sediment and indicator species.

MAN-MADE SUBSTANCES

- concentrations as resulting from zero discharges.

Policy and management

The key element of the Wadden Sea Plan is the common policy and management. For each Target category trilateral policy and management and proposals for trilateral projects and actions necessary for the implementation of the Targets have been developed. The extent of the arrangements and the national implementation is demonstrated with mussel fishery as an example.

Mussel fishery — managing sustainable use on a common basis

Besides the shrimp fishery the most important fishery activity in the Wadden Sea is the shellfish fishery for blue mussels (*Mytilus edulis*) and cockles (*Cerastoderma edule*). The blue mussel fishery is an exceptional good example of the difficulties in managing a resource in a sustainable way. Mussel fishery in the Dutch and the German section of the Wadden Sea entails mussel cultivation on culture lots. Mussel seed is fished on wild banks and dispersed on designated culture lots where they grow to a marketable size. In the Danish section mussels remain to be fished on natural mussel beds. By removing seed mussels to maintain culture lots and marketable mussels from natural mussels beds, the structure and the functioning of the natural system of the Wadden Sea is being interfered with.

Blue mussel populations are through natural circumstances permanent subject to strong fluctuations in size and they are therefore periodically decimated considerably by natural mortality. It is therefore difficult to isolate and determine the impact of mussel fishery on the population. Blue mussel beds play an important role in the ecology of the Wadden Sea both in sediment dynamics, nutrient dynamics, biodiversity and as food source for birds. The continued decline in mussel beds in recent years is therefore of grave concern. The decline is besides natural events like storms and ice winters caused by mussel fishery.

In order to maintain a natural system and a sustainable mussel fishery it was agreed at the 1991 Ministers conference „to limit the negative ecological impact of mussel fishery on the Wadden Sea environment and to this end to close considerable parts of the Wadden Sea, including intertidal and subtidal areas“. This cardinal agreement was supplemented with further agreements in the Wadden Sea Plan entailing in particular limitation of the mussel fishery in principle to subtidal areas, no enlargement of the current area of mussel culture, protection and enhancement of the growth of wild mussel beds and seagrass fields. The limitation of the mussel fisheries to the subtidal area in principle is of major importance since the intertidal mussel beds are particular vulnerable to fishery and natural developments and hence also regenerates with difficulty.

The agreements have been or are in the process of being implemented in national regulations and management. In the Danish section of the Wadden Sea roughly 50% of the tidal area is closed for wild mussel fishing and in addition the number of licenses/vessels have been limited to 5 and a yearly quota is set for each of the vessels. In Germany mussel fishery became more and more restricted. Cockle fishery has been prohibited in the three national parks. In the German Schleswig-Holstein section an agreement has recently been concluded with the blue mussel fishery branch which restricts seed mussel fishery to the subtidal area and furthermore prohibits it in the core zones of the national park. Also the area of culture lots will decrease significantly in the coming 10 year period. Finally the licensees with a total of 8 vessels pay an annual fee to enable an appropriate management of the mussel stock. In the German Lower Saxony section only four vessels are running but actually seed mussel fishery is still allowed in the sensible tidal zone.

In the Netherlands section of the Wadden Sea which traditionally has the most extensive mussel fishery — 85 firms are involved in the mussel farming — the balance between the maintenance of a natural system and a sustainable fishery has been a particular critical one. This explains the complexity of the current management. Only about 26% of the tidal area has been closed for mussel fishery. In years with less availability than 60% of birds food demand the whole shellfish fishery will be closed. Finally the fishery sector has developed an own management plan for the areas where fishery is allowed. The aim of this co-management scheme is to further reduce the negative effects of the impact of fishery thorough e.g. limiting the fishery to subtidal areas and to use the resource more effectively. Recently the responsible Dutch minister has indicated that this policy will be continued and where necessary extended in order to enhance the growth of mussel beds and seagrass.

