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Wadden Sea Quality Status Report

Introduction

Common Wadden Sea Secretariat (CWSS)

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1. Overview

Since 1999, the Trilateral Wadden Sea Cooperation (TWSC) between Denmark, Germany and the Netherlands has periodically produced Wadden Sea Quality Status Reports (QSR) describing and evaluating the current ecological status of the Wadden Sea. The QSRs identify changes in this status and their possible causes, classify issues of concern and indicate possible measures of amelioration, including evaluation of the likely effectiveness of these measures. They also indicate gaps in our knowledge. The QSRs are based upon the Trilateral Monitoring and Assessment Programme (TMAP). The programme and the reports were key elements in achieving the inscription of major parts of the cooperation area on the list of UNESCO World Heritage Sites.

The Trilateral Monitoring and Assessment Programme is the common monitoring programme for the Wadden Sea carried out by Denmark, Germany and the Netherlands since 1997 in the context of the Trilateral Wadden Sea Cooperation (TWSC). The programme aims to facilitate adequate, cost-effective monitoring and integrated science-based assessments of the Wadden Sea ecosystem, while considering the Member States' monitoring and reporting requirements under the relevant EC Directives and international conventions. TMAP provides an important and scientifically sound evidence base for decision making and policy development at all levels, delivers essential contextual information to support the management of the Wadden Sea as a single ecological entity, supports the reports on directives and the World Heritage status, and enables integrated assessment to be undertaken, which is an essential prerequisite for the application of the ecosystem approach. The programme further provides information on the progress of trilaterally set targets of the Wadden Sea Plan and facilitates the discussion on future priorities.

After a pilot phase which started in 1994, a Common Package of monitoring parameters including the associated data management was implemented beginning in 1997 (Stade Declaration, 1997). Joint monitoring programmes for breeding and migratory birds and seals had already been trilaterally implemented since 1989 and 1992, respectively, and are also part of TMAP. In 2008, TMAP was further elaborated (TMAP Revision) in order to meet the requirements of the relevant EC Directives to the extent possible (Schiermonnikoog Declaration, 2005; see www.waddensea-secretariat.org). In 2014 a long-term TMAP-strategy was adopted, as the basis for the further development of TMAP. The strategy was developed in close connection with the scientific community with the aim of further increasing the programme's value in implementing EU Directives, and providing information for a wider range of stakeholders. One key element in achieving this is the further development of the information system to enable better access to the data.

The 2017 Quality Status Report was written by over 100 scientists and edited by the QSR Editorial Board in cooperation with CWSS. Like its predecessors it comprises reports covering the parameters as defined on basis of the TMAP Common Package (see Table 1). The present introduction offers an overview of the TWSC as well as basic data and background information on the Wadden Sea and the instruments and mechanisms for its protection at the national, European and international levels.

Table 1. List of reports of the 2017 QSR by sections.

Geomorphology and climate	Habitats and communities	Species	Human activities	Pollution
Geomorphology	Macrozoobenthos	Marine mammals	Landscape and culture	Eutrophication
Climate change	Beds of blue mussels and Pacific oysters	Fish	Coastal risk management	Marine litter
Climate ecosystems	Seagrass	Alien Species	Harbours and shipping	Oil pollution and seabirds
	Subtidal habitats	Breeding birds	Fisheries	Contaminants in bird eggs
	Salt marshes	Migratory birds	Tourism	Heavy metal and xenobiotics*
	Beaches and dunes	East Atlantic Flyway	Military activities	
	Estuaries		Energy	
			Extraction and dredging	

* This chapter is still under review and will be published as soon as possible.

2. The Wadden Sea

The Wadden Sea, stretching for over 500 km along the North Sea coast of Denmark, Germany and the Netherlands, has evolved over the last 8,000 years and is therefore a very young ecosystem in geomorphological and evolutionary terms.

It represents an outstanding example of development of a temperate-climate sandy barrier coast under conditions of rising sea level in the Holocene. The Wadden Sea is unique in that it consists entirely of a sandy-muddy tidal system with only minor river influences on morphodynamics. The Wadden Sea ecosystem is characterized by tidal flats and a barrier island system with extensive salt marshes. It is the only tidal flat and barrier island depositional system of this scale and diversity in the world. For that reason major parts of the Wadden Sea Conservation Area have inscribed on the UNESCO World Heritage List.

Wadden Sea habitats and species

The Wadden Sea ecosystem is characterized by enormously productive marine biota and linkages far beyond its narrow geographical boundaries.

The tidal flats in the Wadden Sea account for 60 % of all tidal areas in Europe and North Africa. Consequently, many textbooks refer to the Wadden Sea when describing inter-tidal habitats and the rich and diverse flora and fauna they sustain. The tidal flats and the salt marshes form the largest coherent habitat of this type in Europe and constitute an essential element to the Wadden Sea ecosystem, which is a biologically highly productive ecosystem of great natural, scientific, economic and social importance.

The Wadden Sea is extremely rich in environmental gradients and transitional zones, offering many different (micro) habitats that form the basis for ecological specialization under extreme conditions. The salt marshes host about 2,300 species of flora and fauna. The marine and brackish areas support a further 2,700 species. In total it is estimated that the Wadden Sea Area provides habitats for up to 10,000 species of unicellular organisms, plants, fungi and animals.

The size of the Wadden Sea allows the diverse species to survive by spreading over several habitats, or by adopting a series of niches over the course of time. This constantly opens up territory for use by other individuals or species, and accounts for a high capacity to accommodate migratory species.

