Europe / North America

The Wadden Sea

Germany / The Netherlands

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE WADDEN SEA (GERMANY/THE NETHERLANDS) ID No 1314

Background note: In 1988 Germany nominated the Wadden Sea as a national nomination focussed mainly on the mudflats of Lower Saxony. The Committee at its 13th Session (Paris, 1989), recommended that the nomination of this property be deferred until a fully revised nomination of the Wadden Sea was submitted jointly by Denmark, Germany and the Netherlands.

1. DOCUMENTATION

i) Date nomination received by IUCN: 15 March 2008.

ii) Additional information officially requested from and provided by the State Party: Additional information regarding the nomination was requested following the IUCN field visit. The State Parties of Germany and The Netherlands submitted in November 2008 additional information on the nomination including further work on its global comparative study. Further additional information was requested from the State Parties following the IUCN World Heritage Panel, and was provided to the World Heritage Centre and IUCN in February 2009.

iii) IUCN/WCMC Data Sheet: Sourced from nomination document which cites 28 references.

iv) Additional Literature Consulted: Dijkema, K.S. (Ed.) (1984) **Salt marshes in Europe**. Council of Europe. Nature and Environment Series 30, Strasbourg, pp. 178; Thorsell, J., Ferster Levy, R. and Sigaty, T. (1997) **A global overview of wetland and marine protected areas on the World Heritage List**. IUCN, Gland, Switzerland, 23 pp; Buttler, R.W., Davidson, C.N. and Guy-Morrison, R.I. (2001) **Global-scale Shorebird Distribution in Relation to Productivity of Near-shore Ocean Waters**. In Waterbirds Vol. 24, No. 2, pp 224-232; Beukema, J.J. (2002) **Expected changes in the benthic fauna of Wadden Sea tidal flats as a result of sea level rise or bottom subsidence**. Journal of Sea No. 47: 25-39; De Jong, F. (2003) **Wadden Sea Targets: lessons from the first six years**. In Wolff WJ, Essink K, Kellermann A, Van Leeuw MA (Eds.), pp. 207-220; **Challenges to the Wadden Sea Area**. Proceedings of the 10th International Scientific Wadden Sea Symposium. Ministry of Agriculture Nature Management and Fisheries, Department of Marine Biology, University of Groningen, Netherlands; Blew, J., Günther K., Laursen, K., van Roomen, M., Südbeck, P., Eskildsen, K., Potel, P. and Rösner, H.U. (eds.), (2005) **Overview of Numbers and Trends of Migratory Waterbirds in the Wadden Sea 1980-2000**. Wadden Sea Ecosystem No. 20, Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Joint Monitoring Group of Migratory Birds in the Wadden Sea, Wilhelmshaven, Germany, 51pp; De Vlas, J. and Marquenie, J. (2004) **The impact of subsidence and sea level rise in the Wadden Sea: Prediction and field verification**. Ameland's Commission on Environmental Monitoring, Assen, The Netherlands, 68 pp; Elphick, J. (edit) (2007) **The Atlas of Bird Migration**. The Natural History Museum, London, UK, 176pp. A wide range of additional references.

v) Consultations: 10 external reviews. The mission met with national representatives from both Germany and the Netherlands, representatives of: the Common Wadden Sea Secretariat, the Wadden Sea Forum and the Wadden Society, local politicians and officials; representatives of fisheries associations, key NGOs working in the area, site managers, experts and scientists working in a number of Research Centres and Scientific Institutions, and representatives of oil/gas companies.

vi) Field Visit: Pedro Rosabal, 1-11 September 2008.

vii) Date of IUCN approval of this report: 15 April 2009.

2. SUMMARY OF NATURAL VALUES

The Wadden Sea is nominated as a serial transnational property encompassing the Dutch Wadden Sea Conservation Area and the German Wadden Sea National Parks of Niedersachsen and Schleswig-Holstein. The nominated property does not include the Danish part of the Wadden Sea, as its designation as a national park has not yet been concluded. Taking account of the extensive preparations already undertaken, the increased public support for the nomination in both countries and the uncertainty of whether and when further consultations on the World Heritage nomination will be re-initiated in the Danish Wadden Sea region, Germany and the Netherlands decided to proceed with a Dutch-German nomination. This decision was made at the 10th Governmental Danish-German-Dutch Wadden Sea Conference (The Netherlands, November 2005). Denmark remains a partner within the trilateral Wadden Sea cooperation agreement and is a signatory to the Wadden Sea Management Plan.

The nominated property is delimited by a boundary set at 3 nautical miles offshore, with the exception of areas off the East Friesian islands and off the islands of Sylt and Amrum, where the boundaries are up to 12 nautical miles offshore. The nominated property comprises four components which together encompass over 66% of the whole Wadden Sea. The nominated property excludes urban areas, areas under oil and gas exploitation and major seaports, harbours and associated infrastructure. Table 1 below summarises the different components of the nominated serial property.

The Wadden Sea is an extremely large temperate coastal wetland system containing an extensive and coherent system of tidal flats and barriers. The system is a depositional coastline which displays large scale coastal processes, and is notable for having very limited inputs from riverine sources. The nominated property has low overall relief: with its deepest and highest parts all lying within 50 m below and 50m above sea level.