Monitoring and assessment

At the 1997 Ministers Conference, a Trilateral Monitoring and Assessment Program (TMAP) was adopted. The TMAP entails a common package of parameters which enables a monitoring of the Targets and assessment of the progress in their implementation through regular assessments (cf. Annex). The TMAP also entails a common management of the data which will ensure that they are available for the assessment on a common basis. An important element of the TMAP is the joint monitoring of migratory and breeding birds which has already been in place before the adoption of the TMAP. The migratory and breeding birds monitoring programs have made it possible to produce reliable population estimates and trends for most species.

Outlook

The Dutch-German-Danish Wadden Sea co-operation has indisputably contributed to a comprehensive protection and management of the Wadden Sea as a shared wetland system in the sense of Art. 5 of the Ramsar Convention. The political nature of the cooperation, i.e. the non-legal nature of the arrangements is a main reason of its success. The triennial ministers conferences have been indispensable for the cooperation because the large majority of the issues are of a political nature and therefore need to be resolved on the political level by the responsible ministers. There is, however, a precondition that needs to be fulfilled in this case, which is that the appropriate legal instruments and administrative arrangements need to be available to fulfill and implement the decisions. Several reviews over the years have demonstrated that there is no lack of legal instruments and possibilities both nationally and internationally so that the coordinated implementation should be in focus. Therefore the experiences of the trilateral Wadden Sea cooperation do not have a universal character.

Another important element has been the mutually supportive character of the arrangements. The trilateral, national and regional activities have run parallel and have, over most of the years, been perceived as constructive and encouraging to the overall objective.

Furthermore, the Ramsar Convention has played an essential role in promoting a comprehensive protection of the Wadden Sea, in particular, in the initial period of the co-operation. The Ramsar Convention is a “broad” international legal instrument which

leaves room for an implementation appropriate to the regional circumstances and therefore both commits countries to implement its provision and creates the necessary freedom of action. In the case of the Wadden Sea, the European Union instruments, in particular the Birds and Habitat Directives, have played and will play an increasing role in coming periods in protecting the Wadden Sea as a shared system because of their direct legal application on the national level.

Finally the importance of the formulation of common delimitations, principles and targets should be emphasized. Many of the problems cannot be solved by imposing one solution because of e.g. the differences in legal systems, management and traditions. And mostly there are several solutions to the same problem and with almost the same outcome. Therefore, it is particularly important to address the issue on a more fundamental level by formulating some common principles and targets. It is also important to define the geographical scope but at the same time realize that an area is also related to its surroundings. This is, in particular, relevant for Ramsar sites which, by their nature, are potentially affected by activities and developments in the surrounding area and which also need to be addressed to promote conservation and wise use. In particular in the framework of international cooperation, the endorsement of such common principles and targets is indispensable provided that they are politically accepted, and those affected, both governmental and non-governmental organizations, have been involved in their formulation and adoption.

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ANNEX

Common Package TMAP

Contaminants	1	TBT in water and sediment
	2	Metals in sediment
Nutrients	3	Inorganic nutrients in water
Salt Marshes	4	Spatial extension
	5	Agricultural utilization: grazing
Benthos	6	Macroalgae
	7	Eelgrass
	8	Macrozoobenthos communities
	9	Blue Mussel beds
	10	Contaminants in Blue Mussel
Plankton	11	Phytoplankton
Fish	12	Contaminants in flounder
	13	Mussel/Cockle/Shrimp fishery
Beaches and Dunes	14	Spatial extension
Birds	15	Breeding birds: numbers and distribution
	16	Breeding birds: contaminants in bird eggs
	17	Migratory birds: numbers of waterbirds in counting units
	18	Beached Bird Survey
Seals	19	Population parameters by aerial survey
Recreational Activities	20	Boats at sea
	21	No. of guided tours
	22	Air traffic
General Parameters	23	Coastal protection measures
	24	Geomorphology
	25	Flooding
	26	Land use
	27	Weather conditions
	28	Hydrology