



## **More Maritime Safety for the Baltic Sea**



### **WWF Baltic Team 2003**

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# **“WWF’s demand: More Maritime Safety for the Baltic Sea – Particularly Sensitive Sea Area (PSSA) status with additional protective measures needed**

## **Summary**

The scenario of a severe oil accident in the Baltic Sea is omnipresent. In case of a serious oil tanker accident all coasts of the Baltic Sea would be threatened, economic activities possibly spoiled for years and its precious nature even irreversibly damaged.

The Baltic Sea is a unique and extremely sensitive ecosystem. Large number of islands, routes that are difficult to navigate, slow water exchange and long annual periods of icecover render this sea especially sensitive. At the same time the Baltic Sea has some of the most dense maritime traffic in the world. During the recent decades the traffic in the Baltic area has not only increased, but the nature of the traffic has also changed rapidly. One important change is the the increase of oil transportation due to new oil terminals in Russia. But not only the number of tankers has increased but also their size has grown.

The risk of an oil accident in the Gulf of Finland will increase fourfold with the increase in oil transport in the Gulf of Finland from the 22 million tons annually in 1995 to 90 million tons in 2005. At the same time, the cruises between Helsinki and Tallinn have increased tremendously, and this route is crossing the main routes of vessels transporting hazardous substances.

WWF and its Baltic partners see that the whole Baltic Sea needs the official status of a “Particularly Sensitive Sea Area” (PSSA) to tackle the environmental effects and threats associated with increasing maritime traffic, especially oil shipping, in the area. A PSSA is an area which due to its ecological, economic, cultural or scientific significance and its vulnerability to international shipping activity needs special protection. The whole Baltic Sea fulfills such criteria. PSSA status, designated by IMO, (International Maritime Organisation) can be used to protect a variety of marine and coastal habitats as well as marine wildlife, and to improve maritime safety.

Due to the fact that the main shipping route passing through the Baltic Sea, from the Sound to the Primorks harbour in the eastern part of the Gulf of Finland, plying a lot of important areas for seals, fish and sea birds WWF suggests that the Vessel Traffic Monitoring and Information System (VTMIS) including Automatic Identification System (AIS) and traffic separation schemes should be established for the whole Baltic Sea. In the case of an big oil accident a common combating infrastructure of the Baltic Sea states and enough emergency capacities must be in place.

International collaboration is as crucial for environmentally sound shipping as it has been for nature conservation. The Baltic Sea PSSA could be an important and needed next step to do both.

Our common goal should be to enable a lasting, sustainable coexistence of shipping and unique nature in the Baltic Sea. WWF wants to highlight the fact that PSSAs are not simply a reflection of high ecological importance but also protect sites of high socio-economic importance and educational value against harmful effects caused by international shipping. The list of prioritized areas with need of additional protective measures in the Baltic Sea is included in this proposal.

WWF and its partners wants also to stress the urgent need to ban single hull vessels to enter the Baltic Sea in a few years from now, i.e. well ahead of 2015 as decided by IMO in 2001. Further, the illegal oils spills should consequently be monitored and all national measures (in territorial waters

and in Exclusive Economic Zone (EEZ)) and international measures (international waters) taken in use and further developed to tackle this this problem which nowadays is worse than oil accidents in the Baltic Sea annually. Difficult ice conditions, especially in the northern parts of the Baltic Sea should also taken account seriously and standardized ice classification requirements included as additional safety measures in the Baltic PSSA application.

In the case of accident it is important that there are adequate resources to combat oil spills in the Baltic area and an effective international collaboration. After the enlargement of European Union in the Baltic area, we should consider a Common Baltic coast guard under EU to combat oil spills as the Baltic Sea will be EU's inland sea.

Within its boundaries core areas, that need more strict protective measures to avoid or control the maritime activities, should be identified as well as those specific protective measures which are needed in each area. WWF is giving here enclosed a detailed proposal about the core areas (Fig. 4., APPENDIX III) and additional safety measures needed (Table 2, APPENDIX III).

## CONTENTS

1. Introduction.....	5
1.1. The Baltic Sea.....	5
1.2. Shipping as a main threat for the Baltic marine life and Baltic human societies - Vulnerability to damage by international shipping.....	6
2. Statistics on shipping and oil transport.....	7
3. Statistics on ship accidents: groundings and collisions .....	8
4. Safety measures for shipping in the Baltic Sea.....	12
4.1. Existing measures.....	12
Reporting systems.....	12
The Danish Ship Reporting Systems, SHIPPOS.....	12
Pilotage.....	14
4.2 .Additional safety measures urgently needed.....	15
<b>What is a PSSA?</b> .....	15
WWF's proposal: Additional protective measures to be taken for the whole Baltic Sea.....	16
WWF's proposal: Additional protective measures needed for the core areas in the Baltic PSSA.....	16

## APPENDICES

I	Distribution of oiltanker movements in the Baltic Sea in 1997
II	Forecast for the ship movements in 2015
III	Descriptions of the Baltic core areas which need special protection against international shipping
IV	Glossary of terms and abbreviations used

# 1. INTRODUCTION

## 1.1 The Baltic Sea

The Baltic Sea can be characterised as a semi-enclosed ecosystem, with slow water exchange, giving the Baltic water a residence time of 25-35 years. The catchment area of the Baltic, 1.6 million km<sup>2</sup> is four times larger than the area of the basin, 373 000 km<sup>2</sup>.

There are no tides in the Baltic; however, seasonal variation in the water level can be more than 1.5 m due to the changes in atmospheric pressure and winds.

The Baltic Sea is the second largest brackish-water ecosystem in the world. The salinity of the Baltic Sea is a result from a huge annual freshwater river runoff from the drainage basin and inflow of saline water pulses through the Danish Straits under special environmental circumstances. In the northern Baltic Sea salinity is extremely low, approx. 2- 6 promilles, compared with oceanic salinity, and it can be regarded as a major factor constraining the distribution of species.

Due to exceptional salinity conditions, the Baltic Sea is characterised by low species diversity of freshwater and marine origin, and a simplified food web. The number of macroscopic marine algae in the Baltic Marine area decreases from more than 350 species in the Kattegat (with salinity of 23 promilles) to less than 90 species in the low-salinity waters of the Stockholm archipelago where salinity is approximately 5-6 promilles. Further north in the Botnian Bay all but one of the 32 algal species are freshwater species. The same pattern is seen in fish species. Marine species dominate in Kattegat, while freshwater ones occur in coastal areas. The evolutionary history of the Baltic Sea with freshwater and marine phases has given rise to this quite unusual aquatic biota with not too many species but a huge amount of individuals, i.e. very high productivity.

Some of the species in the Baltic Sea are so called “habitat-forming” species, often also called “keystone” species. These have an indisputable importance by creating a life-supporting environment for other species and that is why their occurrence is most important. Typically habitat-forming species are plants, such as brown algae and eelgrass. A few animals have a habitat-forming role, e.g. common mussel can form banks that are inhabited by other animals.

Seasonal variation is characteristic for the Baltic Sea, especially in the northernmost parts. In the Gulf of Finland surface water temperature varies annually between 0 and 20 °C and the sea normally has an ice cover for 100 days each year.