The rich and diverse habitats are important for many species of migratory birds. According to the 1 % criterion of the Ramsar-Convention, which is an internationally recognized measure to identify wetlands of international importance, the Wadden Sea is of outstanding international importance as a staging, moulting and wintering area for at least 52 populations of 41 migratory waterbird species that use the East Atlantic Flyway and originate from breeding populations as far away as northern Siberia or north-eastern Canada. For 44 populations of 34 species the Wadden Sea is indispensable and often the main stepping stone during migration, respectively their primary wintering or moulting habitat. Therefore, the Wadden Sea is essential for the existence of these bird species. A severe deterioration of the Wadden Sea would imply a biodiversity loss on a worldwide scale.

Human activities

The Wadden Sea Region is also an area where people live, work and recreate. About 3.7 million people live along the Wadden Sea coast. Some 75,000 live inside the Wadden Sea Area. The Trilateral Wadden Sea Plan (2010) acknowledges this by stating that sustainable human use will continue and have to be continuously balanced in a harmonious relationship between the needs of society and ecological integrity. This was again underscored in the Declaration of the Ministerial Council Meeting, held in Tønder, Denmark, 5 February 2014.The involvement of relevant stakeholders in the conservation of the Outstanding Universal Value (OUV) of the Wadden Sea World Heritage is therefore an important aim of the Trilateral Wadden Sea Cooperation (TWSC). This is reflected in a wide variety of initiatives and projects carried out in the context of the TWSC.

3. Trilateral Cooperation

The Trilateral Wadden Sea Cooperation (TWSC) between Denmark, Germany and the Netherlands was established in 1978 at the 1st Trilateral Governmental Conference (TGC) on the Protection of the Wadden Sea held in The Hague, Netherlands. The Guiding Principle of the TWSC is to "*achieve, as far as possible, a natural and sustainable ecosystem in which natural processes proceed in an undisturbed way*". The Cooperation aims at:

- Protecting and conserving the Wadden Sea as an ecological entity through common policies and management;
- Monitoring and assessing the quality of the Wadden Sea ecosystem in collaboration with national and regional authorities and scientific institutions as a basis for effective protection and management;
- Cooperating internationally with other marine sites on protection, conservation and management;
- Engaging the public in the protection of the Wadden Sea through awareness-raising activities and environmental education;
- Securing the sustainable development of the Wadden Sea with respect to its natural and cultural values.

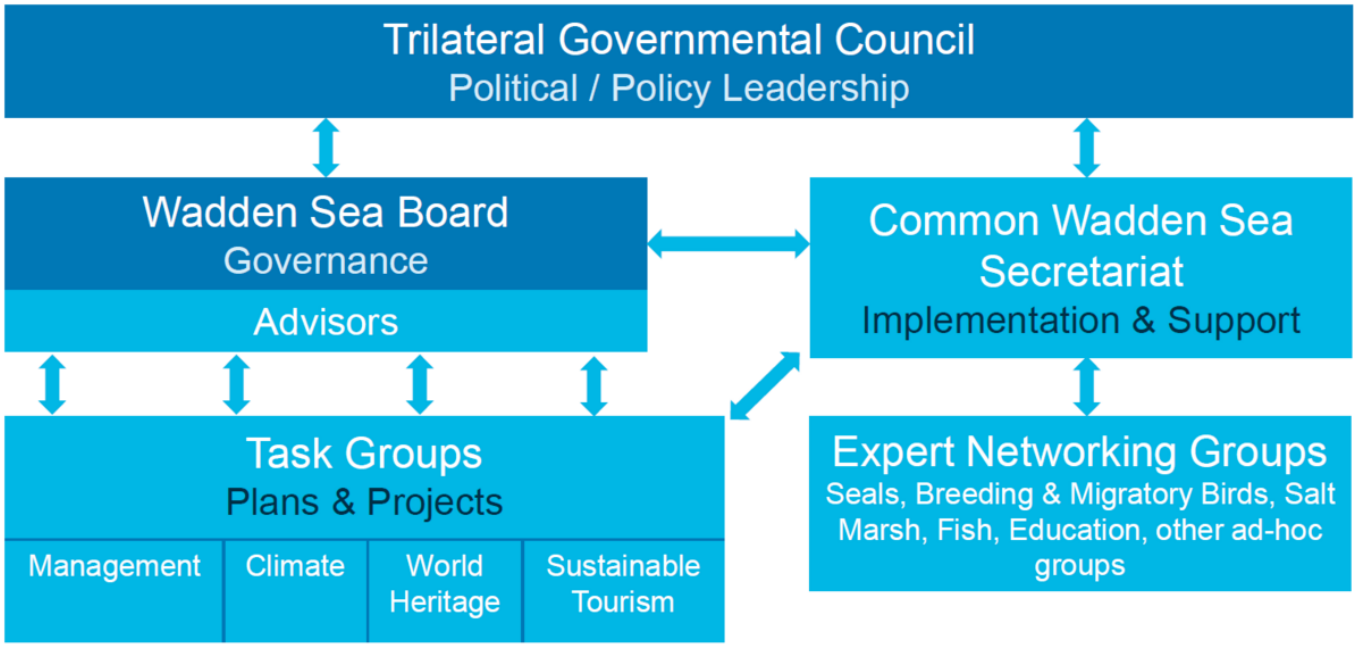


Figure 1. Organizational structure of the Trilateral Wadden Sea Cooperation (Image: CWSS).

