

# Main potentials and conflicts in the German sea space

(a blue print prepared by Katarzyna Scibior, s.Pro)

## I. Main potentials

The German coast is 2389 km long and divided into two parts on the North and Baltic Sea. The natural dynamics of these two vessels are very different: North Sea has a dynamic, deeper character with large tidal fluctuation leading a.o. to the formation of Wadden Sea area. Baltic Sea has low salinity and almost now tidal activity. Both coastal waters (12 sea mile zone) and the open sea are

increasingly under influence of the human activities. Many new forms of use have recently developed alongside the more traditional forms, with particular focus on offshore industries and technologies.

Fig 1. Main sea uses and potential uses on the German North Sea (BSH 2007)

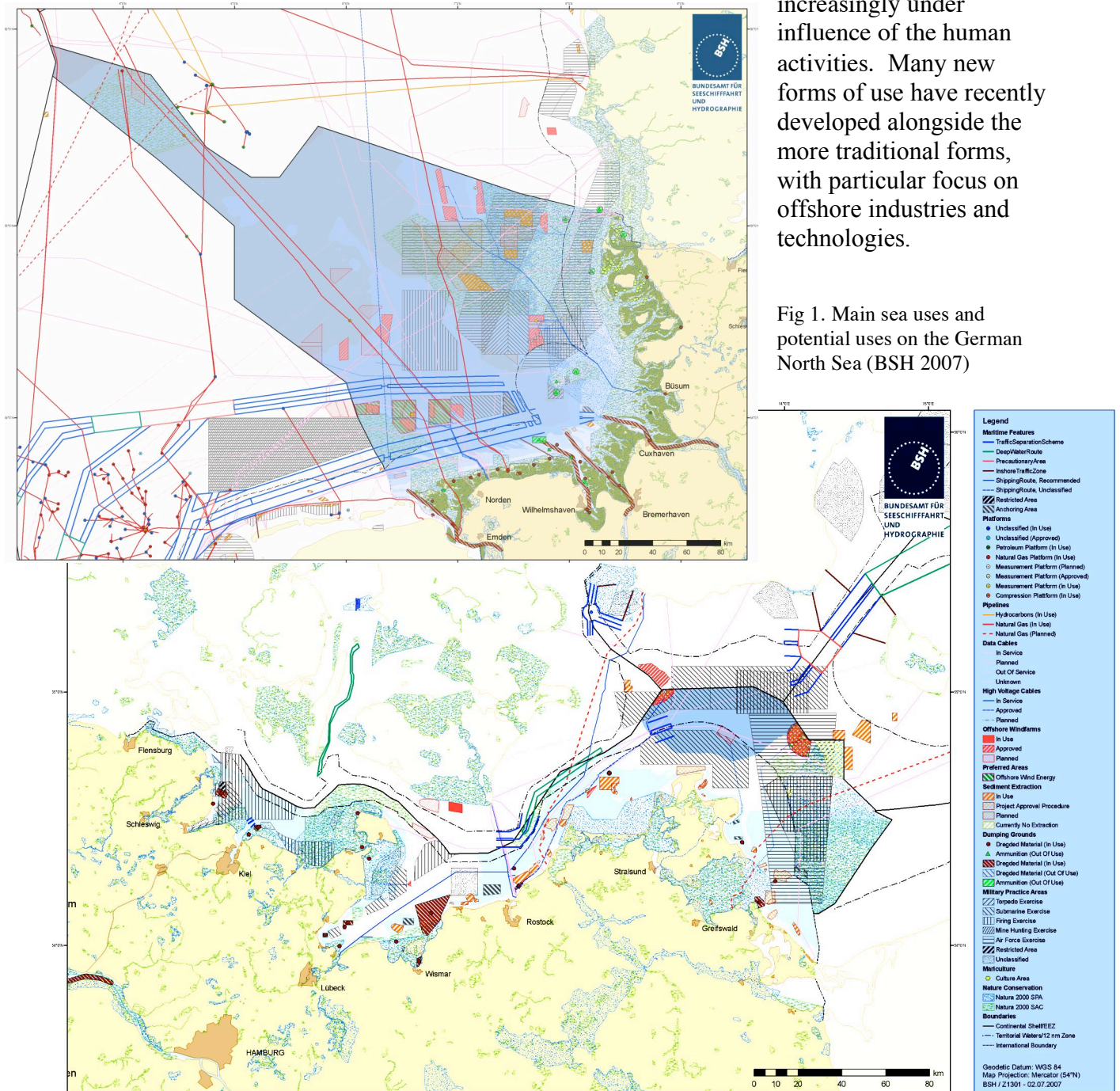


Fig 2. Main sea uses and potential uses on the German Baltic Sea (BSH 2007)

Eight most important offshore trends - areas of most dynamic economic development plus nature protection as identified by the German ICZM Strategy of 2006 are:

### **1. Shipping**

Shipping traffic on both North and Baltic Sea is among the busiest in the world, therefore shipping-associated industries (harbour development, harbour supporting infrastructure, shipyards, inland water connections) are of high priority for the German economy.

The both economically and environmentally relevant aspiration of the German government is the shifting of cargo transports from streets to the sea (so-called motorways on the sea). By 2015 shipping movements in the Baltic are expected to double, although any growth in oil transport will depend on the development of trade with Russia. Tanker size is also expected to rise. For the North Sea similar developments are predicted, based on growth in container, oil and ferry transport. The immense growth rates of the container shipping will therefore be making up for the bulk of the growth in shipping volume. The coastal shipping traffic will be driven by the fishery, ferry traffic and tourism. Increased servicing traffic could be expected related to the expanding off-shore uses.

The losses in German shipping traffic by 10-20% could be consequence of constructing the Fehmarnbelt Bridge in Denmark<sup>1</sup>.