Due to the Ice Age, land uplift is still an ongoing process along coastal areas, especially in the northern parts of Baltic. A slow but permanent land uplift process (5- 7 cm/y) leads to a birth of particular phenomenon: shallow fladas and oxbow lakes. These areas are usually very rich in their birdlife. The Baltic Marine area as a whole encompasses many highly important staging areas for sea birds, and more than 30 species breed along the shores. The shallow parts of the Baltic coastline, frequently covered by grasslands, are of great importance for migrating waterfowl, including thousands of Arctic ducks, geese, swans, cranes, ducks and waders, to northern nesting grounds in spring time. Other productive parts, like shallow marine hard-bottom areas of the Baltic Sea, are of international importance for diving ducks during the winter and migrations periods.

The coastal zone serves as a nursery ground for many economically important fish species, e.g. the Baltic herring, although little is known about species composition, habitats, genetic diversity, ecology and endangerment, particularly in the case of non-exploited fish species.

The Baltic Sea is a part of the north-east Atlantic Global 200 ecoregion, one of the 238 areas world wide that WWF regards as priority areas for nature conservation. WWF`s mission is to save the Baltic Sea for future generations. The action plan that WWF is developing for the Baltic Ecoregion includes several measures to improve and safeguard marine biodiversity, and to stop and decrease eutrophication, illegal oil spills and oil accidents.

The uniqueness of the Baltic Sea is also reflected in many other international conservation networks such as Important Bird Areas (IBA-areas), Baltic Sea Protected areas (BSPA) established by Helsinki Commission, RAMSAR-sites, National parks, Seal Sanctuaries and several large NATURA 2000 areas.

After the enlargement of European Union in May 2004 only Russia will be non EU member in the Baltic Sea area and the Baltic Sea will be EU`s inland sea. Regional co-operation among all Baltic Sea states is, however, still necessary to ensure ecologically sustainable maritime transportation.

## **1.2. Shipping as a main threat for the Baltic marine life and Baltic human societies**

### **-Vulnerability to damage by international shipping**

The Baltic Sea has always been an important route for shipping activities, at present also for oil transportation as there are several important oil terminals in Estonia, Finland, Latvia, Lithuania and Russia. The oil transportation has doubled in the last six years and it is expected to increase up to 160 million tons by 2010 as a result of the building of new oil harbours in Russia, in Primorsk and in Vysotsk. Not only oil and chemical tankers use the Baltic Sea but container and bulk carriers of often more than 100.000 TDW sail through the narrow straits of the Baltic Sea, and their lanes are also often crossed by fast ferries and pleasure crafts.

The increase in maritime traffic due to increased amount oil and chemical transportation is causing an increased risk of oil accident. Especially in areas like the Sound, the Great Belt, the Kadet Trench between Germany and the Danish Falster the Baltic Proper and the Gulf of Finland, where the narrow and shallow straits and shallow banks are causing additional risks. In the northern Baltic Sea an annual ice cover makes the shipping extremely demanding and even statistically, winter is the most dangerous time for oil shipping. The most serious danger is caused by ships in poor technical condition, without standardised ice classification or with inadequately trained crews. Ice classification was discussed during the last winter 2003, especially concerning the tankers (> 100 000 tons) shipping oil in thick ice (60-80 cm) from the Russian harbour Primorsk, in the Gulf of Finland, to the western market.

The latest serious oil spill in the Baltic Sea was in 2001 when the Bulk Carrier "Tern" and the tanker "Baltic Carrier" collided in the Kadet Fairway and c. 20 000 seabirds were contaminated. This collision and the recent sinking of oil tanker "Prestige" in Spanish territorial waters, as well as the cargo vessel "Nicole" in the Adriatic Sea, Italy and of the barge "Spabunker IV" off the Andalucian bay of Algeciras, Gibraltar, once again illustrate the insufficient control over ships in areas highly vulnerable such as the Baltic Sea to harmful impacts of shipping activities.

And further, the case of the Chinese freighter Fu Shan Hai that foundered off Bornholm in Denmark in the beginning of June 2003 illustrates the need for increased control and tougher rules for shipping in the Baltic Sea. More than 1000 tons of crude oil and 65 000 tons of potassium chloride have been spilled since the freighter Fui Shan Hai sank. She was loaded with 1700 tons of heavy fuel oil and fertilizer from Latvia to China when she was rammed by the container ship "Gdynia".

This accident demonstrated once more the risks involved in shipping and transporting dangerous chemicals, even though in this case cargo was only a relatively non toxic fertilizer.

An oil or chemical accident could have disastrous effects on the vulnerable nature of the Baltic Sea, especially on spawning areas of fishes and breeding and resting areas for birds and marine mammals, such as seals and the endangered harbour porpoise. Further, an oil accident would hit the local economy by impacting on tourism, fishery and aquaculture. Thousands of breeding and wintering water birds would be the first victims of an oil spill. The shallow offshore banks in the southern Baltic Sea are of international significance for several species of wintering sea birds, e.g., more than 25% of the European population of long-tailed ducks spend the winter on Hoburgs Bank. Studies have shown that as many as 100,000 long-tailed ducks are affected by oil every year in this area alone due to illegal discharges of oil by vessels that traverse the international shipping lane through the Baltic Sea. Oil smothering of birds is the greatest threat to bird populations as oil-smothered birds lose their insulation and die of hypothermia or drowning.

An oil slick hitting the haul-out areas of seals would be especially deleterious in the breeding season. The Baltic fishermen, commercial as well as leisure-time, would suffer from an oil spill through the tainting of fish and damage to them and their prey. An oil slick hitting the beaches with summer houses or hotels would be a blow to the tourist industry. Illegal oil spills from vessels are, unfortunately, also a serious problem in

Not only nature protection demands a clean Baltic Sea but also fishing business as well as tourism and pleasure boating are economic sectors that rely on a clean and unspoiled Baltic Sea. An extensive oil pollution e.g. in the fishing grounds could destroy irreversibly the basis for the existence of fishing industry. The biodiversity of the Baltic marine area is under pressure, not only due to natural variations in hydrographical conditions, but increasingly due to the impact of human activities, including shipping. Approximately 90 % of the marine and coastal biotopes in the Baltic Marine Area are to some degree threatened, either by loss of area or reduction in quality.

When considering other harmful environmental effects caused by international shipping in the Baltic Sea, noise, the waves, currents and pressure effects need to be taken account of. The risk of increasing invasion of alien species via ballast water is an additional environmental effect of increasing oil shipping.

The countries that have ratified the Convention of Biological Diversity are committed to the preservation of biodiversity, the sustainable use of biological resources and equitable distribution of their benefits. The convention covers also Baltic marine habitats which should encourage us to do all we can to prevent the loss of Baltic biodiversity.

Worry about the decline in marine biodiversity is just now very much discussed. In the beginning of June 2003 leaders of the worlds eight largest industrialized democracies (G8) wound up their annual meeting on the shore of Lake Geneva with a joint statement that emphasizes environmental responsibility and sustainable development and called for measures to prevent marine pollution and decline in marine biodiversity.

## **2. STATISTICS ON SHIPPING AND OIL TRANSPORT**

In the Baltic Sea the last ten years have seen a steadily growing maritime traffic – a sign for the intensified co-operation in the Baltic Sea region and a prospering economy.

