

Information Sheet on Ramsar Wetlands (RIS)

1. **Date this sheet was completed:** February 2002
2. **Country:** Federal Republic of Germany
3. **Name:** Schleswig-Holstein Wadden Sea and adjacent areas (Schleswig-Holsteinisches Wattenmeer)
4. **Geographical co-ordinates:** 08:40 E 54:30 N approximate middle of site
5. **Elevation:** -15 to 50 m
6. **Area:** 441,000 ha (national park)+ 13,988 ha (adjacent areas), total 454,988 ha
7. **Overview:**

The wetland is part of an extensive tidal flat ecosystem "The Wadden Sea" which extends from Den Helder in the Netherlands to Esbjerg in Denmark. It is an area of outstanding natural value that constitutes a major part of the largest coherent area of tidal-flats in the world. It includes large areas of intertidal sand- and mud flats, partly estuarine, with sand banks, numerous islands, extensive areas of saltmarsh, dunes, heath, beaches and beach plains. It includes also a Cetacean protection area covering 124.000 ha and a number of polder areas with freshwater and brackish marshes and pools which lie adjacent to the Wadden Sea (see appendix I).

The area is a nursery ground for the harbour porpoise and many North Sea fish species. It is of international importance as a resting, feeding and breeding area for seals and as a roosting, feeding, breeding and moulting site for birds. It is an essential stepping stone for millions of waterfowl on the East-Atlantic flyway. It accommodates more than 2000 indigenous invertebrate species, many of them endemic.

The Wadden Sea landscape is an area of outstanding natural scenic beauty. The Halligen with their settlements built on mounds are unique. Because of the dynamic geomorphological history of the region many archaeological remains of human settlements are present in the tidal-flats.

8. **Wetland type:**

Marine and coastal wetland including some human-made wetlands.

G, A, B, E, F, H, O (freshwater lakes 8ha+), Sp, Tp (freshwater pools and marshes below 8ha) (ranked according to dominance)

9. **Ramsar Criteria:**

All 8 criteria listed in Annex II of the Explanatory Note and Guidelines for the RIS are applicable to the Schleswig-Holstein Wadden Sea (SHWS). Criteria 1 to 6 are the most important. The single criterion most significant is criterion 1 because the SHWS is a rare and unique example of a natural or near natural wetland type within its biogeographical region.

10. Map of site included: Yes

11. Name and address of the compiler of this form:

Landesamt für den Nationalpark Schleswig-Holsteinisches Wattenmeer, Schloßgarten 1, D-25832 Germany.

12. Justification of the criteria selected under point 9:

Criterion 1: The Ramsar site "Schleswig-Holstein Wadden Sea" includes about 1/3 of the total Wadden Sea ecosystem, which is a 13.500 km² tidal flat ecosystem unique to the eastern North Sea coast. Most of the international Wadden Sea is designated as a Ramsar site.

Criterion 2: The wetland supports a number of threatened, heavily endangered and endangered biotopes, and numerous vulnerable, endangered, or critically endangered animal and plant species (See: Nordheim et. al. 1996 & Nordheim & Merck 1995 and appendix 2).

Criterion 3: The SHWS accommodates numerous often endangered plant and animal species (see Appendix 2). including more than 2000 indigenous invertebrate species.

Criterion 4: The area is the most important nursery ground for the endangered harbour porpoise known for the North Sea, it is an essential pupping and nursery ground for the common seal (1800 young born in 2001) and the grey seal (20 young born in 2001). It is an internationally important and vital stopover site for millions of birds on their route from their breeding grounds in the north and east and their wintering grounds in the south and west. It is an internationally important breeding area for numerous bird species (see attached figures). About 17% of all gulls and about 40% of all terns and waders that breed in the entire Wadden Sea breed in the SHWS. The SHWS is especially important as a breeding site for the Kentish Plover, Arctic Tern, Gull-billed Tern and Sandwich Tern as well as for the Ringed Plover, Northern Lapwing, Ruff, Eurasian Oystercatcher and Little Tern (see Appendix 3 and attached figures). The Common Eider moves to the area when weather conditions in the Baltic Sea become to adverse. Almost the entire Northwest European population of the Common Shelduck moults in the southern part of the site in the mouth of the river Elbe during the period July to early September. It supports numerous salt-marsh plant species, many of which are scarce or endangered.

Criterion 5: See Appendix 3 for breeding birds and Appendix 4 for migratory birds.