The habitats and ecosystems within the nominated property are the product of intricate interactions between physical and biological factors. There is a multitude of transitional habitats with tidal channels, sandy shoals, sea-grass meadows, mussel beds, sandbars, mudflats, salt marshes, estuaries, beaches and dunes. A key feature of the hydrology of the nominated property is a continuous long-shore current from southwest to northeast. This is supplied with Atlantic water passing southward along the east coast of the United Kingdom and eastward through the English Channel. The combined effect of coastal currents and tides facilitates enrichment and distribution of nutrients which is essential for maintaining the biodiversity of the area. The density and diversity of the tidal flat fauna in the Wadden Sea are very high. The average biomass present in the tidal flats is 10-20 times higher than in the offshore area. The benthic biomass production on tidal flats results from two sources: microbial and microalgal production on the sediment surface and phytoplankton import with the tides from offshore waters.

The terrestrial vegetation within the nominated property is predominantly related to salt marshes with the highest biodiversity found in sandy salt marshes and in the transition zone to dunes. Dune grasslands and scrub also occur. The marine vegetation is characterized by seagrasses that occur in mixed stands on the tidal flats.

Coastal wetlands are often not among the richest sites in relation to faunal diversity. However, this is not the case in the Wadden Sea, which has a high habitat diversity generated by the dynamic transitions between the land and the sea and a rich spectrum of resources that support biodiversity. In addition, the Wadden Sea is in a key location relative to migration routes.

The nominated property protects critical habitat for about 2,700 marine species in the intertidal and subtidal zones and at least 5,000 semi-terrestrial and terrestrial species, mostly the flora and fauna of salt marshes and dunes on the islands. There are 2,300 species of flora and at least 4,200 species of fauna.

Table 1: Component parts of the nominated property

Country	Name of component part	Size (ha)
The Netherlands	(1) PKB (Key Planning Area) I (IUCN Category IV Protected Area)	247,386
The Netherlands	(2) PKB Area II (IUCN Category IV Protected Area)	790
Germany	(3) National Park Niedersachsen (IUCN Category II)	283,519
Germany	(4) National Park Schleswig-Holstein (IUCN Category II)	436,698
TOTAL		**968,393**

Marine mammals present in the Wadden Sea include the harbour seal, grey seal, and harbour porpoise. After centuries of hunting, protection measures have resulted in recovery of the seal populations. The Wadden Sea now sustains approximately 20% of the North-east Atlantic subspecies of harbour seals: atotal of 15,426 were counted in an annual survey in 2006, compared to about 4,000 thirty years earlier.

The most renowned indicator of the values of the nominated property is its international importance as a breeding, staging, moulting and wintering area for birds. The availability of food and a low level of disturbance are essential factors that contribute to this ecological function. For 43 bird species the Wadden Sea supports more than 1% of the entire flyway population, which is the criterion used by the Ramsar Convention for identifying wetlands of international importance. Of these species, 4 visit for the breeding season, 24 are breeding as well as migratory species and 15 use the Wadden Sea only during their seasonal migrations. 29 species of migratory birds occur with more than 10% of their flyway population in the Wadden Sea. Regular censuses are carried out on breeding bird species that are considered characteristic for the Wadden Sea. The 2001 survey recorded a maximum of 469,000 breeding pairs or territories. Nearly 70% of the breeding bird population is represented by gulls, with Black-headed Gull, Lesser Black-backed Gull and Herring Gull being the most abundant species. Another 18% of the total breeding bird population are coastal waders, notably Oystercatcher.

For five species, at least 25% of north-western (NW) European populations breed in the Wadden Sea. For 21 out of 31 species, the population accounts for more than 1% of the NW-European population, the majority of which rely on the nominated property. Results from the different surveys suggest that over 6 million birds may be present in the Wadden Sea at the same time each year, and an average of 10-12 million birds pass through the property annually.

3. COMPARISONS WITH OTHER AREAS

The nomination dossier provides a detailed comparative analysis which was further enhanced by additional information provided by the State Parties of Germany and the Netherlands in November 2008 and February 2009.

In relation to its values for geomorphology, the nominated property is compared with 180 tidal flats areas worldwide. Whilst tidal flats can be found in all climate zones, the largest are found in the tropics. Rivers are major features strongly influencing their development via freshwater run-off and sediments in most cases. Examples are the tidal flats associated with rivers such as the Red River Delta, Huanghe, Yangtze Delta, Chao Phraya Delta, Mekong Delta, Gujarat, Nile Delta, Frobisher Bay and to a lesser extent the mangrove systems of Western Africa, Indochina, Myanmar coast, East Africa and New Guinea.

The Wadden Sea has developed in the temperate zone and it represents a tidal barrier island system that only has minor river influences fringing the flat and low-lying coastal plain. The nearest comparators are the temperate barrier and back-barrier environments of the Georgia Bight in USA. The Georgia Bight extends for a distance of 1200 km between Cape Hatteras in North Carolina to Cape Canaveral in Florida. Both the Wadden Sea and the Georgia Bight are mesotidal barrier coasts (areas with tidal range of 2-4 meters) and both have a coastal development affected by Holocene sea level rise. However Georgia Bight is not only smaller (800,000 ha) when compared to the Wadden Sea nominated property (968,393 ha) but, in particular, lacks extensive open tidal flats (300 km^2 vs. 4700 km^2 for the Wadden Sea), being instead characterized by extensive cord grass meadows with narrow intertidal flats along the margins of the tidal channels. Expert reviews received, from the International Union of Geological Sciences (IUGS) and the International Association of Geomorphologists (IAG), noted that the Wadden Sea is one of the most important and highly dynamic depositional marine and coastal geomorphological system on Earth.