According to HELCOM RESPONSE meeting in October 2002 the volume of goods transported via The Baltic Sea will double. Looking at different sectors, general cargo and container traffic is expected to triple, oil transportation is thought to increase by 40 %.

The distribution of oil tanker movements in the Baltic Sea in 1997 is illustrated in Appendix I (Rytkönen *et al.* 2002 and the forecast for ship movements in 2015 is presented in Appendix II (Rytkönen *et al.* 2002).

To give an example there are more than 550,000 calls to Danish ports by freighters, tankers, roll-on-roll-off ships and passenger ships and about 60,000 passages in and out through the narrow Danish straits along even narrower traffic lanes annually.

**The Sound** is a strait between Denmark and Sweden, 118 km long and 4-28 km wide. The northern entrance is funnel-shaped, 3.7 km wide and 50 m deep where it is narrowest between Helsingør and Helsingborg. The combined bridge and tunnel crossing between Denmark and Sweden going via an artificial island south of Saltholm has left a 3 km wide opening over the tunnel to the west and a 490 m wide and 57 m high passage under the bridge to the east leading to Køge Bay. The deepest passage is Drogden, with a guaranteed minimum depth of only 8 m in an approximately 300 m wide and 7.5 km long lane with **no traffic separation scheme**.

In spite of these limitations, about 40,000 ships pass through the Sound annually. And additionally, more than 10% of the freight (by weight) handled in Danish ports, go via the Sound.

In the period 1997-2001 about 22,000 ships passed through **the Great Belt** annually, about 450 of which had to take the deep-water route (This is a little more than half the approx. 40,000 ships which passed through the Sound and considerably more than the approx. 2,800 passing through Little Belt). More than 25% of the freight (by weight) handled in Danish ports, go more or less via the Great Belt.

In **the Kadet Trench** between Denmark and Germany on the main shipping route c. 50.000 vessels pass annually, the narrowest lane in the deep water way (17 m deep at the shallowest points) describes a 80° curve and caused several groundings during the previous years.

In **the Gulf of Finland** the total number of passages was 34 000 in the year 2000). The Gulf of Finland is an important route for oil transportation (6360 oil tankers in the year 2000) as there are several important oil terminals around the Gulf of Finland in Russia, Estonia and Finland and some new ones are under construction or planning. During the last 6 years the amount of oil transported in the Baltic Sea have doubled being currently about 40 million tons per year. By the year 2005 it is expected to increase up to 80 million tons. Without any additional measures the risk will increase accordingly. The oil- and chemical transportation is expected still to increase up to 160 million tons by 2010. Risk for a major accident especially in the Gulf of Finland is increased by the crossing passenger traffic between Helsinki and Tallinn.

Detailed information on statistical analyses of the Baltic maritime traffic is available e.g. from the following internet site : <http://www.vtt.fi/val/val3/val34/seastat/balticstatfinal20021.pdf>.

### **3. STATISTICS ON SHIP ACCIDENTS: GROUNDINGS AND COLLISIONS**

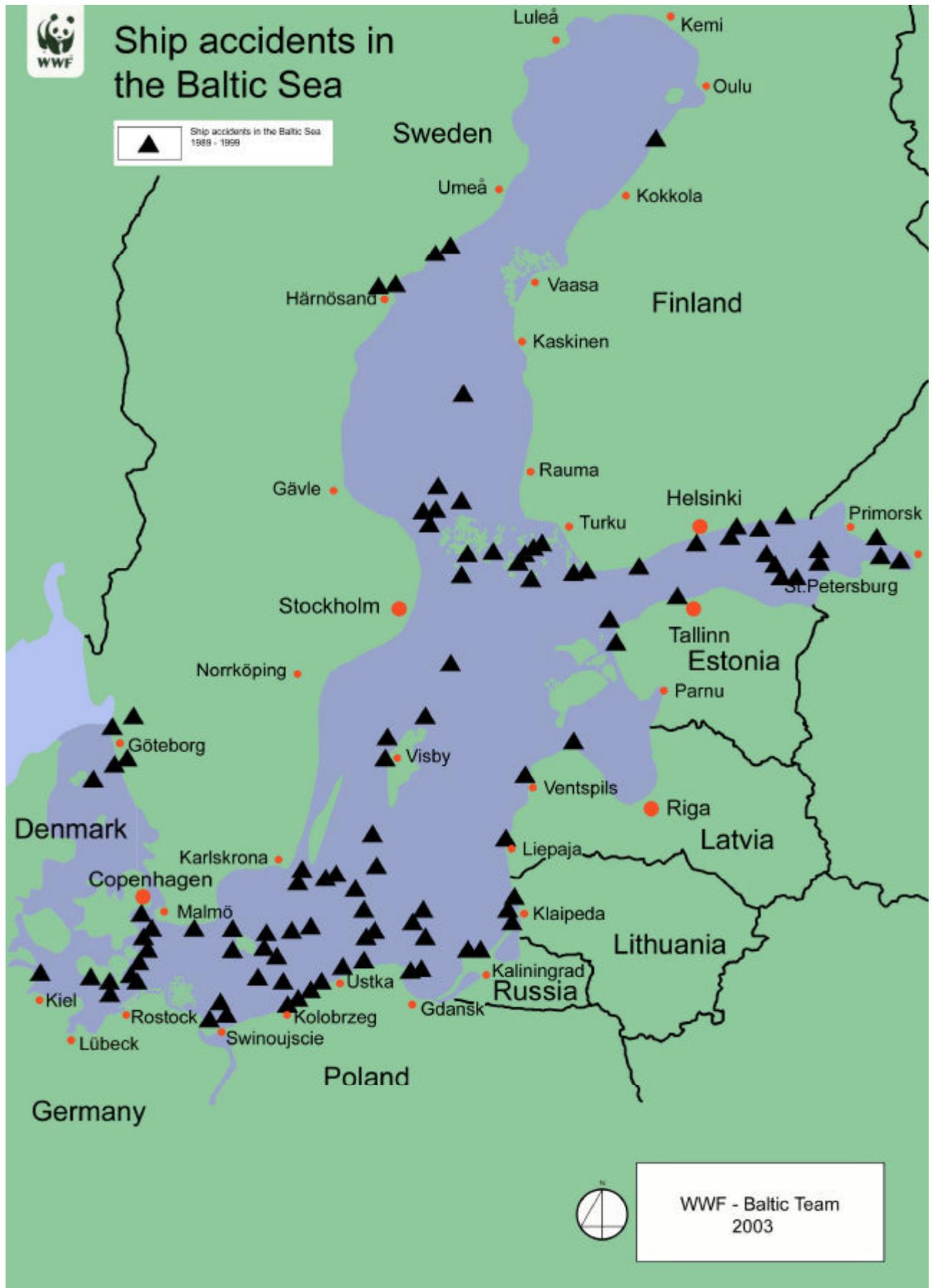
According to HELCOM the total number of ship accidents in the Baltic Sea in 2000 and 2001 was **119**, of which **73** were ship groundings, fortunately only one causing oil pollution. During the same time period there were **19** tanker accidents, **12** of them were single hull tankers and **7** double hull tankers. One of the double hull tanker accident caused oil pollution and 3 of single hull vessels, respectively. **Altogether 9 ship accidents resulted in oil pollution in 2000-2001 (HELCOM)**.