Joint Declaration

The formal basis of the Cooperation is the "Joint Declaration on the Protection of the Wadden Sea" (JD) signed at the 3rd Wadden Sea Conference in Copenhagen in 1982. In 2010, the Joint Declaration was reaffirmed and updated, following a comprehensive external evaluation of the Cooperation with regard to both its content and structure. It is noteworthy that the TWSC is based solely on political agreement between the three Wadden Sea states and not underpinned by any instrument of international law. Since the signing of the original Declaration in 1982, many environmental, political, economic, and social changes have taken place and the work of the Cooperation has developed. Consequently, the original JD had become progressively outdated as a fundamental document to underpin the Cooperation. Today, the activities of the Cooperation have progressed well beyond the rather limited scope defined in 1982. The 2010 JD takes account of these developments. The JD furthermore contains the overall policy and management principles of the Cooperation (see sub-chapter "Wadden Sea Plan").

Organizational structure

The main bodies of the TWSC are the Trilateral Governmental Council (TGC), The Wadden Sea Board and the Common Wadden Sea Secretariat (CWSS).The Trilateral Governmental Council meets every three to four years to chart the course of the TWSC for the coming years. Its results are documented in the related Ministerial Declarations. The meeting of the 13th Trilateral Governmental Council is scheduled for May 2018 in Leeuwarden, Netherlands. An overview of all TGCs and their main outcome is contained in the box below.

Trilateral Governmental Wadden sea Conferences and main themes/results

1978 - 1st Wadden Sea Conference, The Hague, NL; Decision to strengthen the cooperation
1980 - 2nd Wadden Sea Conference, Bonn, DE; Coordination of scientific research
1982 - 3rd Wadden Sea Conference, Copenhagen, DK; Adoption of the joint declaration
1985 - 4th Wadden Sea Conference, The Hague, NL; Decision to establish a common secretariat
1988 - 5th Wadden Sea Conference, Bonn, DE; Agreement on the protection of seals
1991 - 6th Wadden Sea Conference, Esbjerg, DK; Guiding principle, common management principles and objectives
1994 - 7th Wadden Sea Conference, Leeuwarden, NL; Common delimitation, common targets
1997 - 8th Wadden Sea Conference, Stade, DE; Wadden Sea Plan
2001 - 9th Wadden Sea Conference, Esbjerg, DK; Wadden Sea forum
2005 - 10th Wadden Sea Conference, Schiermonnikoog, NL; Harmonization EC directives
2010 - 11th Wadden Sea Conference, Sylt, DE; Adoption updated Wadden Sea plan; climate change, alien species
2014 - 12th Wadden Sea Conference, Tønder, DK; Strengthening of cooperation on World Heritage matters

Between meetings of the TGC the TWSC is governed by the Wadden Sea Board. The Board prepares and implements the Trilateral Declarations, oversees the operational and advisory bodies, and secures relations with key stakeholders. It is chaired by an independent chairperson appointed by the Council. The chair rotates between the countries along with the Presidency. Each country appoints four members of the WSB. In addition the WSB also comprises four non-governmental advisors with expertise and experience relevant to the Cooperation.

The Common Wadden Sea Secretariat (CWSS) is the coordinating body of the Cooperation. The Secretariat was established in 1987 pursuant to a decision of the 4th Wadden Sea Conference (The Hague, Netherlands, 1985). Located in Wilhelmshaven, Germany, CWSS coordinates the trilateral research, monitoring and protection measures of the Wadden Sea states, it raises public awareness, provides support and advice to the parties and prepares and services the meetings of the bodies of the TWSC. The tasks and the financing of the Secretariat and its staff are laid down in an Administrative Agreement between the three countries, which was concluded in 1987 and updated in 2010.

The bodies of the TWSC are supported and advised by three types of operational and advisory bodies, namely advisors (regional and nongovernmental stakeholders), task groups and expert groups.

Wadden Sea Area and Conservation Area

The Wadden Sea Area is, in general terms, 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) up to 3 nautical miles from the baseline or the offshore boundaries of the Conservation Area. Additionally, some adjacent inland marsh areas of Denmark and Schleswig-Holstein are part of the Wadden Sea Area. After the extensions of the Danish

Wadden Sea Wildlife and Nature Reserve in 1998, the Schleswig-Holstein Wadden Sea National Park in 1999, and the Hamburg Wadden Sea National Park and Lower Saxony Wadden Sea National Park in 2001, the delimitation of the Trilateral Cooperation Area and the Conservation Area was adapted in 2001 (Esbjerg Declaration, 2001) because parts of the national parks of Schleswig-Holstein and Lower Saxony exceeded the three nautical mile line.

The Conservation Area consists of the Dutch Key Planning Decision area, the three German National Parks and the Danish Wildlife and Nature Reserve.

The Wadden Sea Area covers approximately 14,700 km²; the Conservation Area about 11,200 km² (Figure 2).