In relation to its ecosystem values, the analysis compares the nominated property with 31 existing properties with significant marine components, 24 existing properties representing coastal island sites with no, or limited, marine components as well as with 180 tidal flats areas worldwide. Most of these areas are located in a different biogeographical region than that of the nominated property. Amongst existing World Heritage properties, The Sundarbans (Bangladesh and India), Everglades (USA) and Doñana (Spain) contain intertidal flats, but their extent is very limited when compared with the Wadden Sea. The closest comparator is Doñana National Park (Spain), however Doñana is located along the borders of the North-east Atlantic Ocean Region, whereas the Wadden Sea is located in the North Sea Region. Taken as a whole the two most appropriate sites for comparison are Banc d'Arguin (Mauritania) and Georgia Bight (USA). Comparisons are set out in table 2 on the following page and emphasise the extensive mudflat areas and the levels of biomass production as superlative aspects of the Wadden Sea. IUCN in its global overview of wetland and marine protected areas with potential for World Heritage listing (1997) considered the Wadden Sea as a key global area for maintaining biological processes; this opinion is confirmed by expert reviews received during the evaluation of this nominated property.

Table 2: Comparison of The Wadden Sea with Banc d'Arguin (Mauritania) and Georgia Bight (USA) (Ecosystem values)

Key Features	The Wadden Sea	Banc d' Arguin	Georgia Bight
Total Area (ha)	968,393	1,200,000	800,000
Area of Mudflats (ha)	450,000 (46%)	63,000 (5%)	30,000 (4%)
Climate Zone	Temperate	Dry subtropical with continental influence	Temperate
Key physiographic conditions	Complex tide-dominated barrier coast (not deltaic).	Relic of former deltas, back barrier islands with open mudflats.	Tide-dominated barrier coast (not deltaic).
Productivity (Primary production in gC/m²/y)	Phytoplankton: 200-300 Microphytes: 150 Seagrass: 500 Macrophytes: 500 – 1,000	Phytoplankton: 2.1-8.9	Phytoplankton: 200 Microphytes: 60 Seagrass: 150 - 500 Macrophytes: 800
Habitats and biotopes	Complex mosaic of bare intertidal flats fringed by saltmarshes, tidal channels, seagrass meadows and mussel beds.	Sand dunes, coastal swamps, small islands, intertidal areas with 80% seagrass cover.	Tidal channels with narrow band of bare intertidal flats. Most intertidal areas completed covered by saltmarshes.

Table 3: Comparison of the Wadden Sea nominated property with inscribed World Heritge properties with high biodiversity and/or waterfowl and migratory bird populations.

Name of Property	Size (ha)	Key Biodiversity Values	Biophysical Setting
The Wadden Sea (Germany and The Netherlands)	*968,393*	*900 species vascular plants; 176 birds (over 6.1 Million migratory birds at the same time; 10-12M each year)*	*Extensive and contiguous sand flats and mud flats*
Everglades National Park (U.S.A)	592,900	1,600 species vascular plants; 400 birds	Freshwater & coastal marshes, mangrove swamps
Fraser Island (Australia)	166,283	750 species vascular plants; 230 birds	Sandy Island
Doñana National Park (Spain)	54,252	750 vascular plants; 360 birds (500,000 waterfowl/ year)	Mediterranean Coastal marshlands and dunes
Sunderbans (Bangladesh and India)	272,510	334 species vascular plants (27 species of mangroves); 260 birds (200,000 - 300,000 migratory birds/ year)	Deltaic islands, waterways, intertidal area with extensive mangrove forest
Banc d'Arguin National Park (Mauritania)	1,200,000	200 species vascular plants; 108 birds, (2.1 million migratory birds/ year)	Mudflats, dunes, islands
iSimangaliso Wetland Park (South Africa)	239,566	2,173 species vascular plants; 521 birds	Coastal lakes, dunes and continental shelf

In relation to its biodiversity values, the nominated property is compared with both inscribed World Heritage properties and other protected areas worldwide that host a high biodiversity, both in general and in relation to birds. Key comparisons with a number of World Heritage properties are provided in Table 3 above.

The property most closely related to the Wadden Sea in this case is Banc d'Arguin (Mauritania), notable for hosting c.2.1 million overwintering birds within the East Atlantic Flyway. Georgia Bight (USA) hosts 1-2 million migratory birds in the West Atlantic Flyway. The Wadden Sea hosts over 6.1 million migratory birds at the same time and 10-12 million migratory birds in total each year. In addition recent global assessment of shorebird distribution in nearshore areas shows the Wadden Sea ranks as the most important area for migratory birds, in the context of the East Atlantic Flyway, and that it also plays a critical role for the Conservation of the African-Eurasian Migratory Waterbirds. In parallel to this key role for the survival of migratory birds species the Wadden Sea protects critical habitat for about 2,700 marine species in the intertidal and subtidal zones and at least 5,100 semi-terrestrial and terrestrial species, as well as wider importance for some regionally important populations of marine mammals, such as the harbour seal.