### **2. Development of sea ports**

Germany's ports are highly significant as places of trans-shipment, production and the provision of services. The combined transit volume of the German sea ports of Brake, Bremen/Bremerhaven, Brunsbüttel, Cuxhaven, Emden, Hamburg, Kiel, Lübeck, Nordenham, Puttgarden, Rostock, Saßnitz, Stade-Bützfleth, Stralsund, Wilhelmshaven, Wismar was in 2004 estimated on 272 mio tones and contributed for the 24,6% of the German foreign trade revenue. Except the two large universal ports of Hamburg and Bremen/Bremerhaven, most of German ports are specialised, e.g. Rostock and Lübeck on ferry and personal transport, Wilhelmshaven – mineral oil.

The anticipated growth rates of worldwide container shipping (read more above) is the reason behind a planned development of capacities and improvement of intermodal connections for both central transportation nodes Hamburg and Bremen/Bremerhaven.

The construction of a new deep-water port in Wilhelmshaven (JadeWeserPort) for very large container ships is planned as a joint action of city of Bremen and the federal state Lower Saxony and should start operation in 2009/10.

### **3. Mineral oil and gas extraction**

Besides the large number of British and Norwegian oil and gas extraction sites on the Northsee, there three such appliances on the German waters: the oil-extracting island 'Mittelplate' (within the National Park Schleswig-Holstein Wadden Sea) and two natural gas platforms: 'Manslagt Z1' in the Ems Selta and 'A6-A' in the EEZ. Further, Germany possesses exploration rights to wide areas on the North sea with confirmed natural gas reserves.

Oil extraction rates have doubled in the last decade and so increased the number of extracting appliances and connecting infrastructure such as pipelines. Also the German EEZ is expected to have share on this growth. On Wadden Sea further gas extractions are planned. However, in long term the exploitation of the reserves will inevitably lead to closing up the sites and huge ecological and social problems. Therefore investment in fossil fuels should not be seen as a sustainable

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<sup>1</sup> IKZM Strategie 2006, 21

development potential for Germany.

#### **4. Off-shore wind parks**

Offshore-Windparks are a relatively recent issue in Germany. Interest in offshore wind farming has risen considerably with the introduction of financial incentives by Federal Government, in attempt to meet the goals of the Kyoto Protocol. Developments therefore follow trends in other countries, with Denmark and the UK who are pioneers of offshore energy use.