Criterion 6: See Appendix 3 for breeding birds and Appendix 4 for migratory birds.

Criterion 7: 63 fish species occur in the SHWS. Some species are endangered e.g. Houting, Twaite Shad, Great Pipefish, Sea Snail and Montagu's Sea Snail, Sea Trout and River and Sea Lamprey. See Appendix 2.

Criterion 8: The SHWS is internationally important as a nursery for Plaice, Sole, Herring and Sprat. The young fish grow up in the SHWS and wander out from there into the North Sea. The SHWS is thus of exceptional importance for a number of North Sea fish species. The area is also important for anadromous and catadromous fish species on passage (e.g. Eels). The area is a spawning ground and nursery for sessile species such as Eelpout (viviparous Blenny), Bull Rout (Short-spined), Butterfish (Gunnel), Common Goby, Hooknose and Sea Stickleback. Food resources for fish are abundant in the SHWS in the form of marine worms, shrimps and mussels.

13. General location:

The wetland is situated on the German North Sea coast of the state of Schleswig-Holstein between the Danish border in the north and the river Elbe in the south. The wetland is part of two counties; Nordfriesland in the North with its capital town Husum and Dithmarschen in the south with its capital town Heide. It lies about 80-160 km north-west of the city of Hamburg.

14. Physical features:

The wetland is part of an extensive tidal flat ecosystem "The Wadden Sea" which extends from Den Helder in the Netherlands to Esbjerg in Denmark. It includes large areas of intertidal sand- and mud flats, partly estuarine, with sand banks, numerous islands, extensive areas of saltmarsh, dunes, heath, beaches and beach plains. It includes also a Cetacean protection area covering 124,000 ha and a number of polder areas with freshwater and brackish marshes and pools which lie adjacent to the Wadden Sea. The hallig islands - low lying saltmarsh islands with settlements on mounds – are a special feature of the area. Two tides flow in and out of the Wadden Sea from the North Sea each day, with a tidal amplitude of about 2,5 m.

At the beginning of the millennium, the area now covered by the Wadden Sea consisted of a number of terminal moraine islands, surrounded by low lying brackish marshes and woods. The area was systematically drained and reclaimed by humans. A series of storms and floods in the 14th and 17th centuries destroyed many of the early dykes and converted the area into a series of low lying islands and sandbanks, surrounded by tidal flats. Saltmarshes bordered the Wadden Sea on the mainland side and around the islands with natural estuaries and deltas. Land reclamation since the 17th century has led to continuous losses of the Wadden Sea ecosystem and reduced it to its present size. The tidal flats and areas below mean low tide mark are covered with layers of silt and sand. Soils of marshes, saltmarshes and hallig islands and reclaimed polders are clayey, while the soils of the dunes and heathlands are sandy.

Sediments:

Deposits in the Wadden Sea are the result of several thousand years of a geological evolution beginning 4 000 to 6 000 years ago during the post-glacial rise in sea level, when the North Sea invaded the shallow coastal waters. The wave and tidal action eroded material from the bottom of the sea and from the shores and transported it into the Wadden Sea and deposited it there. With the passage of time – until today - the supply of material diminished, and sediment turnover within the Wadden Sea attained predominance.

Four types of sediments are of principal importance in the Wadden Sea:

1. The sand of the sandflats: This type of sand covers the greatest part of the surface in the Wadden Sea.
2. The sandy mud of the sandy mudflats,
3. The mud of the mudflats,
4. The sands of the offshore sandbanks generally forming a chain at the seaward boundary of the Wadden Sea. They consist of very compacted sand of uniform grain size.

With the exception of the offshore sandbanks and a few other areas - the three first types of sediment consist to about 40 to 60% of very fine sand 63 to 125 µm in diameter. The

outer sandbanks, on the other hand, consist almost exclusively of fine and medium sand of a grain size around 200 μm .

The sediments are characterised according to their content in silt* and clay* (particle size smaller than 63 μm):

- Sand (sandflats): less than 10% under 63 μm
- Muddy sand (muddy sandflats): 10 to 50%
- Mud (mudflats): more than 50%

Accordingly, the sand flats may consist of more than 40% sand with grain sizes greater than 125 μm . This size fraction is smaller in the muddy sandflats, and it virtually disappears in the mudflats. The content in organic matter is low in the sands, and increases markedly in muddy sand and mud. There are transitional categories between the different types of sediments.