During the same time period **19 ships collided** in the Baltic Sea, one of them causing oil pollution

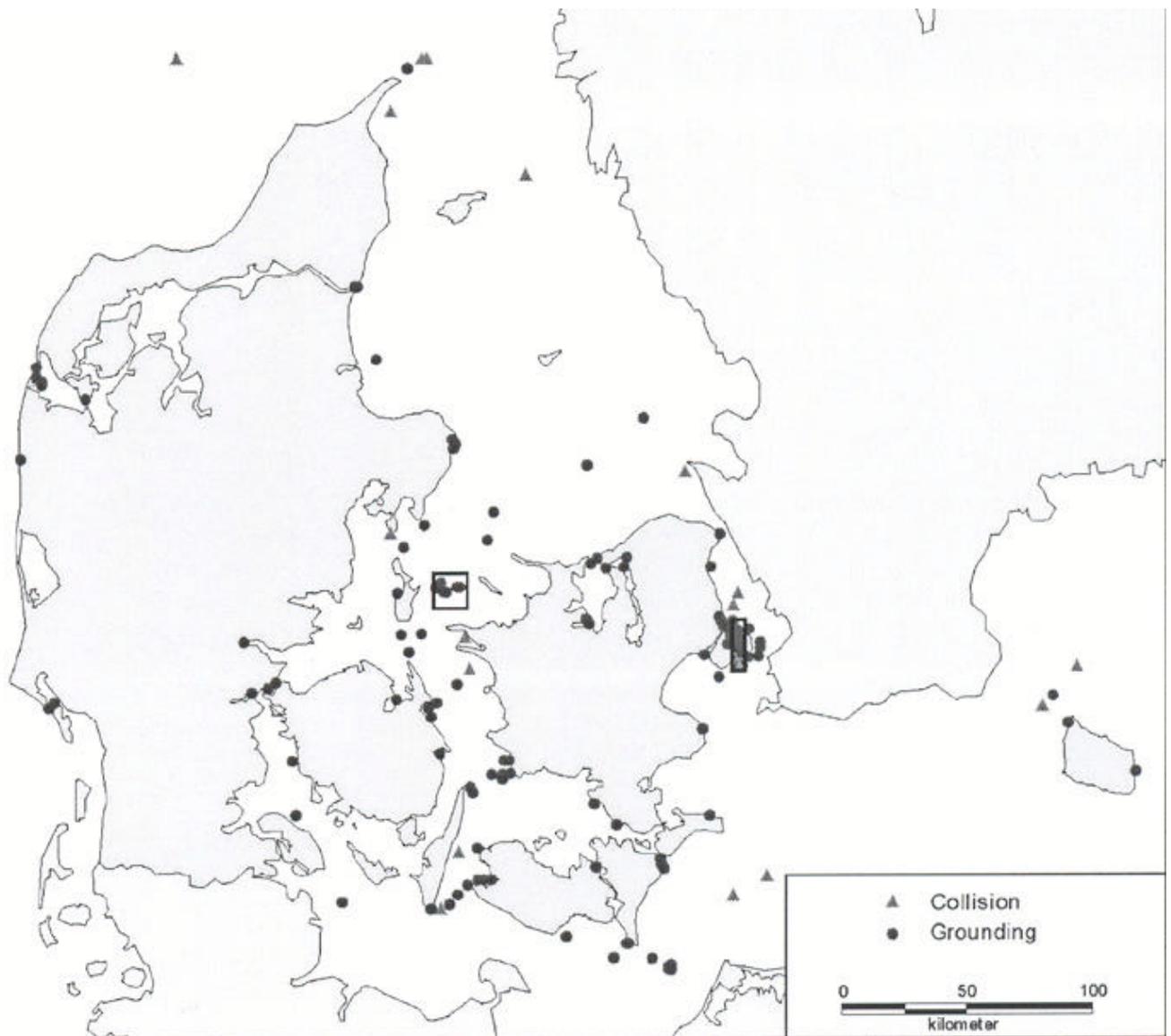
The biggest oil spill of 2500 m<sup>3</sup> caused by a ship accident in 2000 and 2001 occurred during the Baltic Carrier and Tern accident.

The HELCOM statistics on ship accidents quite clearly point out that **the highest risk for accidents** are in **the entrances to ports, The Gulf of Finland** as well as **the southwestern part of the Baltic, including the Danish straits**. The figure 1 illustrates the sites of ship accidents in the whole Baltic Sea in the years 1989-1999.

The figure 2 is showing the location of 170 groundings and 36 collisions involving ships of more than 50 gross tons (GT) in Danish waters during the 5-year period 1997-2001. The figure clearly demonstrates that the major problem area is in the Great Belt, especially at Hatter, and in the Sound, especially at Drogden. Taking into account that the annual number of passages through Little Belt, the Great Belt and the Sound are 1:15:25, and that the deep-water route carrying the largest ships and probably all the oil tankers, goes through the Great Belt, then it is evident that the greatest problems lie in the Great Belt.



**Figure 1.** The sites of ship accidents in the Baltic Sea in the years 1989-1999.  
 (Source: Marine Safety in the Baltic Sea, Report from the Land Parliament Mecklenburg-Vorpommern (Germany), 2001, Volume 1, page 107 from: HELCOM SEA 2/2001 3.1; 3.01.2001)



**Figure 2.** Groundings (circles) and collisions (triangles) which have been observed in Danish waters in the period 1997-2001. Only accidents, the positions of which are known are shown. The black rectangles show the location and extent of the Hatter area (left) and the Drogden area (right).

From “risk analysis of Navigational Safety in Danish Waters”- Danish maritime Authority and Royal Danish Administration of Navigation and Hydrography (2002) at <http://www.frv.dk/en/publikationer/risikovurdering/risikovurdering.asp>

## 4. SAFETY MEASURES FOR SHIPPING IN THE BALTIC

### 4.1. EXISTING MEASURES

#### Reporting systems

Nowadays only in selected areas, reporting systems on ship movements are in place. For the Danish waters there exists the Shippos Ship reporting system, for the Gulf of Finland, the joint Finnish-Russian- Estonian “Vessel Traffic Monitoring and Information System” (VTMIS) will be ready for use in July 2004, in the Kadet Trench between Germany and Denmark the landbased surveillance centre for the Automatic Identification System (AIS) has operated since 2002. All these systems increase the information about the ships and their cargoes that are shipping through the Baltic Sea and help in responding quickly in a case of accident.