A decisive factor for the development of offshore wind energy in Germany was the Renewable Energies Act (EEG) of 1 April 2000, which makes it mandatory for electricity providers and grid operators to purchase and transmit energy generated from renewable sources. The Act also guarantees minimum prices for feeding renewable energy into the grid. It therefore created attractive economic framework conditions for those interested in constructing offshore wind park. The federal strategy for offshore wind energy use<sup>2</sup> suggests a gradual approach towards realising offshore wind potentials in North and Baltic Sea. A start-up phase between 2003/4 and 2007 foresees the installation of pilot parks with a total capacity of 500 MW. By 2010, the first expansion phase will provide up to 3000 MW. By 2030, when offshore wind farms can operate at profit, forecasts envisage up to 25.000 MW of installed power<sup>3</sup>. Gross of the German off-shore wind parks development will take place in the EEZ. 20 sites (17 in the North sea, have so far been approved in the German EEZ, other approval procedures are running.

The search for environmentally friendly and low-conflict locations as recommended by the German off-shore wind energy strategy has led to considerable lag between Germany and the neighboring countries on the North Sea such as Denmark or the Netherlands. However, at the moment the approval procedures have been successfully accomplished and many installations are about to start, gross of them in the northern EEZ (17 sites) and Baltic EEZ (3 sites) with total of 1417 turbines. Smaller appliances are planned in the coastal sea of Mecklenburg-Vorpommern (Baltic 1 with 21 turbines) and Schleswig-Holstein in the Baltic sea with 5 turbines.

#### **5. Cables and pipelines**

Internationally more and more services such as the telecommunication, electricity, gas and oil pipelines are placed on the sea bottom, in order to avoid conflicts on the land. New off-shore uses such as energy generation create additional demand for cables and pipelines.

A current project that gained much publicity is underwater pipeline Baltic Gas Interconnector delivering Russian gas directly to Germany. The 1200 km long compound of two pipes, 106,7 cm diameter each is planned to be laid between Vyborg and Greifswald (Mecklenburg-Vorpommern). The construction should start in 2008 and take 4 years. It has been proceeded by a Territorial Impact Assessment (TIA) procedure in order to choose the most suitable and least conflicting with other uses route. Most important pipelines on the North Sea are the gas pipes NORPIPE, EUROPIPE I and II.

Fig. 3 Planned Baltic Sea pipeline: alternative routes

#### **6. Fishery and mariculture**

North Sea is one of the most important fishing grounds world-wide. Herring, mackerel, pollock and cod belong to the most frequently caught fish species. While stocks of the fist three of them are relatively good condition, cod fish (cabeljau) and plaice stocks are extremely depleted and there is

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<sup>2</sup> BMU (2002)

<sup>3</sup> [http://www.bmu.de/files/windenergie\\_strategie\\_br\\_020100.pdf](http://www.bmu.de/files/windenergie_strategie_br_020100.pdf)

uncertainty over whether they can regenerate at all, which suggests that the fish stocks on the North Sea are generally overfished. Both in North and Baltic Sea the trend is towards further reduction of catchment quotas and increased management of fish stocks. On the German North Sea coast the number of people employed in the fishing industry shows a steady decline, although shrimp fishing has stabilised in Schleswig-Holstein at a low level. There is a general trend towards reducing fishing fleets, with higher investment in new technology and fishing methods and increased international competition.

Mariculture of crabs and shellfish is practiced on a relatively small scale in the brackish waters of the Wadden Sea. Relevant is the production of crab and shellfish and to a smaller degree oysters. On Baltic Sea mariculture has, due to unfavourable natural conditions, no significant potential.

## **7. Marine protected areas and coastal nature reserves**

With increasing pressure of use, protection of marine ecosystems is becoming more and more important. Due to non-stationary nature of some marine fauna the designation of marine protected areas can be difficult. Whilst some species are dependent on certain conditions such as breeding areas, others travel long distances, requiring effective international co-operation for their protection.

Germany is signatory to several international conventions. The most important agreements at an EU level are the EU Birds Directive, which demands the designation of so-called Special Protection Areas, as well as the EU Habitats Directive. Others include the Ramsar Convention for the protection of wetlands, the Bonn Agreement to protect migratory birds as well as special agreements on the protection of seals and whales. All international conventions protect both individual species and their habitats.