Water transport

There is a conspicuous net water transport from south to north. It runs across the tidal watersheds between Pellworm Island and the mainland, as well as between Föhr Island and the mainland. Some 50 mill. m^3 of water are transported northward across these divides during an average tide - More than the average discharge of the Elbe River.

Salinity (in practical salinity units (psu). 1 psu = 1 g/kg water)

The water of the North Sea has an average salinity of 34 psu, whereas typical values in the Wadden Sea are around 30 psu. Much higher salinity's are found in extreme situations on the upper tidal flats, e.g. during prolonged periods of westerly winds, due to strong solar irradiation, when the flats fall dry for long periods, or when there is strong ice formation. On the other hand, the salinity falls when seawater is diluted by freshwater inputs and additional heavy precipitation.

The Elbe River introduces an average of 700 m^3/s (about 22 bill. m^3/year) of freshwater into the Wadden Sea of Schleswig-Holstein and neighbouring parts of the North Sea; the Eider River contributes another 21 m^3/s , the Schlüttsiel Canal 7.2 m^3/s , the Miele 4.1 m^3/s , and the Arlau 2.9 m^3/s . Increased inflow from the Elbe, resulting from the melting of the snows, for instance, can be measured in the Wadden Sea of North Sylt about one month later. The highest freshwater inputs therefore occur in the months from January to March.

Because of these influences, seasonal fluctuations in salinity are stronger in the Wadden Sea than in the North Sea proper. In the area off List/Sylt, the salinity minimum is 25 in February and March, and the maximum is 32 in July and August. During the summer, evaporation is too strong to be compensated by the inflow of freshwater.

Climate

The water temperature peaks in August. The sea subsequently cools until February, when the lowest temperatures are usually attained. Water temperatures fluctuate in the Wadden Sea more than anywhere else in the North Sea. Small-scale variability is also greatest there. There has been an exceptional series of mild winters and warm summers during the past decade. The water temperature data of the past 130 years, however, show no significant warming or cooling trend in the North Sea and Wadden Sea. The lowest temperatures in tidal flat areas are near the freezing point of seawater (-1,5°C to -1,9°C). The highest water temperatures are around 23°C, but values of 30°C may be attained in small isolated pools.

The highest temperature ever measured on the mainland has been about 36°C. The island stations of Wyk and List at the same time attained just under 31°C, whereas Helgoland remained below 29°C. The mainland coastal area is hardly cooled by the sea during heat

waves, because these are usually associated with southerly or south-easterly winds, when air masses which have heated up over the land reach the coast. The air mass does not cool until it flows over the water surface on its way to the islands. The absolutely lowest temperatures have been -30 to -22°C on the mainland, -25 to -20°C on the Wadden Sea islands, and about -15°C on Helgoland.

The number of frost and of summer days confirms the attenuating influence of the sea. Frost days are defined as those with a minimum temperature less than 0°C, summer days are those with at least 25°C. The number of frost days is 70 to 80 in the inland sector of western Schleswig-Holstein, 55 to 70 on the coast and the Wadden Sea islands, and only 37 at Helgoland. A similar situation exists with respect to summer days, with about 12 to 17 annually inland, 5 to 11 on the coast and islands, and only one at Helgoland.

Precipitation on the west coast of Schleswig-Holstein averages about 700 to 750 mm per year, with a peak from August to November. The wettest months are October and November with monthly averages of 80 to 100 mm. Precipitation falls on 14 to 17 days in February, and on 19 to 22 days in November. The months with the fewest number of rainy days are May and June with 10 to 14.

15. Hydrological values:

The wetland is bordered on the mainland coast and on the large islands by embankments (dykes) built to prevent flooding of the hinterland. Coastal stabilisation measures include the construction and maintenance of brushwood groynes for sediment trapping on the seaward side of the dykes and bordering saltmarshes. Some of the lakes bordering the Wadden Sea are rain water reservoirs.

16. Ecological features:

The wetland is part of an extensive tidal flat ecosystem "The Wadden Sea" which extends from Den Helder in the Netherlands to Esbjerg in Denmark. It includes large areas of intertidal sand- and mud flats, partly estuarine, with sand banks, numerous islands, extensive areas of saltmarsh, dunes, heath, beaches and beach plains. The Wadden Sea is the only major coastal wetland in Europe where a full range of natural geomorphological and biological processes still take place. It contains a great variety of landforms, habitat types and plant and animal species - many of them endangered - that are of outstanding universal value from the point of view of science, education, recreation and conservation. The full range of habitats typical of a tidal flat ecosystem is represented (see appendix 2 for a list of biotopes). The area thus plays a very important role in the protection of biological diversity.