4. INTEGRITY

4.1 Protection

The nominated property is mainly classified as an IUCN Category VI protected area that includes other more restrictive categories of protected areas within its boundaries. All the existing protected areas are legally established by federal or state decrees. A small part of the nominated property (0.25%) is under private ownership. Management of private lands is regulated by existing protective measures.

An essential feature of the protection of the nominated property is that the framework of the Trilateral Wadden Sea Cooperation (The Netherlands, Germany and Denmark) provides it with one comprehensive protection and management scheme, with additional layers of protection at federal and state levels. This is also supported by a number of international legal instruments such as the Ramsar Convention, a Biosphere Reserve under the UNESCO's MaB Programme, a Particularly Sensitive Sea Area (PSSA) under the International Maritime Organization (IMO), Special Protection Area (SPAs) and a Special Area of Conservation (SACs) under the EU Birds and Habitats Directives. The nominated property is also protected under the African-Eurasian Waterbird Agreement (AEWA), which protects 235 waterbird species ecologically dependant on wetlands within the flyway.

IUCN considers the protection status of the nominated property meets the requirements set out in the *Operational Guidelines*.

4.2 Boundaries

The nominated property extends variously from the base of dikes constructed on the land to protect from flooding, from the spring high-tide water mark or from the brackish water limits of the Rivers Ems, Weser and Elb. It also includes inland Ramsar sites and sites included within the Natura 2000 Network. Offshore, the nominated property extends to three nautical miles from the island coastline to the North Sea, with the exception of areas off the East Friesian islands and off the islands of Sylt and Amrum, where the delimitation extends to 12 nautical miles offshore. The main islands or major parts of the islands that are subject to intensive use are not included within the nominated property. A number of adjoining areas under oil and gas exploitation and major seaports, harbours and associated infrastructure have also been excluded. Overall the boundaries are adequate to protect the existing values and ecological processes occurring within the nominated property.

As the whole Wadden Sea also includes areas in Denmark, IUCN requested supplementary information on whether the elements included in a nomination of Germany and the Netherlands can be considered of Outstanding Universal Value, without the Danish part of the system. In the reply provided, a comparative assessment of the importance of the Danish part of the Wadden Sea in relation to the nominated property was made and this is summarized in Table 4 below.

The comparison confirms that the substantial part of the most significant values of the Wadden Sea are encompassed within the nominated property. The large area of the property encompasses over 66% of the entire Wadden Sea ecosystems and is sufficient to maintain the critical ecological processes and to protect the key features and values. However the Danish Wadden Sea Area would undoubtedly enhance the integrity of the nominated property further.

IUCN considers that the boundaries of the nominated property meet the requirements set out in the *Operational Guidelines*, and that a further extension to include important areas of the Danish part of the Wadden Sea would strengthen the integrity of the nominated property further.

Table 4: Internal comparison within the Wadden Sea nominated property and the Danish Wadden Sea Area.

Key Features	Nominated Property	Danish Wadden Sea Area
Saltmarshes	28,000 ha	700 ha
Intertidal sand and mud flats	414,500 ha	4,500 ha
Subtidal flats and gullies	234,000 ha	24,500 ha
Offshore area (-15 m-depth seaward of the islands)	272, 000 ha	49,000 ha
Migratory birds (peak)	6.1 Million	c.450,000

4.3 Management

The key management authorities in the nominated property are the Federal Ministry for the Environment (Germany), the Nature Protection and Nuclear Safety Agency (Germany); the Federal Agency for Nature Conservation (Germany); and the Ministry of Agriculture, Nature and Food Quality (The Netherlands). The work of these institutions is supported and implemented through the different states by existing national parks administration. The involvement of Non Governmental Organisations (NGOs) in protected area management is substantial; they support not only operations through rangers and experts, but also most environmental education and awareness raising activities.

The entire nominated property is subject to active planning, management and monitoring, in national and international contexts, and with an exceptional level of integration and harmonized approach between the three countries involved in the management of the Wadden Sea. There are two key documents guiding the overall management: the "*Wadden Sea Plan*" which represents a legally binding planning and management framework for the whole area; and an Integrated Coastal Zone Management (ICZM) Strategy, prepared to address recommendations from the European Parliament on coastal zone conservation and management. There are specific management plans for the different protected areas within the nominated property.

The nominated property is well supported in terms of human and financial resources. Existing staff working directly in the protected areas within the property include 213 permanent positions covering technical experts, scientist and rangers. These permanent staff positions are complemented by over 200 staff funded by NGOs and local governments. Staff are highly qualified and subject of on-going training programmes to enhance their effectiveness. There is also effective law enforcement via local police, coastguards and naval police forces through an integrated system of patrolling and inspection. A navigation system used for commercial and recreational boasts in the Wadden Sea has geo-referenced information on the boundaries of all existing protected areas and the restrictions associated to each of them, thus helping to avoid negative impacts, and are augmented by targeted education programmes. Conservation efforts are also strongly supported by local governments and local NGOs provide significant volunteer support to management activities. Local communities are strongly committed to nature conservation through environmental education and nature based tourism activities. During the field mission, it was also possible to verify the exceptional level of public consultation implemented by the State Parties in preparing this nomination.