Until 2002 Natura 2000 sites, Important Bird Areas and Special Protection Areas were only proposed in coastal and inshore waters. Amendment of the Federal Nature Protection Act in April 2002 also allowed the designation of marine protected areas in the EEZ. Four areas in the North Sea and six in the Baltic have since been formally proposed to the EU as potential SPAs<sup>4</sup>.

In the Baltic Sea HELCOM agreed the designation of special Baltic Sea Protected Areas, which are significant for migratory birds as rest and breeding areas. In the North Sea, the Wadden Sea offers a continuous protected area extending from the Dutch to the Danish coast. In addition to its designation as a National Park, the entire Wadden Sea is also classed as a Particularly Sensitive Sea Area (PSSA) by MARPOL and IMO. In 2005 the Baltic Sea was also included in the list of PSSAs<sup>5</sup>. PSSAs serve to regulate shipping and allow the introduction of appropriate transboundary measures such as requirements for navigation or shipping safety.

Despite the stated difficulties there is a trend towards increased designation and recognition of the significance of marine protected areas. The EU- maritime policy also supports this trend. Greater continuity between marine protected areas and coastal nature reserves is planned.

## **8. Tourism**

In all coastal regions of Germany tourism is one of the most important economic driving forces. In Schleswig-Holstein, the tourism industry represented 4.7% of the total revenue in 2004, with 80.000 people directly and another 50.000 indirectly employed in tourism. Tourism is particularly important in Mecklenburg-Vorpommern, with gross turnover reaching 3.5 billion euros annually.

Germany's coastal regions are very attractive to holiday-makers. Apart from the natural coastal landscape and the recreational value of beaches and islands, interest is also growing in coastal

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<sup>4</sup> [http://www.bmu.de/naturschutz\\_biologische\\_vielfalt/natura\\_2000/doc/35487.php](http://www.bmu.de/naturschutz_biologische_vielfalt/natura_2000/doc/35487.php) (15.2.2006)

<sup>5</sup> [http://www.imo.org/Environment/mainframe.asp?topic\\_id=760](http://www.imo.org/Environment/mainframe.asp?topic_id=760)

towns and cities where the refurbishment of old harbour and industrial sites has created attractive spaces directly on the water. Overnight stays are much higher on the coast than in the hinterland: in Schleswig-Holstein for instance 80% of all overnight stays are in coastal districts and islands.

Following years of direct competition coastal regions now show increased individual profile and market stabilisation, which is combined with targeted thematic marketing. Coastal regions focus on quality rather than mass tourism and the qualities of the natural coastal environment, emphasizing possibilities for active recreation, water tourism, wellness, camping and culture. Improvements in tourism infrastructure are an issue particularly in Mecklenburg, since the EU expansion not only leads to higher tourist numbers, but also to much direct competition through new destinations<sup>6</sup>.

## **9. Sand and gravel extraction**

In Germany, sea bottom sediments are used mostly for harbour development and construction industry, sand finds application in beach nourishment. Gross of the commercially interesting sand and sediments deposits can be found in the shallow areas of the North Sea between 6 and 20 meters depth.

Although in the German coastal waters no further extraction is currently planned, in the EEZ large gravel extraction sites have been granted or are currently undergoing approval. In late 2002 for example, a large field “Weiße Bank” (OAMII) was approved in the North Sea for a period of 30 years.

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<sup>6</sup> dwif-Consulting GmbH: Landestourismuskonzeption Mecklenburg-Vorpommern 2010, <http://www.wm.mv-regierung.de>



## II. Sea use Conflicts

Matrix in Fig. 3 shows the compatibility of existing or planned uses on German sea waters. The darkest fields mark the highest incompatibility, which can easily be interpreted as conflicts or potential conflicts. Medium fields can fairly be a subject to mitigation through zoning and other maritime spatial planning measures (PlanCoast Handbook 2008 after Gee et al. 2006).