#### **The Danish Ship Reporting System, SHIPPOS**

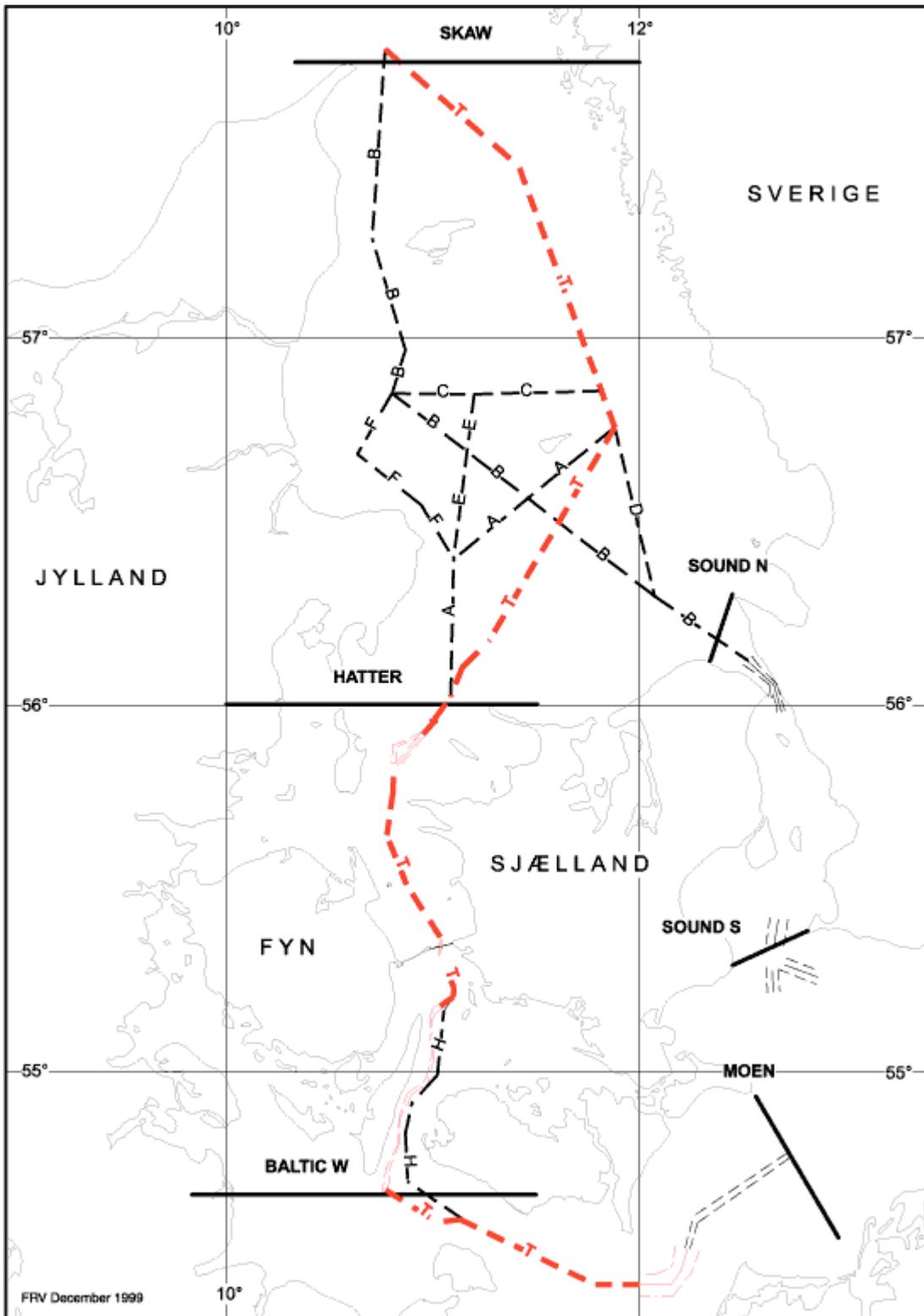
With the objects of ensuring the safety of navigation and of reducing the risk of pollution of Danish coasts and waters as may result from grounding or collision of especially oil tankers, gas carriers and chemical tankers a reporting service has been established in order:

- a. To inform shipping about large ships' movements, so that smaller ships can take into account the limited manoeuvrability of those and in order to avoid the risk of large ships meeting one another in areas difficult to pass.
- b. To inform ships about navigational hazards en route and deviations from normal conditions of current, water level, and wave height.
- c. To facilitate the authorities' early and effective pollution combating action in case of an accident.
- d. To notify the authorities immediately about any deficiency which could affect safe navigation and the marine and coastal environment, and about ships' observation of pollution.

In short, all ships of 20,000 tons GT and above, with a draught of 13 metres and more, loaded oil-, gas- and chemical tankers of 1,600 tons gross tonnage and above, or carrying radioactive cargoes shall report on their sailing plans when passing the reporting lines listed in the Table 1. and shown in figure 3, and when arriving at or leaving a Danish port, when derogating from previously reported plans and in case of accidents. The reported information is broadcast over VHF as SHIPPOS INFORMATION by the coast radio station Lyngby Radio.

**Table 1. The SHIPPOS reporting lines for ships in Danish waters.**

Latitude	57° 45' N	: SKAW
Latitude	56° 00' N	: HATTER
Latitude	54° 40' N	: BALTIC W.
The line	Nakkehoved-Kullen	: SOUND N.
The line	Stevns-Falsterbo	: SOUND S.
Position	Off Møn	: MOEN



**Figure 3 .** The T-route and other major shipping routes in Danish waters, and the SHIPPOS reporting lines.  
 (from *Navigation Through Danish Waters* at: <http://www2.fomfrv.dk/frv2/en/index.php>)

## Pilotage

Taking a local pilot on board as an experienced regional nautical expert, can dramatically increase the maritime safety especially if the crew members of the vessel are not familiar with the navigation-conditions in the Baltic Sea.

Pilotage is in general compulsory for certain types of vessels and with certain types of cargoes within the territorial waters, when sailing to harbours .

Within international waters and passages and straits like the Danish Belts and the Sound, the Gulf of Finland, the Kadet Trench or for the areas around Bornholm and Gotland, pilotage is only recommended.

Pilotage is compulsory at all Danish harbours for certain types of vessels carrying oil, dangerous liquid chemicals covered by the IMO Chemical Code, gas and radioactive cargoes, for certain towing and towed vessels navigating in dredged channels or marked navigation channels or when passing harbours or pilot stations, and for certain types of vessels at some Danish harbours, fjords and bridges. And there are provisions concerning the use of a pilot on ships with a draught of 13 metres or more bound for certain harbours bordering the Danish Straits.

IMO has adopted Resolution A.620(15) recommending the use of pilotage services for ships with a draught of 13 m or more and ships carrying radioactive materials navigating through the entrances to the Baltic Sea via the deep water Route T (see Fig 3) from the Skaw to east of Gedser, and Resolution A.579(14) recommending the use of pilotage services for certain loaded oil tankers, chemical tankers and gas carriers and ships carrying radioactive materials navigating through the Sound. The services of a deep-sea pilot are strongly recommended by IMO for infrequent visitors to Danish waters and for all vessels constrained by their draught.

Pilotage is compulsory at all Polish, Lithuanian and Latvian harbours for certain types of vessels carrying oil and dangerous liquid chemicals covered by the IMO Chemical Code, gas and radioactive cargoes. With the increasing number of vessels with dangerous cargo entering the ports in the eastern Baltic the demand for deep-sea pilots is growing in all three countries. Pilot stations are both state employed under the port management and private, the tendency being for privatisation, although low pilotage fees slow down this process. The legal organisation of pilotages is now expected to change and the number of deep-sea pilotages is expected to increase when the new infrastructures are issued.