The overall level of funding dedicated by the State Parties of Germany and The Netherlands to the conservation and management of the property, is in the order of Euro 18.3 million, while the level of financial and in-kind support provided by NGOs and local institutions has been estimated in around Euro 4-5 million. The State of Niedersachsen in Germany established in 1994 a special fund, supported by oil and gas companies, which distributes c. Euro 1 million annually, to support scientific projects and activities to enhance the conservation status of the Wadden Sea. The Netherlands has also established a Wadden Fund, on the basis of income from gas production and from public funds, whose funding supports nature conservation and sustainable economic development. Overall management and conservation activities are well resourced.

IUCN requested the State Parties to clarify the role of the Wadden Sea Plan for ensuring the coordinated management of the nominated serial property as required under Paragraph 114 of the *Operational Guidelines*. The additional information provided by the State Parties noted that the Wadden Sea Plan was officially adopted in 1997 and is a legally binding document. The implementation of the plan is done by the standing bodies of the Trilateral Wadden Sea Cooperation through a Wadden Sea Board which oversees operational aspects of implementation and ensures effective coordination of the different tiers of management.

The Common Wadden Sea Secretariat (CWSS) is tasked with the daily implementation of the Wadden Sea Plan, coordination of the activities in the framework of the plan and a regular review of its implementation. Thus the Wadden Sea Plan was prepared and adopted long before the preparation of the present nomination of the property for inscription on the World Heritage List.

The State Parties provided a table of the activities that maintain the values of the nominated property in relation to the relevant natural criteria that have been established by the World Heritage Committee. They also noted that, at the last Governmental Wadden Sea Conference in 2005, it was agreed to further develop the Wadden Sea Plan to be adopted at the 2010 Governmental Wadden Sea Conference. This would include an update of policies and management measures that are further necessary to maintain the Outstanding Universal Value of the property in the event that the nominated property is inscribed on the World Heritage List.

IUCN considers the management of the nominated property meets the requirements set out in the *Operational Guidelines*.

4.4 Threats

The Wadden Sea lies within one of the most density populated areas of Europe, and thus the active management of a range of threats is required. The principal threats noted include the following:

4.4.1 Fisheries

The most important current fisheries within the nominated property are for blue mussel and shrimp. In the 1980s and 1990s, the environmental quality of the Wadden Sea decreased greatly, mainly because of the impact of mussel and cockle fishery, which had an impact not only on the biological processes as well as on the sediment dynamics and sediment composition. However, fisheries of these species have been strictly regulated and are subject to a comprehensive management scheme which is in line with the EU Water Framework Directive and the EU Habitats Directive. These regulatory measures are complemented by the establishment of a number of marine no-take protected areas and restoration measures. Zoning of fisheries is applied on a permanent or seasonal basis to regulate activities that could disturb birds and seals during critical periods of their lifecycle. Some activities are banned within the nominated property, such as mechanical cockle fishery and extraction of sand for commercial purposes. Whilst ecological monitoring shows positive trends there is an ongoing debate between industry, regulators and conservation organisations, who call for increased attention to fishery management, monitoring and research programmes on marine biodiversity.

4.4.2 Harbours, industrial facilities and maritime traffic

There are a number of important international ports located adjacent to the nominated property, which contribute significantly to the local and regional economy in terms of the supply and communications between mainland and the islands. A number of smaller ports are located directly adjacent to the nominated property on the mainland or on the islands. Access to the harbours and maintenance of navigation channels is subject to an integrated planning system including sediment management, both to maintain the shipping routes and to avoid environmental impacts to the marine and coastal ecosystems. A number of independent expert reviewers emphasised this system as being of the highest international standard.

Pollution resulting from harbours, seaports and urban areas, including nutrients and hazardous substances has been significantly reduced in the past 10 years through the application of strict regulations, control and monitoring systems. The pollution resulting from operational discharges from shipping has likewise been reduced under the designation of the North Sea, including the Wadden Sea, as a Special Sea Area under the International Convention for the Prevention of Pollution from Ships (MARPOL Convention). A rigorous system for control and monitoring of operational discharges has been developed and it is fully operational in both State Parties.

Shipping safety has been significantly enhanced during the last 10 years by the designation of traffic separation schemes in conjunction with the designation by the International Maritime Organization of the Wadden Sea as a Particularly Sensitive Sea Area (PSSA). The PSSA regime includes Vessel Traffic Management System (VTMS), Traffic Separation Scheme (TSS), navigation control and transboundary emergency management. Vessels carrying hazardous goods navigate the offshore routes in the North Sea far away from the coast and are thus separated from the other traffic according to the mandatory routing system adopted by the International Maritime Organization (IMO).