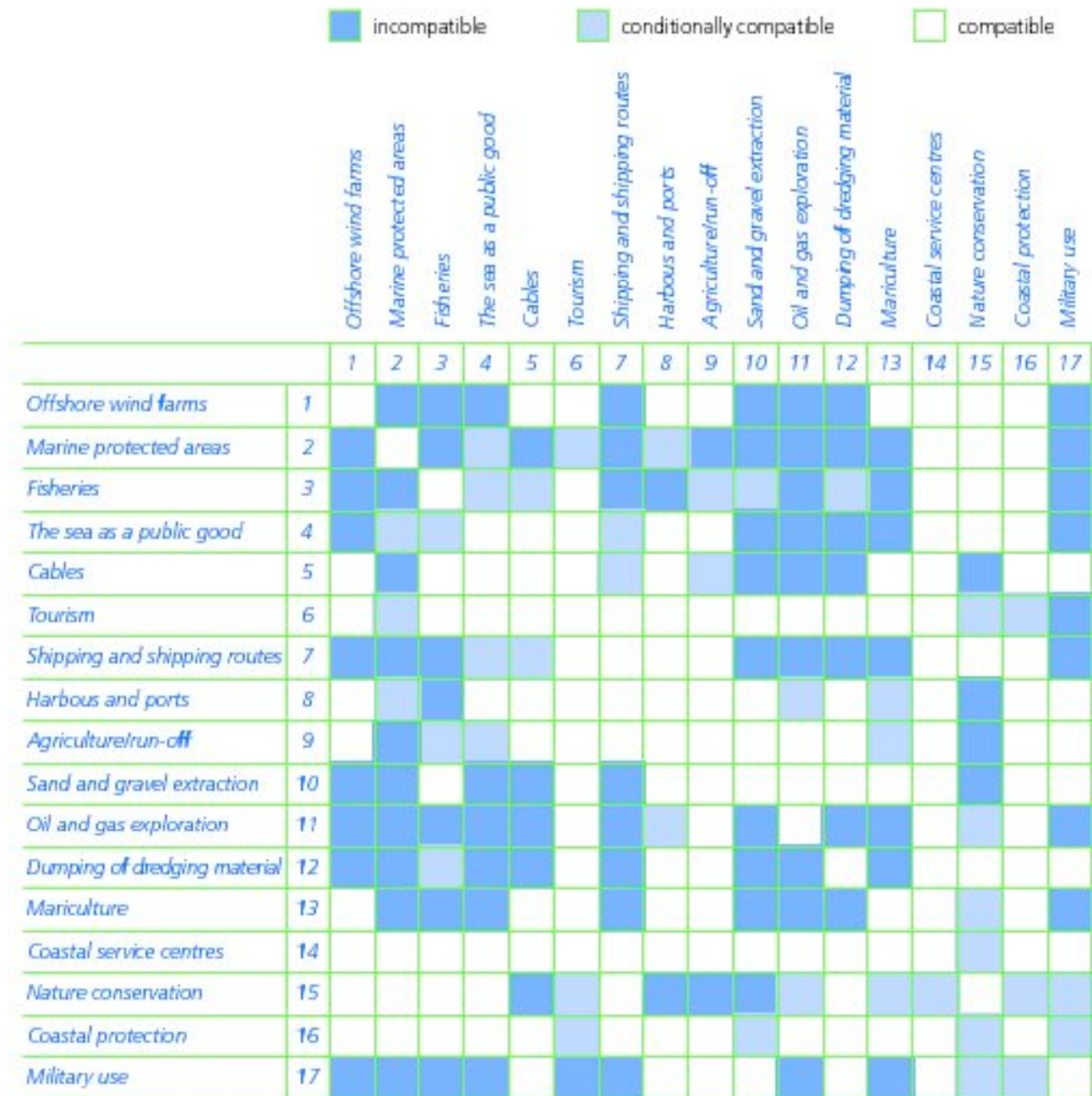


Fig. 3: Compatibility of German sea uses (PlanCoast Handbook 2008)

### 1. Offshore wind farms

In practice, the realisation of the ambitious German offshore strategy goals will not be easy. The current state of the art allows construction of offshore wind farms at up to 40 m depth, effectively restricting them to areas that are already covered by a multitude of other uses such as shipping, fishing, military use and nature conservation.