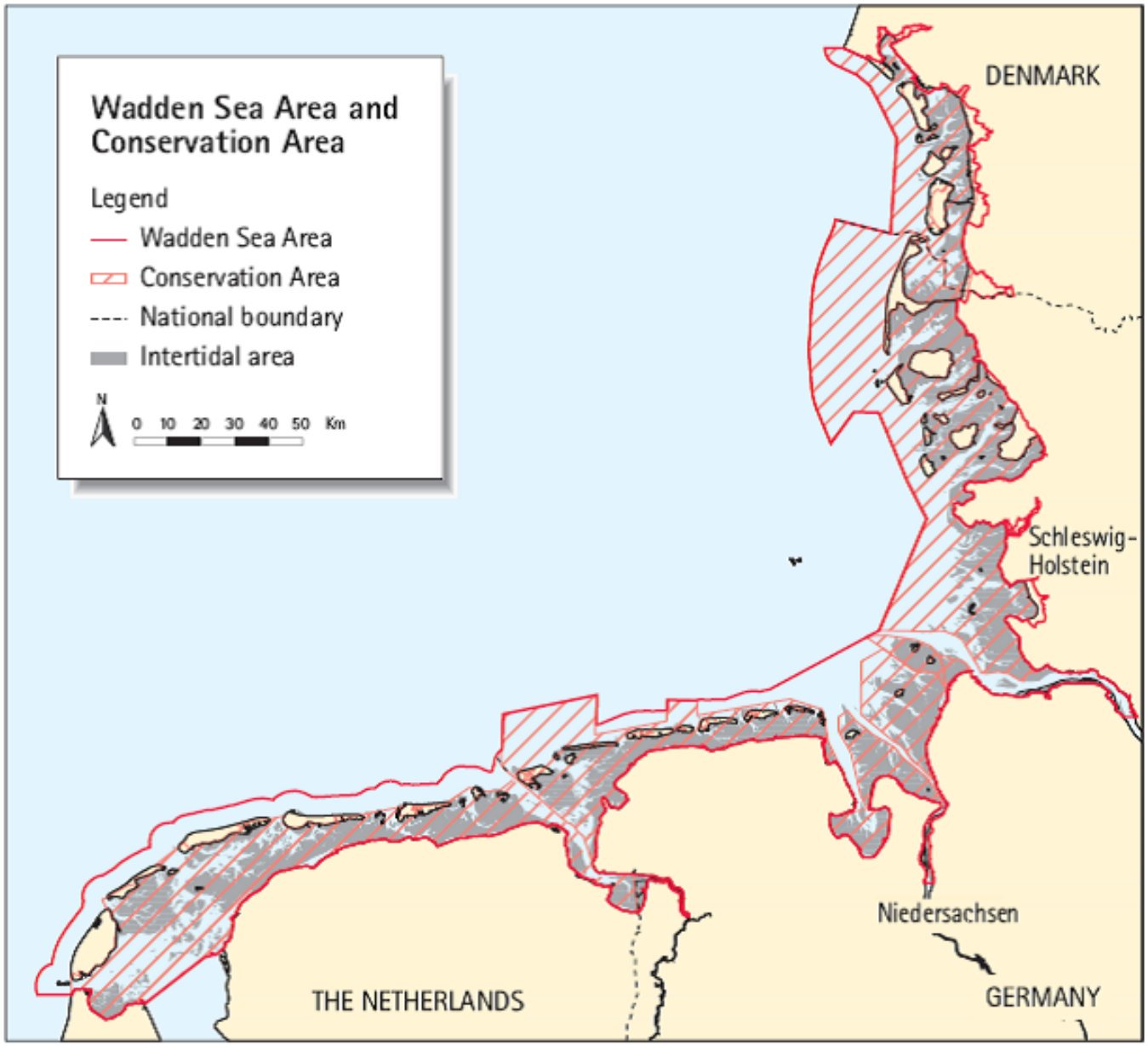


Figure 2. Map of the Wadden Sea Area and Conservation Area (Image: CWSS).

Wadden Sea Plan

The trilateral Wadden Sea Plan (WSP) was adopted at the 8th Wadden Sea Conference in Stade, Germany in 1997 and revised in 2010. The WSP constitutes the common transboundary policy and management plan for

the Wadden Sea Area and the World Heritage site. It is important to acknowledge that the WSP is a policy and management plan adopted by governments for a trans-boundary area and therefore has a wider scope than a traditional management plan for a site in so far as it also encompasses the vision, principles, policies and measures and constitutes a framework for the integrated protection and management of the Wadden Sea. The Plan is a reflection of how the three countries involved envisage the coordination and integration of management of the Wadden Sea Area and of the projects and action needed to achieve the commonly agreed targets.

The WSP presents an approach to the protection and management of the Wadden Sea in a trans-boundary context. In essence, it is based on the ecosystem approach and aimed at achieving and maintaining the geomorphological and biological processes and the full scale of habitat types which belong to a natural and dynamic Wadden Sea in order to preserve biological diversity, the site's OUV and integrity. It includes a vision, shared principles, targets and policies and management measures combined with actions. The vision contained in the WSP comprises the following elements:

- A healthy environment, which maintains the diversity of habitats and species, its ecological integrity and resilience, taking account of the global responsibility connected to the World Heritage status;
- Sustainable use;
- Maintenance and enhancement of ecological, economic, historical-cultural, social values and coastal protection, providing aspirations and enjoyment for the inhabitants and visitors of the region;
- Integrated management of human activities which takes into account the socio-economic and ecological relationship between the Wadden Sea Area and the adjacent areas;
- An informed, involved and committed community .

UNESCO World Heritage status

In 2009, the Dutch Wadden Sea and the Schleswig-Holstein Wadden Sea as well as parts of the Lower Saxon Wadden Sea were inscribed on the World Heritage list of the United Nations Educational, Scientific and Cultural Organization (UNESCO). The inscription of the Hamburg part of the Wadden Sea followed in 2011. The Danish Wadden Sea was inscribed in 2014, together with an additional part of the Lower Saxon part of the Wadden Sea.

To be included on the World Heritage list, sites must be of Outstanding Universal Value (OUV) and meet at least one of 10 selection criteria, of which four are relevant to natural heritage sites. The inscription of the Wadden Sea as World Heritage Site is based on the following criteria:

- Criterion viii: "outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features"
- Criterion ix: "outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals"
- Criterion x: "contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation."