The Wadden Sea itself can be divided into three ecological zones: the sublittoral, eulittoral and supralittoral zone, according to their daily inundation regime by sea water. The sublittoral zone mainly includes creeks and channels, the eulittoral zone includes tidal flats and the supralittoral zone, the region above mean high tide levels, includes saltmarshes and dunes. Two large rivers flow into the Schleswig-Holstein Wadden Sea, the Elbe in the south and the Eider approximately in the middle of the area.

Many of the biotopes included in the area are threatened, heavily endangered or endangered (Nordheim et. al. 1996 & Nordheim & Merck 1995) (see appendix 2). See also appendix I for details of the areas adjacent to the national park that are included in the RAMSAR area.

At least 26 introduced macrozoobenthic species have been recorded in the German Wadden Sea (Nehring & Leuchs 1999).

Areas adjacent to the RAMSAR site are mainly agricultural with winter cereals and rape and grassland.

The majority of the birds and fish species visiting and breeding in the site feed on benthic organisms on the tidal flats. Terns feed predominantly on organisms (mainly fish) in the water column, sea ducks such as the Common Eider feed mainly on blue mussels. Brent Geese and Wigeon feed on eelgrass in the autumn and on the salt marshes of the islands and mainland when this food supply is depleted. Barnacle Geese feed on the mainland salt marshes and on grassland in the polders adjacent to the Wadden Sea. Seals and the Common Porpoise feed on fish in the Wadden Sea and the adjacent North Sea.

17. Noteworthy flora:

Lists of noteworthy flora for the Schleswig-Holstein Wadden Sea are included in the Red Lists of Biotopes, Flora and Fauna of the Trilateral Wadden Sea Area, 1995 from Nordheim et. al. (1996) & Nordheim & Merck (1995). The lists cover rare and endangered marine macroalgae and vascular plants (see appendix 2). The lists do not cover the polder areas adjacent to the national park.

18. Noteworthy fauna:

Lists of noteworthy fauna for the Schleswig-Holstein Wadden Sea are included in the Red Lists of Biotopes, Flora and Fauna of the Trilateral Wadden Sea Area, 1995 from Nordheim et. al. (1996) & Nordheim & Merck (1995). The lists cover rare and endangered macrofaunal benthic invertebrates, spiders, beetles, grasshoppers, lampreys and marine fish, amphibians and reptiles, birds and marine mammals (see appendix 2).

Recent information on population sizes of seals in the Schleswig-Holstein Wadden Sea

The Grey Seal *Halichoerus grypus* regularly occurs in the Wadden Sea and breeds there in small numbers. 20 young were recorded in 2001 and it is estimated that 60 individuals are present in the area.

The Grey Seal was widespread in the Wadden Sea until the early middle ages and became virtually extinct in the 16th century, possibly because of increased human settlement and hunting. Its status is considered critical because undisturbed sites for rearing young are rare (Nordheim et. al. 1996).

The breeding population of the Common Seal *Phoca vitulina* is more abundant, with 7500 individuals recorded in 2001 producing ca.1800 young.

The Common Seal is listed in the Red lists of Fauna in the Wadden Sea with the status "vulnerable" as it is still considered to be threatened especially by pollution (Nordheim et. al. 1996).

Birds

The site is of international importance as a major stop-over site for migrating birds on the East-Atlantic-Flyway. Substantial parts of the biogeographical populations of numerous species of waders, geese, ducks and passerines pass through the Wadden Sea on migration and significant numbers spend the winter there (see appendices 3 & 4). For over 40 species Schleswig-Holstein has an international responsibility because it accommodates over 1% of the biogeographical population or over 5% of the Northwest European breeding population. The situation of five species is critical, four species are

endangered, 6 species vulnerable and three species susceptible (see appendix 2) (Nordheim et. al. 1996).

19. Social and cultural values:

The wetland is important for shrimp and blue mussel fisheries. A number of archaeological sites are situated on the tidal flats. The wetland is used extensively for tourism and recreation purposes.

20. Land tenure/ownership of:

The area covered by the National Park is almost completely (98.5 %) state or federal property. Only about 600 ha are not state owned. See Appendix I for ownership of adjacent areas that are included in the RAMSAR site.