Offshore wind farms are amongst the most controversial forms of marine resource use. Critics point

out uncertain effects of fixed large-scale installations on marine ecosystems and the lack of co-ordination with other forms of use when issuing permits. Effects of large-scale farms on migratory birds, whales or fish species also remain unclear. The biggest risk of ecological and social relevance is the collision risk with ships. In order to exclude it, a risk analysis has to proceed every site designation.

Other potentially conflicting uses are fishery, military and tourism (the 'spoiled horizon'), as well as environment. Sea mammals are believed to be disturbed by the vibration of the pillars, and birds could be victims of the mills' rotation. Time-management schemes could prove effective in this case, as birds are usually, as birds migrate only at certain short periods of the year and knowing that, the turbines could be closed.

All in all, the co-ordination of offshore wind farming with other forms of use represents a real challenge for spatial planning. Designating favoured zones for offshore wind farming requires many other interests to be taken into account, for instance mining and access rights to the sea bed, shipping safety, shipping routes, military use, fisheries, nature protection and also underwater cables and pipelines (e.g. telecommunication cables). Potential collisions of oil tankers with offshore wind farms represent a particular concern. Although the German coastal *Länder* have agreed not to place offshore wind farms in the Wadden Sea, they do have an interest in placing them as close to the coast as possible to facilitate the testing of relevant technologies.

## **2. Marine protected areas**

Marine protected areas are typically hot-spots for numerous conflicts, as they tend to be sensitive to changes in water quality and other systemic disruptions. Systemic changes can be caused by badly sited offshore wind farms, which in the Baltic Sea could affect water exchange rates and disrupt the natural balance of the system (e.g. salinity). Water quality is also dependant on the nutrient and pollutant intake from rivers and cannot therefore be controlled by coastal or marine management alone. In this context the implementation of the Water Framework Directive (WFD) becomes a key element of successful coastal zone management. Another problem is the potential long-range effects of alterations to the sea-bed or abiotic changes for which monitoring and control are all but impossible. In principle, therefore, marine protected areas conflict with all other forms of use that have a negative effect on habitats and individual species. These include sediment extraction, fisheries, dumping, shipping, cables and pipelines, low flight zones, (potentially) offshore wind farming, tourism and (potentially) mariculture.

Spatial analysis can help to determine which conflicts are inevitable and which can be resolved through appropriate management. Spatial planning needs to recognise the importance of marine protected areas whilst at the same time developing regulatory approaches for new and existing demands on marine resources. Although they need to be designed so as to ensure maximum ecosystem protection, marine protected areas should not exclude new and innovative forms of use as a point of principle.

Zoning and other management concepts in coastal protected areas have led to restrictions of other forms of use, most notably fisheries and tourism. During the 1999 amendment of the National Park Act in Schleswig-Holstein, this led to considerable debate and resistance of the population to the National Park. Indirect factors such as the influx of pollutants or the effects of coastal protection measures are difficult to influence or regulate. In the Baltic Sea region, activities in river catchments or industrial air pollution have an influence on the sensitive marine environment. International co-operation and the implementation of appropriate regulatory measures represent a big challenge in the international areas affected.

Given appropriate management tourism can be compatible with nature conservation objectives. In

many cases public participation in protected area planning can lead to greater acceptance of management measures. Because of the particularly emotional nature of the debate, a clear distinction needs to be drawn between real and imagined conflicts in the case of nature conservation.

### **3. Fishery**

Conflicts arise with nature conservation on account of overfishing and subsequent alteration of marine communities, through fishing waste and disturbance of the sea bed, conflicts between different fisheries because of increased competition and unsustainable practice. Uses that negatively impact on fishing include all those that involve fixed installations with potential impacts on spawning and fishing grounds, installations precluding the free movement of fishing vessels, cable and pipeline routes or the designation of marine protected areas and no-fishing-zones. Also significant are developments at a European level. Growing pressure on remaining resources, the restructuring of EU policy and increasing competition amongst fishermen lead to higher conflict potential and pressure to make maximum use of whatever resources remain.