The integrity and sufficient protection and management of the site must also be ensured.

In connection with the inscription, the World Heritage Committee also expressed a number of requests that the Wadden Sea states should comply with. Trilateral activities to implement the above requests by the UNESCO World Heritage Committee are comprehensively documented in the "Report on the State of Conservation of the World Heritage property 'The Wadden Sea (N1314)'".

The "Wadden Sea World Heritage Site" encompasses the Danish, German and Dutch parts of the Wadden Sea

(Figure 3). It covers an area of 11,456 km² along a coastal strip of approximately 500 km. The Wadden Sea has had the status of a protected area for more than 20 years: by a Nature and Wildlife Reserve in Denmark, by National Parks in Germany and by Nature Reserves in the Netherlands. The designation as a World Heritage site has no immediate influence on the protection status of the area nor does it cause any new regulations.



Figure 3. Map of the Wadden Sea World Heritage Site (Image: CWSS).

4. Legal protection

International law

The Wadden Sea states are contracting parties to a number of international agreements, conventions and treaties, such as the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS, Bonn Convention) also covering the Agreement on the Conservation of Seals in the Wadden Sea (WSSA, see below), the Agreement on the Conservation of African-Eurasian Waterbirds (AEWA) and the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS), the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention).

The only instrument of international law specifically addressing the Wadden Sea is the Agreement on the Conservation of Seals in the Wadden Sea, which entered into force in October 1991, as the first Agreement under in Article IV of the Convention on the Conservation of Migratory Species of Wild Animals (CMS, Bonn Convention). The Seals Agreement was concluded with the aim of cooperating closely in achieving and maintaining a favourable conservation status for the common seal population of the Wadden Sea. A Seal Management Plan contains a comprehensive statement of actions which are be undertaken by the Parties to achieve the goals of this Agreement. While the WSSA itself does not refer to Grey seals, this species is now covered by the Seal Management Plan. CWSS acts as the Secretariat for the WSSA.

The German and Dutch parts of the Wadden Sea have been designated as Man and Biosphere (MAB) Reserves under the United Nations Educational, Scientific and Cultural Organization (UNESCO). Whereas the MAB-Reserve in the Dutch, Lower Saxony and Hamburg part is nearly identical with the conservation area, the MAB Reserve in Schleswig-Holstein also includes five Halligen as development zone adjacent to the nominated property.

As of December 2015, the Danish-Dutch-German Wadden Sea is included in the List of Transboundary Ramsar Sites, under the name “Wadden Sea”. The 13 national Ramsar sites that already existed across the Wadden Sea are all considered to be part of this overarching site. The recognition of one single Transboundary Ramsar Site underlines the integrated nature of the Wadden Sea as one single natural area.

In 2002, the Wadden Sea was designated as a Particularly Sensitive Sea Area (PSSA) by the International Maritime Organization (IMO). The area designated as a PSSA is the marine area of the Wadden Sea. The PSSA covers approximately 13,000 km^2; the major shipping routes were excluded from the designation. The PSSA does not limit either shipping in the area or the use of the Wadden Sea harbours.

European law

European Union (EU) legislation in the field of the environment is of special significance for the Wadden Sea and has increased in importance during the past decades. EU legislation is binding on all EU member states and has direct implications for Member States’ legislation. Of the many pieces of European environmental legislation, the Birds Directive (Council Directive 79/409/EEC adopted in 1979 and amended in 2009 to become the Directive 2009/147/EC), the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, adopted in 1992) and the Water Framework Directive are most relevant for the protection and sustainable use of the Wadden Sea World Heritage property. The Marine Strategy Framework Directive is currently being implemented and will also be important for Wadden Sea policy. The Tønder Declaration adopted by the Trilateral Governmental Conference in 2014 acknowledges the importance of EU legislation for the Wadden Sea and reaffirms the commitment of the Wadden Sea status to their effective implementation.

Other relevant European Union legislation includes the Environmental Impact Assessment Directive and the Strategic Environmental Assessment Directive, which are of central importance for the assessment of the environmental impacts of policies, plans and concrete projects, as well as the Regulation No 1143/2014 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species. Also, the recommendation of the European Parliament and the Council on Integrated Coastal Zone Management is of particular importance for the Wadden Sea, which is a site located at the interface between land and sea and to be managed according to this specific characteristic.

National Law

Denmark

The Danish Wadden Sea is managed according to, among others, The Statutory Order for the Danish Nature and Wildlife Reserve (No. 867, June 21st 2007), covering the Danish part of the Conservation Area. The statutory order implements The Wadden Sea Ministerial Declarations and the Wadden Sea Plans, the latest being the 2010 plan (for historical details see 1999 QSR).

In 2008, the Danish parliament formally agreed to establish the Danish Wadden Sea National Park which is basically similarly delimited as the Danish Wadden Sea Area and hence incorporates the islands, adjacent marsh areas and the Varde Å estuary. Following the parliamentary decision, a statutory order entered into force (No. 1159, September 30th 2010) two weeks before the national park was inaugurated at October 16th 2010. The national park covering an area of 1.459 km^2 of which only about 300 km^2 is dry land, can thus be characterized as a predominantly marine national park.

Germany

In Germany the coastal federal states are responsible for the implementation of the Federal Nature Conservation Act (BNatschG). The Federal Nature Conservation Act is a federal framework act for nature conservation which includes provisions for the establishment of nature reserves and national parks. According to Article 24 of the valid Federal Nature Conservation Act, national parks are large areas of national importance of which the greater part is almost undisturbed and qualifies to be designated as a nature conservation area. The objective is to safeguard, in the greater part of the area concerned, undisturbed ecosystem interactions and their natural dynamic processes to the extent possible.