21. Current land use:

- a) The wetland is used for shrimp and blue mussel fisheries. Approximately half of the salt-marshes are grazed by sheep. The wetland is used extensively for tourism and recreation purposes. Some of the adjacent areas are grazed at low stocking levels for conservation purposes.
- b) Surrounding areas are used mainly for agricultural purposes. In parts intensive arable (wheat and rape) farming is practised other areas are used for grazing of cattle and sheep. A number of small towns lie directly on the boarder of the site. There are 19 ports on the Schleswig-Holstein Wadden Sea National Park coast. Büsum, Husum and Wyk are the main ports for freight shipping and passenger traffic. Important fishing ports in the region are Büsum, Friedrichskoog, Husum , and to a lesser extent Tönning. Dagebüll, Schlüttsiel and Strucklahnungshörn supply the North Frisian Islands and hallig islands, and connect them to the outside world. They are departure points of the excursion industry, as are the island ports.

22. Factors (past, present or potential) adversely affecting the sites ecological character, including changes in land use and development projects:

- a)
 - Land reclamation/coastal defence:
In the past land reclamation much reduced the size of the Schleswig-Holstein Wadden Sea. Large areas of tidal flats and saltmarshes were embanked. The polders that resulted from the most recent embankments are nature reserves included in the RAMSAR site (see annex I). A tidal barrage was built across the mouth of the river Eider in 1973.
 - Shrimp fisheries:
The Common Shrimp is a key organism in the Wadden Sea ecosystem because it occurs in such huge numbers. It is an important food source for young fish using the Wadden Sea as a nursery ground. The shrimp fishery is carried out from 115 commercial fishing boats. The shrimp fisheries affect the ecosystem through removal of shrimps and by-catch and through discard of non-target species.
The influence of the shrimp fishery on the ecosystem is, however, not so significant that effects are evident. Investigation of future development within the zero-use-area

will supply more information and enable an estimate of the influence of shrimp fisheries.

- Blue Mussel Fisheries:

The blue mussel fishery is carried out exclusively as mussel culture. Small seed-mussels are fished and spread on culture beds where they are allowed to grow to a marketable size. The mussel fisheries are subject to heavy restrictions. Only 8 boats are allowed to fish for blue mussels. No fishing is allowed in the zone 1 areas or on the tidal flats. The total size of the culture beds will be reduced from three to two thousand hectares by the year 2006. The mussels must remain on the culture beds for a given minimum duration of time. Wild mussels are not allowed to be marketed or exported. For surveillance reasons the ships employed to fish the mussels are fitted with a black-box system

- Oil pollution:

Oil pollution of the adjacent North Sea affects the area regularly. Thousands of birds, especially sea ducks fall victim to this type of pollution at regular intervals. The level of oil pollution in the Wadden Sea is low in comparison to the North Sea. Oil pollution has declined over the past decades in both the Wadden Sea and the adjacent North Sea.

- Oil exploitation:

Oil is exploited on a few hundred square metres in the southern part of the national park. Highest safety standards are applied. With the exception of the relatively small loss of habitat associated with the platform, the exploitation of oil in the national park does not have any measurable effect on the ecosystem. Oil exploitation within the national park does not alter the general nature of the area. It is intended to phase out oil exploitation in the long term.

- Climate:

Increases in temperature and sea-level rise are potential threats to the tidal flats and saltmarshes and their flora and fauna.

- Ground-water extraction:

Human consumption of ground-water on the Wadden Sea islands has increased dramatically since the 1950s. There is some evidence that suggests that this is correlated to increases in tourism. Lowering of ground water levels will effect the flora and fauna of wet dune valleys.

- Gravel and sand extraction:

The Wadden Sea has been used as a source of raw materials ever since the coastal region was colonised. Raw materials are still being extracted from the Wadden Sea today. Four commercial enterprises in southern North Frisia engage in gravel extraction. Gravel, and sometimes sand and shell deposits, are exclusively used on the islands and hallig islands, mostly in road construction. During the four years preceding 1997, the annual quantity extracted was about 13 500 t. More than 54 mill. m³ of sand from the Wadden Sea of Schleswig-Holstein have been used for dike construction and reinforcement. After completion of the last great dike enclosures (e.g., Bay of Nordstrand), most of the sand now used goes into dike reinforcements following the Coastal Protection Master Plan. Clay is also extracted for coastal engineering activities.