There is an excellent safety record and extensive contingency plans and transboundary cooperation are in place to deal with ship accidents. These plans are supported by adequate infrastructure (Contingency Planning Centres), state-of-the-art equipment, and well trained teams who carry out 20-30 training exercises per year for contingency interventions. Only double-hulled tankers are allowed to cross the area and in the last 10 years no major accidents have occurred. However, given the Wadden Sea is located adjacent to one of the world´s busiest shipping routes and that this region is characterized by changeable weather with adverse weather situations, shipping will continue to be a significant risk to the nominated property and the adjacent coastline for the foreseeable future.

4.4.3 Oil and Gas

There are oil and gas deposits in the Wadden Sea, a number of which are located outside the nominated property and have been under exploitation for the last 20 years. Exploration and exploitation of oil and gas requires authorisation under national and European legislation and the Wadden Sea Plan. Moreover, all international regulations for the protection of the sea and the coasts are also applied. Both the State Parties of The Netherlands and Germany have made a clear commitment at the highest political level to not allow exploration or exploitation of oil and gas within the boundaries of the nominated property.

In Germany oil exploitation adjacent to the nominated property is confined to the existing exploitation site at Mittelplate in the Schleswig-Holstein Wadden Sea. Throughout the full operation period of the Mittelplate platform, an independent research and monitoring program has been conducted in order to assess the ecological impact of the oil exploitation. Until now, no negative effects have been found in an extensive area surrounding the platform.

In the Dutch Wadden Sea, new exploration and exploitation of gas is only permitted from sites on land and from existing platforms in the North Sea coastal zone, outside the nominated property, and in accordance with the Wadden Sea Plan. The main impact, resulting from the exploitation of gas resources adjacent to the Dutch part of the nominated property is subsidence of the sea bed. The potential impact due to subsidence has been monitored by an Independent Scientific Panel since 1963 when the production commenced. No significant losses of natural values have been found and subsidence of tidal flats was fully compensated by natural sedimentation. Salt marshes are still increasing in height due to sedimentation.

Considering the importance of The Wadden Sea for migratory species all existing platforms and other facilities for oil and gas exploitation have adopted a new lighting system that minimizes any potential impacts to migratory birds.

4.4.4 Visitor and tourism pressures
Tourism and recreational activities are a substantial part of the public use and regional economic development in the nominated property. Approximately 20 million tourists stay overnight and 30-40 million day trippers visit the Wadden Sea region, mainly on the islands and the coastal areas on mainland. While most activity takes place outside the nominated property, all activities are intimately linked to the its values. Tourism activities are mainly associated with land-based tourism and recreation, tidal flat walking and recreational boating.

The potential for tourism growth is high. During the IUCN field mission it was evident that local communities are committed to maintain nature-based quality tourism instead of intensive massive tourism development. However it was also noted, during the mission and by a number of external reviewers, that the eventual inscription of nominated property in the World Heritage List could lead to the intensification of tourism, which could potentially generate negative environmental impacts. Whilst the Wadden Sea Plan has provisions on tourism development it is necessary to develop a Tourism and Visitation Strategy that will be able to maintain and enhance the natural values and integrity of the nominated property.

4.4.5 Wind Energy
Though the construction of new wind turbines is not allowed within the nominated property, it can be expected that cables from planned wind farms in the North Sea will need to cross the nominated property. Results from similar projects requiring submarine cables that were developed in the past shows that such interventions will mainly cause only a temporary impact on the bottom of the Wadden Sea. The construction of such cables is also subject to assessment and permission and, according to the Wadden Sea Plan, should be kept to the minimum number required and subject of full prior Environmental Impact Assessment to ensure no significant impacts result from such projects.

4.4.6 Natural disasters and risk preparedness
The nominated property has been affected by severe storm events in the past, which have altered the landscape and led to significant loss of life. These experiences have led to the development of an Integrated Coastal Defence and Protection Plan to protect inhabitants inside and outside the Wadden Sea. Local communities and specialized agencies are well trained and equipped to ensure the rapid implementation of this plan which has been effectively applied in a number of severe meteorological and hydrological events.

4.4.7 Climate Change
The nomination considers that the Wadden Sea will be able to adapt to a sea level rise as a result of climate change. Research and modelling applied on climate change predictions in the Wadden Sea shows that a moderate sea level rise (25 cm per 50 years) will be compensated by the import of sediment, derived from the tidal channels, shore-face and the beaches and dunes of the barrier islands. In addition to these hydrodynamical and morphological processes, biotic and ecological processes also positively contribute to sedimentation. In this respect, the importance of conserving seagrass, mussel beds and salt marshes due to their positive influence in deposition and reduction of coastal erosion has been carefully considered in adaptation and mitigation strategies. Results from research and modelling, including possible negative trends linked to the destruction and reconversion of wetlands along the East Atlantic Flyway and the Africa-Eurasian Flyway, also show that the importance of the Wadden Sea for the survival of migratory birds will increase in the years to come.

4.4.8 Invasive Alien Species
There is potential for the introduction of Invasive Alien Species through the discharge of ballast water and from aquaculture. Controls are in place to minimise the introduction of exotic species, to monitor their effect, and to adjust quality standards and management activities in order to conserve native species and natural ecosystems. No species can be introduced into the nominated property without an environmental assessment according to the EU Habitats Directive. Of some 52 known introduced species in the nominated property, only six are considered to have a strong impact on the composition of the existing biota in the Wadden Sea. There is a research and control system in place to mitigate the effects of introduced species to the native biota of the Wadden Sea.