Schleswig-Holstein, Lower Saxony and Hamburg established national parks in the Wadden Sea in 1985, 1986 and 1990, respectively. The objectives of the national parks are to protect the Wadden Sea and to allow natural processes to take place with a minimum degree of disturbance and other detrimental effects of human activities. The national parks have been divided into two or three zones of which Zone I includes the ecologically most valuable areas. Therefore, strict regulations apply to Zone I, including extensive restrictions to public admittance. In Zone II, utilization and activities are allowed under such conditions that the overall protection objectives are not impaired. Each national park is managed by an administrative authority, the national park authority, which is responsible for the implementation of the provisions of the national park instruments.

A number of federal waterways are situated in the German Wadden Sea Area. Navigation is regulated by ordinance of the Federal Minister of Transport and Digital Infrastructure. The ordinance was first issued in 1992 and amended in 1995 and 1997. It establishes i.a. speed limits for navigation in the National Parks and closed areas comprising of seal haul out sites, and breeding and moulting areas for birds with regard to

specific activities. A revision of the ordinance is currently under consultation.

Netherlands

The protection of the Dutch part of the Wadden Sea combines a unique national physical planning approach (the Key Planning Decision Wadden Sea; PKB) with a designation of the nominated property under the Nature Conservation Act, 1998 supported by additional designations.

Since 1980 the Netherlands Wadden Sea has been protected according to a 'Key-planning-decision document Wadden Sea' (PKB-Wadden Sea). The PKB, of which the 3rd version is currently in force, is a national physical planning decree defining the overall objectives of conservation, management and use of the Wadden Sea. The PKB is a specific integrated physical planning instrument of the Spatial Planning Act and its objectives and conditions are binding for all state, regional and local authorities. The PKB is subject to amendments on a regular basis.

Through the Nature Conservation Act (1998) nature areas designated as Special Areas of Conservation (SACs) according to the Habitat Directive, and as Special Protection Areas (SPAs) under the Birds Directive are protected under the aforementioned Act as nature reserves. This designation based on the Nature Conservation Act (1998) has been continued in the Nature Protection Act as from January 1st 2017. The conservation objectives for these Natura 2000 areas are stipulated in a ministerial decree together with the delimitation of the area.

The Dutch part of the nominated property is also designated part of the Ecological Main Structure (EMS), which is the coherent national ecological network of nature areas. The aim of the EMS is to prevent plants and animals from extinction in isolated areas and the devaluation of nature areas. For each of the areas of the EMS a specific 'nature goal' is defined. This is a testable objective for a nature area. At the national borders the EMS connects with other areas of the Pan European Ecological Network (PEEN).

Parts of the islands of Schiermonnikoog and Texel, also within the nominated property, are designated national parks in accordance with national legislation.

Areas that have a special conservation status based on the Nature Conservation Act 1998 or the Ramsar Convention are designated as Environmental Protection Areas in accordance with the Environmental Management Act. This means that the Environmental Decree issued by the provincial government includes at least regulations concerning the protection of the quality of groundwater and the prevention and restriction of disturbance by noise.

5. Reference Area

The term 'reference area' is commonly used for sites representing certain conditions for purposes of monitoring or research. In the framework of the Trilateral Cooperation, they were first mentioned in the context of initiating the Trilateral Monitoring and Assessment Program (TMAP) in the Esbjerg Declaration adopted by the 6th Trilateral Governmental Conference (TGC) held in Esbjerg, Denmark, in 1991. There, it was agreed to designate "sufficiently large areas, spread evenly over the Wadden Sea, where all exploitation and all disturbing activities are banned and which can serve as reference areas for scientific purposes" (Esbjerg

Declaration, 1991, § 33.3). At the 9th TGC, again held in Esbjerg in 2001, the ministers recalled 'the decision taken at the 6th Wadden Sea Conference to designate reference areas, and in this respect, to welcome the designation of a reference area without resource exploitation in the Schleswig-Holstein Wadden Sea 1999 in addition to the Danish zero use reference area designated in 1982, and the Hamburg zero-use area designated in 1990, and the anticipated designation of a reference area in the Dutch Wadden Sea' (Esbjerg Declaration, 2001; §11).

Table 2. Overview of zero-use-areas in the Wadden Sea and their status in the light of the 1991 and 2001 Esbjerg Declarations. For Lower Saxony, the zero-use areas are not listed because they have not official designated as reference area.