As recently as 1990 80 000 m³ of clay were removed from the saltmarshes for the reinforcement of the dike of the Dieksander Koog polder in Dithmarschen. In areas enclosed by dikes there are usually sufficient clay deposits landward of the dike.

Wherever such alternatives exist, the clay is extracted from outside the National Park.

- Nutrients:

The increase in nutrient concentrations in the coastal waters of the German Bight has been documented for the past 30 years. Phosphate levels doubled, but are now slowly decreasing. The introduction of phosphate-free detergents as well as phosphate precipitation in sewage treatment plants have resulted in a 50% decrease in river-borne phosphate inputs during recent years. Nitrate levels have only been increasing since the early 1980s and have since trebled. This has resulted in increases of certain planktonic organisms such as the alga *Phaeocystis*, known for its production of foam on beaches. Increased microalgal production and higher biomass levels of benthic fauna have been observed in intertidal sediments. The increase of black discoloration reaching the surface of the sediment in the Wadden Sea of Lower Saxony might also be an indirect consequence of eutrophication. The most conspicuous effect is, however, the mass growth of green algae. The mass development of green algae in the Wadden Sea shows very clearly how this ecosystem has been removed from its natural condition by agricultural and industrial nutrient inputs. Continuous algal mats causing mortality of the bottom fauna, however, have so far affected less than 1% of the intertidal area, and scattered algal growths have been found on 5 to 10% of the surface. Their further expansion is limited by the lack of hard substrates, by water motion and light availability.

- Dumping of dredged material:

On average 364,222 tons/year of dredging wastes are dumped in the in Schleswig-Holstein Wadden Sea. Material dumped into the Wadden Sea mainly originates from the maintenance of shipping lanes.

- Ballistic tests:

On a few days each year the Bay of Meldorf is used by private contractors to test weapons commissioned and supervised by the German Ministry of Defence. Projectiles are shot into the Wadden Sea from various positions on the dike, and from the Helmsand Peninsula. The shells are retrieved at low tide using boats and helicopters. Retrieval and preparatory inspections by helicopter, disturb birdlife.

- Exotic species:

Some 30 exotics species have been identified in the Wadden Sea.

- Pipelines and cables

The laying of cables and their maintenance represent a potential threat to the tidal flats and the organisms that live there.

- Stabilisation of dunes:

Most dunes are stabilised using brushwood and planting of stabilising vegetation.

b)

- Pollution:

North of the Elbe estuary and around the islands of Amrum, Föhr and Sylt, the cadmium concentrations are more than four times higher than the "base values" regarded as "natural". Centres of pollution with mercury, zinc and lead are similar. The data for iron, nickel, copper and chromium are the same as background levels, or exceed these only by one to two times.

All the concentrations are below known "toxic thresholds". They are nevertheless potentially dangerous in the long run, because they might affect biological processes in the Wadden Sea. Effects are difficult to demonstrate, because they may be obscured by the great natural variability of these biological communities. They do lead for example to high levels of pollutants in bird eggs in the region of the river Elbe. The

pollutants are imported to the Wadden Sea mainly by way of the great rivers – and by atmospheric deposition, which plays a less important role, however, in the case of the synthetic organic compounds.

Pesticides are present in relatively high concentrations. Effects of pesticides on phytoplankton and zooplankton have been detected. Pollution with TBT may be the reason for the drastic declines of the Dog Whelk in the Wadden Sea. Contaminants – mercury and organochlorines PCBs, DDT and metabolites, HCB, HCH isomers and chlordane's are analysed in the eggs of Common Tern and Oystercatcher. With the exception of chlordane's, Common Tern eggs exhibit a higher contamination than Oystercatcher eggs. Higher levels (3-20 fold in the Common Tern) of contamination were recorded for the inner German Bight (Elbe estuary region) than for more western or more northern localities. Mercury and organochlorine levels generally decreased in the period 1991 to 2000 although some local increases were recorded (Elbe estuary) (Becker et al. 2001).

- Wind Turbines:
Offshore windparks are planned for the area ca. 10 km west of the national park border.

See also De Jong et. al. (1999) and Lozan et. al. (1994).

23. Conservation measures taken:

The major part of the wetland was designated a national park in 1985 and is protected by the Law on the Protection of the Schleswig-Holstein Wadden Sea (National Park Law) from 22. July 1985. The National Park Law was revised on the 17. December 1999. The revision included an extension of the area covered by the national park, changes in the protection zones within the area and improvements in protection of the area.