Spatial planning should seek to support sustainable fisheries and mariculture. Coastal fishing represents an important part of coastal identity and should be stabilised, possibly in collaboration with secondary uses such as tourism. Co-operation with relevant institutions is an important prerequisite for success, as is intense and active participation of the fishermen themselves.

### **4. Cables and pipelines**

Gas pipelines and other sea bottom structures such as cables present a relatively limited conflict potential with other uses. A clear use limitation is the extraction of sand or other materials from the sea bottom. Constraints from environmental point of view (clash with MPAs) are scientifically disputable, although some kind of electromagnetic radiation cannot be denied. Through reinforced coverage of the pipelines the negative impact can be somewhat minimised.

Obvious and quite invasive disturbance takes place during the construction phase of the pipeline, when other activities such as fishery or shipping are interrupted. The negative impact on birds or fish is of a potentially lasting character. The oil pipelines present an additional risk in case of leaking. An anchor can tow the cable and damage (slice) pipelines. Therefore it is important that cables are put parallel to the pipelines to save space, that their crossing is avoided as much as possible, and that when it has to happen, the cables are placed above the pipelines. Their location must be chosen particularly carefully also in order not to collide with other sea-bottom uses.

In order to minimise the permanent conflict potential, the so-called earth-cables are becoming popular, despite the considerably higher initial costs.

### **5. Tourism**

Tourism brings direct and indirect threats to terrestrial and marine ecosystems. Direct threats include disturbance of breeding birds, access to sensitive habitats or destruction of habitats through infrastructure development. Indirect threats include rising amounts of waste water, domestic waste, arrival and departure as well as travel to and from destinations. High numbers of tourists, particularly during the summer months, can also lead to social stress and conflicts between residents and visitors.

In all areas mentioned efforts are under way to limit negative effects and to develop joint strategies for the future. These include attempts to lengthen the season and to achieve a more even spatial



spread of tourist numbers.

On the other hand, other uses can have negative impacts on tourism. Environmental issues such as oil spills, algae bloom or marine pollution create a negative image for coastal tourist regions. Large-scale changes to the sea-scape, such as possibly wind farms, also count amongst these.

On the water, recreational boating is a growing trend with large potential spin-offs for smaller harbours. The use of offshore installations such as wind farms for tourism is conceivable, although it is difficult to come up with definitive figures. It is feasible, at least, to develop specific products aimed at these new offshore markets.

Unlike any other form of use tourism affects both sea and land in a complex pattern of interaction. Travel alone means that the impacts of coastal and marine tourism extend far afield. The effects of short-term trends and fashions can be felt by ferries, certain regions or small ports, to name but a few. Spatial planning needs to be aware of these interactions and seek to support the particular strengths of coastal and maritime tourism. Infrastructural consequences of demographic developments in Mecklenburg-Western Pomerania need to be considered as well as the growing interactions with Eastern European countries. Valuable natural and cultural goods, often key factors for maintaining or promoting tourism, need to be safeguarded. This particularly includes the special attraction of coastal landscapes which are often of particular significance for local identity. A good example for this is the unique cultural landscape of the Wadden Sea coast.

## **6. Shipping and shipping routes**

In both coastal waters and the EEZ shipping has to meet environmental standards and respect protected area designations. Nevertheless, shipping has “privilege of spatial use”, which brings with it considerable potential for conflict. Conflicts arise with nature conservation (accidents, pollution from vessels, alien species), offshore wind farming and the maintenance of cables and pipelines on the sea bed. Shipping security can be negatively affected by permanent installations on the sea. Significant conflicts of interests between the off-shore industry and shipping authorities like the IMO are the consequence. Maximum safety at sea is considered a priority, so if conflicts arise, they are usually resolved in favour of shipping. The position of prime importance is also reflected in German legislation<sup>7</sup>.

Together with the Federal Waterways and Shipping Authority (WSD) the Federal Ministry for Transport, Building and Urban Affairs has developed a so-called Safety Concept for the German Coast, which is continually updated and expanded according to needs. Top priorities include the avoidance of shipping accidents and the minimisation and control of any damages. The concept relies on separating opposing streams of traffic through traffic rules, monitoring of traffic by dedicated centres, the mandatory use of pilots, policing, availability of tugs, fire protection as well as control of accidents involving pollutants.