In Germany, in coastal Waters: Pilotage is compulsory for all tankships carrying oil or hazardous substances and for other ships according to length and width (from 90m length, 13 m width) . For the different areas detailed regulations are slightly different. Vessels with dangerous cargoes longer than 130 m and wider than 21 m are supposed to take a pilot already when approaching the territorial waters In German territorial waters pilotage is compulsory for tankers larger than 6000 tons,

In Finland pilotage is compulsory inside the strait territorial sea baseline for all vessels which are longer than 60 m or wider than 10 meters or their draught is more than 4,5 .Pilotage is also compulsory for all vessels carrying dangerous or hazardous cargoes and for all foreign vessels whatever is their size or cargo .

## 4.2. ADDITIONAL PROTECTIVE MEASURES URGENTLY NEEDED

WWF and its partners welcomes the tougher regulations on shipping recently proposed by the EU Commission in the wake of the Prestige disaster. However, those are not enough to save the Baltic Sea. For this reason WWF with its partners partners see that the whole Baltic Sea, Belt Sea and Kattegat need an official status of Particularly Sensitive Sea Area (PSSA) with proper additional safety measures to put in practise in all areas where needed.

### What is a PSSA?

A Particularly Sensitive Sea Area (PSSA) is an area that needs special protection through actions of the *International Maritime Organisation* (IMO) because of its significance based on recognised ecological, socio-economic, or scientific reasons and which may be vulnerable to damage by international maritime activities.. IMO will also decide, on the basis of a proposal from a Member Government/Goverments, what kind of associative protective measures will be adopted and put in place in each PSSA.

### There are currently five designated PSSAs:

- 1) the Great Barrier Reef, Australia,
- 2) the Sabana-Camagüey Archipelago in Cuba,
- 3 Marine area around the Malpelo Island, Colombia,
- 4) Marine area around the Florida Keys, United States and
- 5) the Wadden Sea area in Denmark, Germany and the Netherlands.

Guidelines on designating a "particularly sensitive sea area" (PSSA) are contained in resolution A.927(22) Guidelines for the Designation of Special Areas under MARPOL73/78 and Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas which includes criteria to allow areas to be designated a PSSA if they fulfil a number of criteria, including: ecological criteria, such as unique or rare ecosystem, diversity of the ecosystem, or vulnerability to degradation by natural events or human activities; social, cultural and economic criteria, such as significance of the area for recreation or tourism; and scientific and educational criteria, such as biological research or historical value. In WWF, we see that the whole Baltic Sea fullfills all the criterias needed.

There is an overlap of PSSA concept with the networks of different marine protected areas, e.g. BSPA´s, NATURA2000 areas etc. PSSA designation should, however, make a significant difference and additional value in protecting Baltic marine nature. The primary distinction is that a marine protected area is an area of sea identified because of its significance for marine nature conservation, while a PSSA is identified for both its ecological, socio economical and scientific importance and its vulnerability to shipping.

WWF and its partners warmly welcome the initiative to designate the whole Baltic Sea as a Particularly Sensitive Sea Area, PSSA. For nature conservation reasons, the whole Baltic Sea, Belt Sea and Kattegatt should be designated a PSSA. To avoid loss of biodiversity in a low diversity system as the Baltic Sea, and on the basis of the benefits of a PSSA status in protecting the Baltic Sea WWF encourages the HELCOM Contracting Parties in HELCOM 24 Ministerial Meeting to make a decision to apply a PSSA designation from IMO for the whole Baltic Sea.

The PSSA status is meant to avoid accidents, intentional pollution and damage to habitats. Upon request by the countries concerned, the IMO can also decide additional protective measures. There are a variety of shipping management tools which could be used in PSSA´s including ships´routening systems (traffic separation schemes, areas to be avoided, no anchoring areas, inshore traffic zones, deep water routes, precautionary areas, recommended routes), ship reporting systems, Vessel Traffic Service Systems (VTS, and Vessel Traffic Monitoring and Information System,VTMIS), discharge and emission restrictions.

Further there are possible measures for PSSA's in the territorial sea which have to be considered on a case-by-case basis, based on the particular circumstances of the area. Coastal state might consider: a) Special Passage Planning Requirements (e.g. closure of routes to certain types of vessels or cargoes, seasonal closures to protect migrating marine mammals, speed restrictions), b) special anchoring requirements, c) special activity restrictions (eg. regulation of offshore bunkering), d) obligatory escort towing and obligatory pilotage, e) discharge restrictions, f) air pollution emission limitation.

Not only does a PSSA regulate shipping activity, it also informs the shipping community – the mariners – of the sensitivity of certain areas of sea. The PSSA status would also increase the international recognition for the ecological significance of the area.

WWF demands that in the Baltic Sea the most sensitive areas should be identified as core areas and needed additional protective measures considered in each.

### **WWF's proposal: Additional protective measures to be taken for the whole Baltic Sea**

Due to the fact that the main shipping route passing through the Baltic Sea, from the Sound to the Primorsk harbour in the eastern part of the Gulf of Finland, crosses a lot of important areas for seals, fishes and sea birds WWF suggests that

- the Vessel Traffic Monitoring and Information System (VTMIS) including Automatic Identification System (AIS) and traffic separation schemes should be established for the whole Baltic Sea to reduce the risk for ship accidents.
- for the case of accidents the network of ports of distress should be spatially representative
- A joint combatant infrastructure (European Coast guard or Baltic Coast guard) should be established with agreed procedure that allow immediate and quick response in case of an oilspill

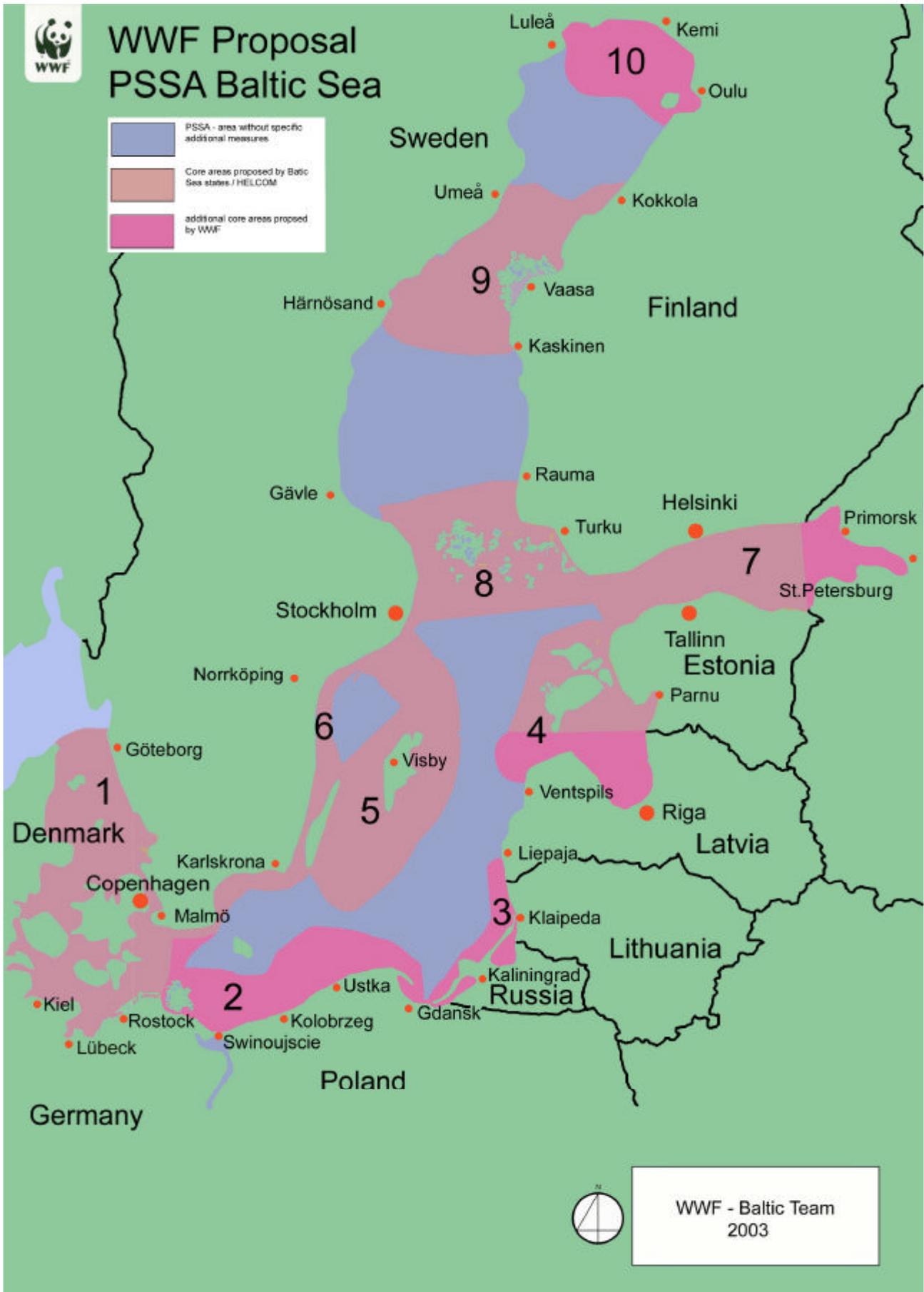
### **WWF's proposal: Additional protective measures needed for the core areas in the Baltic PSSA- selected specifically and individually**