According to the National Park Law §2 (1):

“The national park serves to protect the natural development of the Schleswig-Holstein Wadden Sea and to preserve its particular characteristics, its beauty and its natural state. As far as possible an undisturbed development of natural processes should be ensured. The national park is to be preserved in order to protect the habitats of naturally occurring animal and plant species and the relationships between these habitats and species. The whole natural environment its natural development and all plants, animals and ecosystems have an intrinsic value that should be protected.

The National Park consists of two protection zones (Zone I and II)

Zone I: 156.500 ha

Sublittoral:	59.000 ha
Eulittoral	90.000 ha
Sandbanks/beaches	3.100 ha
Saltmarshes	4.400 ha

Zero-use Zone: 12.500 ha
(part of Zone I)

Sublittoral	3.400 ha
Eulittoral	8.800 ha
Saltmarshes	300 ha

Zone II: 284.000 ha

Cetacean protection area (part of Zone II): 124.000 ha

All management objectives are valid for the entire area. The zonation mainly regulates access to the area. Access to the zone I areas (see map) is restricted.

Most of the areas adjacent to the national park that lie in the RAMSAR site are protected as state nature reserves according to State Nature Conservation Law (see appendix I).

The habitats within the national park and the adjacent areas are, in the main part, protected biotopes according State Nature Conservation Law (§ 15a) in line with Federal Nature Conservation Law (§20c).

The National Park and the adjacent areas were designated as a RAMSAR-Area in 1990 and as a EU-Bird Protection Area in 1996. The National Park was designated as a MAB-Reserve in 1990.

Some of the adjacent areas are grazed at low stocking levels for conservation purposes.

The Hallig islands are managed according to the so called Hallig Programme which was implemented in 1987 and revised in 1992. The Hallig Programme was introduced to secure and improve the income of the people living on the islands and to ensure that the halligen are preserved in their present state. The programme takes into consideration the interests of landscape protection, agriculture, coastal defence, nature conservation and tourism. It includes various schemes to improve the protection of the salt marshes and the Brent Geese that feed there.

Hunting was phased out within the national park from 1989 onwards. The national park has been more or less free of hunting activities since the mid 1990s. After the revision of the national park law in 1999 hunting within the national park is completely prohibited. Hunting is allowed in some of the adjacent areas that are part of the RAMSAR site.

A trilateral seal agreement that was implemented in 1991 includes a management plan for the seal population of the Wadden Sea. The plan includes the protection of seal habitat, reduction of disturbance and research and monitoring measures.

The Trilateral Assessment and Monitoring Programme (TMAP) was implemented in 1993 to provide a scientific assessment of the status of the Wadden Sea ecosystem and to assess the status of implementation of ecological targets. It includes the monitoring of general parameters such as weather conditions , land use etc., of nutrients, contaminants, plankton, benthic organisms, fish, birds, seals, salt marshes, beaches and dunes and recreational activities.

Shipping is regulated within the national park according to the Federal Regulations on Shipping in National Parks in the North Sea of the 15. February 1995. In general shipping must be carried out in a way that does not damage, endanger or, more than is unavoidable under the prevailing circumstances, disturb the fauna of the area. Shipping during low tide in the zone 1 areas is restricted to marked shipping lanes. A general speed limit of 12 knots applies within the national park. Shipping is restricted to a maximum of 8 knots in the zone 1 areas outside the shipping lanes. Speeds of 16 knots are allowed in marked shipping lanes in zone 1. Shipping is restricted to marked shipping lanes during the roosting, moulting and pup-rearing seasons in seal protection areas and in breeding and moulting areas of birds that lie within zone 1 areas. The use of hovercraft is forbidden within the entire national park. The use of motorised water skis, water-scooters or other such motorised sport equipment is forbidden in the zone 1 areas.

A common salt marsh management plan was established by coastal defence and environmental authorities in 1995. The plan aims at an ecologically sound protection and management of salt marshes considering both their values in coastal defence and nature conservation.

A trilateral –Dutch, German, Danish- management plan was implemented for the entire Wadden Sea in 1997.

Voluntary agreements have been made with professional and hobby fishermen and with water sports clubs in order to protect marine mammals, moulting bird populations and other sensitive parts of the ecosystem. The agreements include spatial and temporal restrictions on shipping activities and rules on how to behave in sensitive areas.