	Langli (Denmark)	Hörnum Tief (Germany – Schleswig-Holstein)	Hamburgisches Wattenmeer (Germany–Hamburg)	Rottumeroog / Rottumerplaat (Netherlands)
Size and area	800 ha Entire tidal basin	12 500 ha Approx. 50% of the tidal basin	10 400 ha	7 400 ha Part of tidal basin
Typology	Tidal flats and island habitats	Back-barrier tidal flats	Open Wadden Sea area	Back-barrier tidal flats
Sub-ecosystems included	Tidal basin with silt, mixed, sandy flats, creeks and deep; island with dunes and salt marsh and mainland salt marsh	Inner tidal basin with silt, mixed, sandy tidal flats and tidal creek systems, island and mainland salt marshes and primary dunes	Estuary flats with silt, mixed, sandy tidal flats and tidal creek systems; island salt marshes and primary, white and grey dunes	Small uninhabited islands, primary dunes, salt marsh, tidal basin with sandy flats.
Legal basis	Wildlife Reserve Act 1998 (Art. 7)	National Parks Act (Art. 4)	National Parks Act (enacted 1990, amended 2001): Art. 2 to 5	Rule of Law of the Fisheries Act 2005
Year of designation	1982	1999	1990	Planned in 2005
Reasons for designation	Safeguard the dynamics of flora and fauna, natural processes and structural diversity	Safeguarding development free of human intervention, as well as natural structural diversity and the dynamics of processes	Safeguarding the dynamics of natural processes and structural diversity	Safeguarding the natural dynamic development of habitats and species diversity
Resource uses	None	None	None	None
Zero-use area	Conform ED 1991	Conform ED 1991	Conform ED 1991	Conform ED 1991
Public access, shipping, fishing	Closed to the public from September to July	Shipping only along navigational routes, entry near coastlines	Shipping and shrimp fishing only along navigational routes; in some cases, entry close to islands (e.g. Kleiner Vogelsand) or navigation on two marked routes	Shipping: Already closed for shellfish fisheries and shrimp fisheries
Monitoring program and parameters	TMAP Birds, blue mussel bed	TMAP Fish fauna, measuring pole, theme-based mapping	TMAP Macrofauna, seals, seabirds	TMAP blue mussels, fish birds, seals
Reference area and purpose	Yes Undisturbed development of a tidal basin, which represents a typical 'small scale' Wadden Sea ecosystem	Yes Purpose under discussion	Yes Undisturbed development of high tidal flats and semi-natural dune islands including their biological communities	Yes Undisturbed development of a tidal basin, which represents a typical 'small scale' Wadden Sea ecosystem
Representative for	Tidal flats, island habitats	Back-barrier tidal flats	Mesohaline estuary flats and partly tidal creeks, salt marshes	Back-barrier tidal flats

Definition

Reference areas are designed by definition to serve monitoring and research. Thus, their inventory is thought to be representative for larger units.
According to the 1991 Ministerial Declaration, areas serving as reference areas for scientific purposes must:

- Have a sufficiently large size;
- Be spread evenly over the Wadden Sea;
- Be free of exploitation and disturbances ("zero-use zone").

A precondition for the measurement and assessment of the effects of anthropogenic influence on natural ecosystem structures and processes is the comparison of areas with and without human resource utilization.

The former QSRs concluded that the above mentioned features are only represented by entire tidal basins, stretching from the salt marshes to the ebb delta opening out into the adjacent North Sea. Reise (1992, 1994) proposed a concept for such 'core areas' or 'ecological priority areas' distributed over the Wadden Sea.

Current Status

Denmark

In 1982, a reference area was designated around the island of Langli which is free of exploitation and disturbances and fulfills the definition of a reference area. It covers the tidal flat (about 800 ha, about 1 % of the Danish Wadden Sea) between Langli and the Skallingen peninsula. In addition, the island of Langli (80 ha) and a zone 300 m north, east and south of the island are closed to the public for most of the year (16 September - 15 July). The area represents typical tidal and island habitats covering one tidal basin.

Since 1983, regular monitoring of breeding and migratory birds has been carried out on Langli and is included in the TMAP (breeding birds since 1991, spring tide counts of migratory birds since 1994). The field station was run 1983-2002, manned by 1-2 persons over the whole year. Since 2002, monitoring has been carried out during regular visits. In addition, biological and geological research studies have been carried out on Langli by universities and other institutes. The intertidal part of the reference area is also a site of the blue mussel monitoring programme.

Germany

Within the core zone of the National Park of Schleswig-Holstein, an area of 12,500 ha within the ‘Hörnum Tief’ south of the Hindenburg dam has been designated as a zone in which all resource use including fishery has been fully prohibited in 1999.

It is only allowed to navigate in the zero-use zone on the marked shipping lanes. The area covers about 3 % of the National Park area. Any activity which could cause destruction, damage or change to the protected area or any part thereof or that could lead to lasting disturbance is prohibited.

In the ‘Hörnum Tief’ area, regular surveys a.o. of seals, fish, roosting and breeding birds, blue mussel beds, salt marshes, eelgrass and marcoalgae are carried out as part of the TMAP.

Within the National Park of Hamburg, an area of about 10,400 ha has been protected as a ‘zero-use zone’ mainly since 1990. In this area, all resource use has been fully prohibited. Navigation is only allowed in the zero-use zone on the marked shipping lanes. Fishery is prohibited with the exception of shrimp fishery in these shipping lanes (100 m width). The area covers about 76 % of the National Park area. An integrated monitoring program has been established in the Hamburg National Park according to the reporting requirements for the TMAP, the EU Habitats and Birds Directives. It consists of monitoring breeding and migratory birds, common seals, macrozoobenthos, salt marsh and dune vegetation (Umweltbehörde Hamburg, 2001).

In Lower Saxony, large areas within the National Park e.g. the islands Memmert and Mellum, and tidal flats, the ‘Hohe Knechtsand’ are without any resource use and disturbances by recreational activities. However, these zero-use areas have not officially been designated as reference areas for scientific purpose.

Netherlands

Based on the trilateral agreement laid down in the PKB document and the Policy Decision on Shellfish Fisheries (2004) in the eastern part of the Dutch Wadden Sea, a reference area is designated. This area is about 7,400 ha, which is about 3 % of the Dutch Wadden Sea, and it includes all the important ecological features. It has been closed for shellfish fisheries since 1993. In the reference area, exploitation of biotic and abiotic resources and other disturbing activities is not allowed. The area serves comparative monitoring and research in the Wadden Sea.