In conclusion, IUCN considers that the nominated

property meets the conditions of integrity. IUCN notes that the State Parties of Germany and The Netherlands have excellent institutional, financial and technical capacity to cope with existing and future conservation challenges as to maintain the values and integrity of the nominated property.

5. ADDITIONAL COMMENTS

5.1 Justification for Serial Approach

When IUCN evaluates a serial nomination the following questions are addressed:

a) What is the justification for the serial approach?

The Wadden Sea is an extensive marine ecosystem and as such a nomination aiming to fulfil the requirements for achieving effective marine biodiversity conservation needs to use a broader landscape approach. The nominated property therefore fulfils this requirement by using a transnational serial approach. Its four components represent over 66% of the whole Wadden Sea, thus including areas that represent key natural values of the marine ecosystems and that are essential for the survival of migratory species.

b) Are the separate component parts of the nominated property functionally linked in relation to the requirements of the *Operational Guidelines*?

The four components nominated in this transnational serial property form an integral part of the whole Wadden Sea region, and are ecologically and functionally linked by the terrestrial and oceanographic processes occurring in the Wadden Sea.

c) Is there an effective overall management framework for all the component parts of the nominated property?

As noted under section 4.3, the Wadden Sea Plan is the coordinated management plan for the Wadden Sea as it provides specific guidance on how to integrate and harmonize the individual management plans for the different components of this serial nomination.

5.2 Cultural Values

ICOMOS noted to IUCN that in addition to its natural values “The Wadden Sea is acknowledged as an important cultural landscape which has been well-researched.” The area that has been studied is much larger than the present nomination. Experts consulted during the field mission as well as independent reviewers concluded that, whilst there are important cultural values associated with the nominated property, the most significant features of the components included in the series relate to natural values concerned with coastal systems and biodiversity. IUCN notes that the State Parties of Germany and the Netherlands may wish to discuss the cultural landscape values of the nominated property and the wider area with ICOMOS.

6. APPLICATION OF CRITERIA

The Wadden Sea has been nominated under natural criteria (viii), (ix) and (x)

Criterion (viii): Earth’s history and geological features

The Wadden Sea is a depositional coastline of unparalleled scale and diversity. It is distinctive in being almost entirely a tidal flat and barrier system with only minor river influences, and an outstanding example of the large-scale development of an intricate and complex temperate-climate sandy barrier coast under conditions of rising sea-level. Highly dynamic natural processes are uninterrupted across the vast majority of the property, creating a variety of different barrier islands, channels, flats, gullies, saltmarshes and other coastal and sedimentary features. It is also one of best-studied coastal areas on the planet, providing lessons of wider scientific importance for wetland and coastal management of international importance.

IUCN considers that the nominated property meets this criterion.

Criterion (ix): Ecological processes

The Wadden Sea is one of the last remaining natural large-scale intertidal ecosystems, where natural processes continue to function largely undisturbed. Its geological and geomorphologic features are closely entwined with biophysical processes and provide an invaluable record of the ongoing dynamic adaptation of coastal environments to global change. There is a multitude of transitional zones between land, sea and freshwater that are the basis for the species richness of the property. The productivity of biomass in the Wadden Sea is one of the highest in the world, most significantly demonstrated in the numbers of fish, shellfish and birds supported by the property. The property is a key site for migratory birds, and its ecosystems sustain wildlife populations well beyond its borders.

IUCN considers that the nominated property meets this criterion.

Criterion (x): Biodiversity and threatened species
Coastal wetlands are not always the richest sites in relation to fauna diversity, however this is not the case for the Wadden Sea. The salt marshes host around 2,300 species of flora and fauna, and the marine and brackish areas a further 2,700 species, and 30 species of breeding birds. The clearest indicator of the importance of the property is the support it provides to migratory birds as a staging, moulting and wintering area. Up to 6.1 million birds can be present at the same time, and an average of 10-12 million each year pass through the property. The availability of food and a low level of disturbance are essential factors that contribute to the key role of the nominated property in supporting the survival of migratory species. The property is the essential stopover that enables the functioning of the East Atlantic and the African-Eurasian migratory flyways. Biodiversity on a worldwide scale is reliant on the Wadden Sea.

IUCN considers that the nominated property meets this criterion.

7. RECOMMENDATIONS

IUCN recommends that the World Heritage Committee adopt the following draft decision:

The World Heritage Committee,

1. Having examined Documents WHC-09/33.COM/8B and WHC-09/33.COM/INF.8B2,

2. Inscribes the **The Wadden Sea, Germany / Netherlands,** on the World Heritage List under natural criteria **(viii), (ix) and (x);**

3. Adopts the following **Statement of Outstanding Universal Value**:

Brief Synthesis
The Wadden Sea is the largest unbroken system of intertidal sand and mud flats in the world, with natural processes undisturbed throughout most of the area. It encompasses a multitude of transitional zones between land, the sea and freshwater environment, and is rich in species specially adapted to the demanding environmental conditions. It is considered one of the most important areas for migratory birds in the world, and is connected to a network of other key sites for migratory birds. Its importance is not only in the context of the East Atlantic Flyway but also in the critical role it plays in the conservation of African-Eurasian migratory waterbirds. In the Wadden Sea up to 6.1 million birds can be present at the same time, and an average of 10-12 million pass through it each year.