Our common goal should be to enable a lasting, sustainable coexistence of shipping and nature on the Baltic Sea. WWF wants to highlight once more the fact that PSSAs are not simply a reflection of high ecological importance but also protect sites of high socio-economic importance and educational value against harmful effects caused by international shipping.

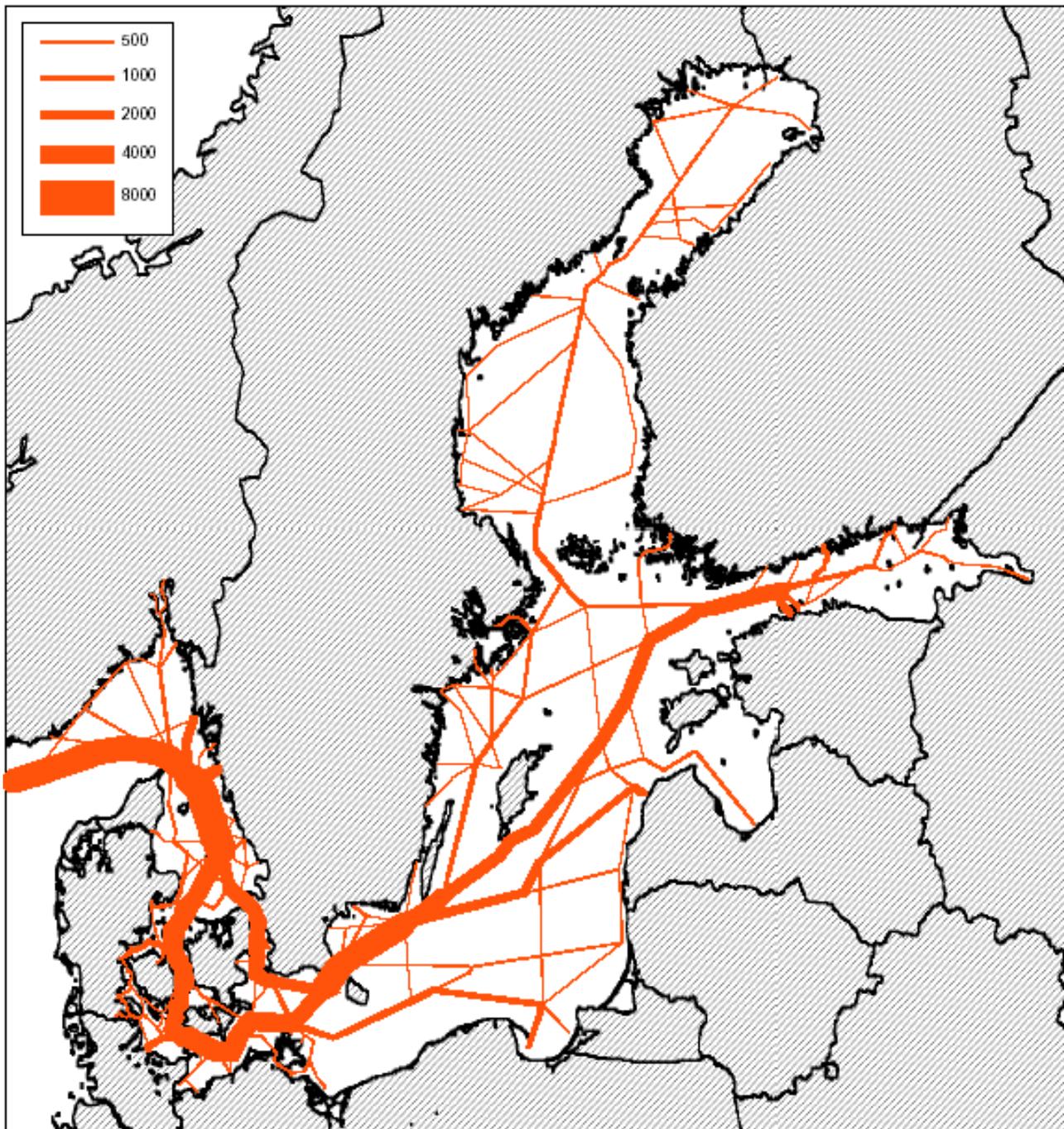
The map of WWF's prioritized core areas with need of additional protective measures in the Baltic Sea is given in Figure 4 and the list of additional protective measures in Table 2. The detailed description of the areas is given in APPENDIX III

**Table 2.** WWF’s proposal: list of additional protective measures needed (marked with X) in different parts of the Baltic Sea. The numbered areas are illustrated in Fig 4.