Previous Quality Status Reports (PDFs)

- 2009 Quality Status Report
- 2004 Quality Status Report

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References

AEWA (2015) *Agreement on the Conservation of African-Eurasian Waterbirds*, as amended at the 6th Session of the Meeting of the Parties to AEWA, Bonn, Germany, November 2015. http://www.unep-aewa.org/sites/default/files/basic_page_documents/aewa_agreement_text_2016_2018_FINAL_correction%20made%20on%20p%2054_wcover.pdf

ASCOBANS (2003) Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas, amended in 2003. http://www.ascobans.org/en/documents/agreement-text

BNatSchG (2017) *Gesetz über Naturschutz und Landschaftspflege*, 29 July 2009, last amended in 2017. http://www.gesetze-im-internet.de/bnatschg_2009/index.html

Bonn Convention (1979) *Convention on the Conservation of Migratory Species of Wild Animals CMS*, Bonn, Germany, June 1979. http://www.cms.int/sites/default/files/instrument/CMS-text.en_.PDF

CWSS (2016) *Report on the State of Conservation of the World Heritage property "The Wadden Sea (N1314)"*. Wilhelmshaven, Germany. https://www.waddensea-worldheritage.org/report-state-conservation-world…

CWSS (2010) *Wadden Sea Plan 2010*. 11th Trilateral Governmental Conference on the Protection of the Wadden Sea. Common Wadden Sea Secretariat, Wilhelmshaven, Germany.

EC (1992) *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora*. Official Journal of the European Communities, L 206 , 22/07/1992 P. 0007 – 0050.

EC (2001) *Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment*. Official Journal of the European Communities, L 197, 21.7.2001, p. 30–37.

EC (2009) *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds*. Official Journal of the European Communities, L 20, 26.1.2010, p. 7–25.

EC (2014) *Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance*. Official Journal of the European Communities, L 124, 25.4.2014, p. 1–18.

EC (2014) *Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species*. Official Journal of the European Communities, L 317, 4.11.2014, p. 35–55.

Esbjerg Declaration (1991) *Ministerial Declaration of the 6th Trilateral Governmental Conference on the Protection of the Wadden Sea, Esbjerg, November 1991*. Common Wadden Sea Secretariat, Wihelmshaven, Germany.

Esbjerg Declaration (2001) *Ministerial Declaration of the 9th Trilateral Governmental Conference on the Protection of the Wadden Sea, Esbjerg, October 2001*. Common Wadden Sea Secretariat, Wihelmshaven, Germany. https://www.waddensea-worldheritage.org/2001-esbjerg-declaration

IMO (2005) *Resolution A.982(24). Revised guidelines for the identification and designation of Particularly Sensitive Sea Areas (PSSAs)*. International Maritime Organization, December 2005. https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOReso...

Nationalparkgesetz Hamburg (2017) *Gesetz über den Nationalpark Hamburgisches Wattenmeer, 9 April 1990*, last amended 2017. http://www.landesrecht-hamburg.de/jportal/portal/page/bshaprod.psml?showdoccase=1&st=lr&doc.id=jlr-WattMGHArahmen

NPG (2007) *Gesetz zum Schutz des schleswig-holsteinischen Wattenmeeres*, 17 September 1999, last amended in 2007. https://www.nationalpark-wattenmeer.de/mediathek/nationalparkgesetz-sch...

NWattNPG (2010) *Gesetz über den Nationalpark „Niedersächsisches Wattenmeer*, 11 July 2001, last amended 2010. https://voris.wolterskluwer-online.de/browse/document/3c7aa9a6-0b0b-358...

OSPAR (1992) *Convention for the Protection of the Marine Environment of the North-East Atlantic*. Ministerial Meeting of the Oslo and Paris Commissions in Paris, 1992 2354 UNTS 67, 32 ILM 1069 (1993)

Ramsar Convention (1987) *Convention on Wetlands of International Importance Especially as Waterfowl Habitat*, Ramsar, Iran, February 1971, amended 1982 & 1987. https://www.ramsar.org/sites/default/files/documents/library/current_convention_text_e.pdf

Reise K. (1992) *The Wadden Sea as a pristine nature reserve*. Neth. Inst. Publ. Ser No. 20: 49-53.

Reise K. (1994) *The Wadden Sea: Museum or cradle for nature?* Wadden Sea Newsletter 1994-1:5-8.

Stade Declaration (1997) *Ministerial Declaration of the 10th Trilateral Governmental Conference on the Protection of the Wadden Sea, Stade, October 1997*. Common Wadden Sea Secretariat, Wihelmshaven, Germany. https://www.waddensea-worldheritage.org/1997-stade-declaration

The Hague Declaration (1985) *Ministerial Declaration of the 1st Trilateral Governmental Conference on the Protection of the Wadden Sea, The Hague, 1985*. Common Wadden Sea Secretariat, Wihelmshaven, Germany.

Tønder Declaration (2014) *Ministerial Declaration of the 12th Trilateral Governmental Conference on the*

Protection of the Wadden Sea, Tønder, February 2014. Common Wadden Sea Secretariat, Wihelmshaven, Germany. https://www.waddensea-worldheritage.org/2014-tonder-declaration

UN (1992) *Convention on Biological Diversity (CBD)*. 1760 UNTS 79,31 ILM 818, p. 30.

UNESCO (1972) *Convention concerning the protection of the world cultural and natural heritage*. Paris, France, November 1972. http://whc.unesco.org/archive/convention-en.pdf