Criteria
Criterion (viii): *The Wadden Sea is a depositional coastline of unparalleled scale and diversity. It is distinctive in being almost entirely a tidal flat and barrier system with only minor river influences, and an outstanding example of the large-scale development of an intricate and complex temperate-climate sandy barrier coast under conditions of rising sea-level. Highly dynamic natural processes are uninterrupted across the vast majority of the property, creating a variety of different barrier islands, channels, flats, gullies, saltmarshes and other coastal and sedimentary features. It is also one of best-studied coastal areas on the planet, providing lessons of wider scientific importance for wetland and coastal management of international importance.*

Criterion (ix): *The Wadden Sea is one of the last remaining natural large-scale intertidal ecosystems, where natural processes continue to function largely undisturbed. Its geological and geomorphologic features are closely entwined with biophysical processes and provide an invaluable record of the ongoing dynamic adaptation of coastal environments to global change. There is a multitude of transitional zones between land, sea and freshwater that are the basis for the species richness of the property. The productivity of biomass in the Wadden Sea is one of the highest in the world, most significantly demonstrated in the numbers of fish, shellfish and birds supported by the property. The property is a key site for migratory birds, and its ecosystems sustain wildlife populations well beyond its borders.*

Criterion (x): *Coastal wetlands are not always the richest sites in relation to faunal diversity, however this is not the case for the Wadden Sea. The salt marshes host around 2,300 species of flora and fauna, and the marine and brackish areas a further 2,700 species, and 30 species of breeding birds. The clearest indicator of the importance of the property is the support it provides to migratory birds as a staging, moulting and wintering area. Up to 6.1 million birds can be present at the same time, and an average of 10-12 million each year pass through the property. The availability of food and a low level of disturbance are essential factors that contribute to the key role of the nominated property in supporting the survival of migratory species. The property is the essential stopover that enables the functioning of the East Atlantic and the African-Eurasian migratory flyways. Biodiversity on a worldwide*

scale is reliant on the Wadden Sea.

Integrity
The boundaries of the property include all of the habitat types, features and processes that exemplify a natural and dynamic Wadden Sea. The large area of the property encompasses over 66% of the entire Wadden Sea ecosystems and is sufficient to maintain critical ecological processes and to protect the key features and values. However, the inscribed property would be strengthened by its further extension to include the area of the Wadden Sea which lies within the territory of Denmark.

The property is subject to a comprehensive protection, management and monitoring regime which is supported by adequate human and financial resources. Human use and influences are well regulated with clear and agreed targets. Activities that are incompatible with its conservation have either been banned, or are heavily regulated and monitored to ensure they do not impact adversely on the property.

As the property is surrounded by a significant population and contains human uses, the continued priority for the protection and conservation of the Wadden Sea is an important feature of the planning and regulation of use, including within land/water-use plans, the provision and regulation of coastal defenses, maritime traffic and drainage. Key threats requiring ongoing attention include fisheries activities, harbours, industrial facilities and maritime traffic, residential and tourism development and climate change.

Management and protection requirements
Maintaining the hydrological and ecological processes of the contiguous tidal flat system of the Wadden Sea is an overarching requirement for the protection and integrity of this property. Therefore conservation of marine, coastal and freshwater ecosystems through the effective management of protected areas, including marine no-take zones, is essential. The effective management of the property also needs to ensure an ecosystem approach that integrates the management of the existing protected areas with other key activities occurring in the property, including fisheries, shipping and tourism.

Specific long-term expectations for the conservation and management of this property include maintaining and enhancing the level of financial and human resources required for the effective management of the property. Research, monitoring and assessment of the protected areas that make up the property also require adequate resources to be provided. Maintenance of consultation and participatory approaches in planning and management of the property is needed to reinforce the support and commitment from local communities and NGOs to the conservation and management of the property. The State Parties should also maintain their commitment of not allowing oil and gas exploration and exploitation within the boundaries of the property. Any development projects, such as planned wind farms in the North Sea, should be subject of rigorous Environmental Impacts Assessments so as to avoid any impacts on the values and integrity of the property.

4. Encourages the State Party of Denmark to submit a nomination of the Danish part of the Wadden Sea as soon as feasible to extent and complement the existing property and also encourages the Common Wadden Sea Secretariat as well as relevant experts that participated in the preparation of this nomination to provide support as required to the State Party of Denmark in preparing this nomination;

5. Requests the State Parties of the Netherlands and Germany to prepare and implement an overall Tourism Development Strategy for the property that fully considers the integrity and ecological requirements of the property and that provides a consistent approach to tourism operations in the property;

6. Also requests the State Parties of The Netherlands and Germany to strengthen cooperation on management and research activities with the State Parties of Spain, Tunisia and Mauritania in relation to the conservation of the World Heritage properties of Doñana National Park, Djoudj National Bird Sanctuary and Banc d'Arguin National Park, which also play a significant role in conserving migratory species along the East Atlantic Flyway.

Map 1: General location of nominated property

Map 2: Boundaries of nominated property