To increase safety before the coasts so-called separation zones have been implemented, which spatially separate ships travelling in opposing directions and also ships carrying different types of load. In the EEZ the responsibility for marking and managing these separation zones lies with the Federal Waterways and Shipping Authority<sup>8</sup>. Overall, the use of pilots needs to become a standard requirement, as does the provision of accident contingency plans.

## **7. Harbours and ports**

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<sup>7</sup> Landesregierung Schleswig-Holstein (2005)

<sup>8</sup> [http://www.wsv.de/Schifffahrt/Seeschifffahrt/Ausschliessliche\\_Wirtschaftszone/index.html](http://www.wsv.de/Schifffahrt/Seeschifffahrt/Ausschliessliche_Wirtschaftszone/index.html)

Dredging existing harbour basins and rivers to make them suitable for ever larger container ships has serious effects on the marine ecosystem. This particularly concerns the consequences of dredging the Elbe and Weser Rivers. Significant compensation measures are required in the context of expanding the Bremerhaven container terminal. In case of container terminal VI for instance former agricultural land is to be turned into ecologically valuable zones.

## **8. Sand and gravel extraction**

From ecosystem point of view, sediments extraction means direct destruction and frequently irreparable loss of whole underwater habitats. Suitable measures can be applied however, to minimize and terminate this impact. Further conflicts persist with sea bottom activities such as cables and pipelines, off-shore energy extraction and generation (wind parks) and fishery.

Through transformation of the sea bed morphology potential conflicts with the coast protection cannot be excluded.

Given the high conflict potential of aggregate extraction on land and the increasing scarcity of suitable raw material the importance of offshore extraction is likely to increase. Spatial planning will need to deal with technicalities of extraction, impacts on nature conservation and questions of shipping. Related issues include connections to coastal service centres and ensuring links to transport infrastructure on land.

## **9. Oil and gas exploration**

Oil and gas extraction sites are ecologically relevant through accident risk and high negative impact during the installation and operation of the platforms and the related infrastructure.

Since platforms drastically change and deteriorate marine habitats, conflicts with nature protection and fishery are acute, especially in the national park Wadden Sea in Schleswig-Holstein. Another significant and likely to become more problematic conflicts of uses is the off-shore wind parks, since platforms hinder the development of power leading cable networks (and the wind parks as such).

## **10. Mariculture**

In contrast to fishery, mariculture has an obvious spatial dimension since it is a static sea-use (cages). The space conflicts are mainly limited to the shallow coastal waters, river mouths, etc. where mariculture/aquaculture is most suited.

The main negative impact of mariculture on sea habitats is pollution: nutrient and organic enrichment and input of chemicals and medicines. Moreover, mariculture can be a source of diseases and (often genetically modified) alien species that spread into the natural environment in an uncontrolled way. Seed mussels are harvested from natural mussel banks, increasing pressure on this resource. All those risks can be restricted by good management practice on the site, however they can never be entirely excluded.

Spatial planning should seek to support sustainable fisheries and mariculture. Increased use of the EEZ brings additional options for co-use, such as e.g. mariculture cages attached to offshore piles.

## **11. Coast protection**

Despite all management attempts, coasts are dynamic environments without a fixed end state. Coastal defence through fixed structures leads to conflicts of use with cable and pipeline routes, shipping, port development as well as oil and gas exploration.

Conflicts with nature conservation rank among the most prominent conflicts for coastal defence. The construction of dykes and other measures alter the physical environment and also influence hydrography and patterns of sedimentation. All of these can have negative impacts on coastal spawning grounds, biodiversity and individual species.

Coastal retreat is an option where suitable areas are available and where acceptance of the population is present. This can be difficult since coastal defence is still a defining principle for many coastal communities. In Mecklenburg-Western Pomerania protection of the Bodden is a key issue, with deficits in research and planning particularly apparent around the area of Darß and Zingst.

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