24. Conservation measures proposed but not yet implemented:

The site was proposed for designation as a Special Area of Conservation according to the EU-Habitat Directive in 1996. An application for the designation of the entire Wadden Sea in Denmark, Germany and The Netherlands as a World Heritage Site (Natural or Natural and Cultural) is under discussion. A number of the adjacent areas to the national park that are included in the RAMSAR site have been proposed as nature reserves (see appendix 1). The area has been nominated for designation as a Particularly Sensitive Sea Area (PSSA) under the International Maritime Organization (IMO).

25. Current scientific research and facilities:

Marine warm-blooded animals in the North and Baltic Seas (MINOS)

This project will investigate temporal-spatial distribution patterns of Common Porpoise, Common Seals and seabirds in the North and Baltic Seas. The information will be used as a basis for the evaluation of the effects of the construction of wind turbines in the offshore area adjacent to the national park. The study will include factors effecting distribution, individual behaviour patterns and sensitivity to disturbances. More than six research institutes will be involved over a two year period.

Acoustic impact on Common Porpoise through fisheries activities

This project is connected closely to the MINOS project. It will investigate the effects of fisheries on the Common Porpoise, especially new acoustic methods of reducing by-catch of this species in fishing nets.

Research facilities include the Wadden Sea research station on the island of Sylt (Wattenmeerstation) of the Alfred-Wegener Institute, the Research and Technology Centre (Forschung und Technologie Zentrum) of the University of Kiel, Schleswig-Holstein in Büsum and the GKSS-Forschungszentrum Geesthacht GmbH, Geesthacht.

26. Current conservation education:

According to § 7 NPG education is an official task to be undertaken by the National Park administration.

A National Park Service (NPS) was initiated in 1996 and was established as a limited company of public utility in 1999. The NPS includes 5 regional visitor centres and a main centre in Tönning "Multimar Wattforum" where amongst other things the results of monitoring within the wetland are presented to the public. Activities range from exhibitions, lectures, slide-shows to a national park youth group and the provision of booklets, leaflets, posters and postcards. Booklets and leaflets cover a number of themes including, for example, single species reports, descriptions of and information on different habitat types, whales and seals, breeding and migratory birds and environmentally friendly behaviour within the national park. National-Park-Service Rangers inform visitors about the Wadden Sea, give advice on the Wadden Sea and behaviour within the national park and offer guided walking tours of the area. A Visitor Information System was established in the site in 1996 in part as a LIFE-Nature project. This system aims to reduce human disturbance of the site especially birds and marine mammals and therewith to protect breeding birds, improve feeding and roosting conditions for migratory and moulting birds and improve conditions for the common seal. The system includes amongst other things information boards and leaflets, maps, educational trails, observation platforms and intensive public information via local media.

27. Current recreation and tourism:

Tourism is the most important economic factor for about two thirds of the communities bordering the National Park. Two million vacationers and eleven million day-trippers spend their leisure time on the west coast of Schleswig-Holstein each year. Every fifth Mark of income in this region is earned in tourism and related jobs. A Working Group Tourism and Conservation works out strategies for the provision of interesting activities for tourists and for directing the flow of visitors within the National Park. Tourism and recreation activities include use of beaches for sunbathing, bathing and sport, wind-surfing, sailing, boating, walks on the mud flats, hobby fisheries and bird watching.

28. Jurisdiction:

The national park part of the wetland is managed according to the National Park Law of the 17. December 1999. The State Office for the National Park Schleswig-Holstein Wadden Sea in Tönning is responsible for the administration of the National Park Law. All

but two of the adjacent areas that lie within the RAMSAR site are state nature reserves and are managed according to the State Nature Conservation Law of the 16. June 1993 (§ 17). The State Office for Nature and the Environment is responsible for the administration of the state nature reserves. The habitats within the national park and the adjacent areas are, in the main part, protected biotopes according State Nature Conservation Law (§ 15a) in line with Federal Nature Conservation Law (§20c). The National Park Office and the Office for Nature and the Environment are subordinate to the Ministry of the Environment, Nature and Forestry of Schleswig-Holstein.

29. Management authority:

The State Office for the National Park Schleswig-Holstein Wadden Sea, Schloßgarten 1, 25832 Tönning, Germany is responsible for the national park. The State Office for Nature and the Environment, Hamburger Chaussee 25, 24220 Flintbek, Germany is responsible for the areas adjacent to the national park that lie within the RAMSAR site.

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