<b>AREA</b>	<b>1 Kattegat/ Beltsea</b>	<b>2 Polish coast</b>	<b>3 Lithu anian/ Kalin grad</b>	<b>4 Latvian Waters</b>	<b>5 Gotland</b>	<b>6 Swe Coast</b>	<b>7 GoF</b>	<b>8 Arch Sea</b>	<b>9 Quark</b>	<b>10 Kemi Area</b>
<b>MEASURE</b>										
<b>Compulsory pilotage</b>	X	X	X	X	X	X	X	X		
<b>Escort towing</b>	X		X	X		X	X	X		
<b>Traffic separation scheme</b>	X				X	X	X	X		
<b>Compulsory routing</b>	X				X	X	X	X		
<b>Areas to be avoided</b>	X	X	X		X	X	X	X		
<b>Ice classification</b>	X						X	X	X	
<b>Speed reduction</b>	X					X	X	X		
<b>Additional protective measures for the whole Baltic Sea</b>										
<b>VTMIS</b>	X	X	X	X	X	X	X	X	X	X
<b>Common coast guard</b>	X	X	X	X	X	X	X	X	X	X
<b>Ports of distress</b>	X	X	X	X	X	X	X	X	X	X



**Figure 4. WWF's proposal concerning the core areas which need additional safety measures in the Baltic Sea PSSA. See also Table 2 and APPENDIX III.**



Distribution of oil tanker movements in the Baltic Sea in 1997 (Rytkönen et al. 2002)



## APPENDIX III

### **WWF: IDENTIFIED CORE AREAS THAT NEED ADDITIONAL PROTECTIVE MEASURES IN THE BALTIC SEA PSSA**

WWF and its partners warmly welcome the initiative to designate the whole Baltic Sea as a Particularly Sensitive Sea Area, PSSA. For nature conservation reasons, the whole Baltic Sea, Belt Sea and Kattegatt should be designated a PSSA. To avoid loss of biodiversity in a low diversity system as the Baltic Sea, and on the basis of the benefits of a PSSA status in protecting the Baltic Sea WWF encourages the HELCOM Contracting Parties in HELCOM 24 Ministerial Meeting to make a decision to apply a PSSA designation from IMO for the whole Baltic Sea.

International collaboration is as crucial for environmentally sound shipping as it has been for nature conservation. The Baltic Sea PSSA could be an important and needed next step to do both.

Within its boundaries core areas, that need more strict protective measures to avoid or control the maritime activities, should be identified as well as those specific protective measures which are needed in each area. WWF is giving here a detailed proposal about the core areas and additional protective measures needed.

#### **Kattegat and the Belt Sea (Area 1)**

The inner Danish waters – south of the Skaw at 57° 45' N - cover a sunken landscape of moraine and sandy plains, mainly shaped by the Wurm glaciation which ended 11,000 years ago. Apart from basins in and adjacent to the western Baltic Sea, these waters are subject to abrasion, especially along the shores and in the deeper channels, and little sedimentation occurs outside sheltered bays and inlets.

No location in the inner Danish waters – except around Bornholm in the western Baltic proper – is more than 21 nautical miles or roughly 39 km from shore. Although the tides are negligible, currents driven by wind and shifting air pressure, and which can persist for days or weeks on end, can flush great masses of water in and out of the Baltic Sea causing water levels to vary several metres. This can have a great effect on the low lying shores, and polluting substances spilled in the ocean can quickly be driven to shore.

Of the inner Danish waters, which cover 45,339 km<sup>2</sup>, about 44% - except areas around Bornholm in the western most Baltic Sea proper and in the northern most, eastern and southern Kattegat and a few additional minor spots - is shallower than 20 m. Shallow as well as narrow are also the major parts of the straits between the many large and small islands. These shallow waters with their fauna and flora and the 6,500 km of coastline are more at risk than deeper waters in case of an oil spill.

Many shallow and sheltered near-shore areas as well as the open Kattegat are of primary importance as staging and wintering areas for several million web-footed water birds. A report to the European Commission from the Danish Environmental Research Institute and Ornis Consult (1994), rates most of the central and northern Kattegat and the Danish straits – except most of the Sound and waters to the south thereof - among the most important wintering areas for sea birds in the Baltic region. For some species even the Kattegat is the most important. These birds are highly vulnerable to oil pollution, especially the sea ducks and alcids during their moulting period in late summer and fall, when they are rendered flightless. 6,000 harbour seals (the so-called seal pest reduced the seal population by almost 50% in 2002) and a few grey seals haul out and breed at

several locations, especially in the Kattegat and in and around Samsø Belt, the northern part of the Great Belt. Most of these sites are protected as seal reserves. More than 40,000 harbour porpoises live in the inner Danish waters. Also these sea mammals are vulnerable to oil pollution, although less than sea birds, to which minute amounts of oil can be lethal.

## **The Great Belt**

### ***Description of the area:***

The Great Belt is generally taken to include Langelands Belt east of the island of Langeland to the south, the Great Belt proper east of the island of Funen and Samsø Belt, largely east of the island of Samsø to the North. The reporting lines Hatter (56° N) and Baltic West (54°40' N) of the Danish Ship Reporting System SHIPPOS (see map on former page) can be used to delimit this major outlet from the Baltic Sea to a north-south stretch of 80 nautical miles or almost 150 km. The Great Belt carries about 70% of the outflow from the Baltic Sea, leaving 30% to the Sound and 10% to Little Belt.

The Great Belt is located between numerous islands of very different sizes. So, although no part of the Great Belt is more than about 6.5 nautical miles or 12 km from shore, the longest free stretch E-W, unobstructed by islands, is about 90 km. Free stretches of up to more than 200 km can even be found due to the scattered location of the islands and to bays and inlets indenting their shores. Before the Great Belt Crossing narrowed the passage to 1.624 km under the 65 m high bridge opening, the narrowest passage to the Baltic Sea was about 7.5 km on either side of the island of Sprogø situated roughly midway between the islands of Funen and Zealand. The greatest depth in the Great Belt is 70 m at the bridge crossing, whereas the major part of the Great Belt area has depths of 15 to 25 m.

A guaranteed minimum depth of 19 m at mean water level is guaranteed along the deep-water route, Route T, throughout the Great Belt. An alternative less precarious alternative Route H, which does not have bends as sharp and as numerous as does Route T guarantees a depth of 15 m at mean water level. Both routes, however, run close to shallow banks and stony reefs. The narrowest lane along Route T is 400 m wide for south going traffic off the island of Agerø where the route, furthermore is somewhat S-shaped. Otherwise the narrowest spot is 500 m wide in Langelands Belt between the islands of Langeland and Lolland. Ships continuing east to the Baltic Sea are guaranteed a minimum depth at mean water level of 17 m in an 800 m wide lane crossing the Darss Sill in the Kadet Trench.

In the period 1997-2001 about 22,000 ships passed through the Great Belt annually, about 450 of which had to take the deep-water route (This is a little more than half the approx. 40,000 ships which passed through the Sound and considerably more than the approx. 2,800 passing through Little Belt). More than 25% of the freight (by weight) handled in Danish ports, go more or less via the Great Belt. As shown in the map on the former page, most of the groundings which occurred during passage of the Great Belt in the period 1997-2001 took place in the Hatter area to the north (11), where Route T makes a sharp turn from north to north-east, going north, and in and adjacent to Langelands Belt to the South (9). In Langelands Belt the large ships following Route T must change course 10 times, and here 3 collisions occurred compared to one at Hatter.

### ***Significance of the area in relation to ecology, socio-economy and science:***

Many species of sea birds and waders breed along the shores of the islands surrounding the Great Belt. In and adjacent to the Great Belt, wide stretches of shallow water in sheltered bays and inlets are important feeding areas for these birds and for large numbers of sea birds staging and wintering in the area. In a report to the European Commission from the Danish Environmental Research Institute and Ornis Consult (1994), the Great Belt and adjacent areas are rated among the most important wintering areas for sea birds in the Baltic region. The birds forage on the benthic vegetation - mostly eel grass – and the benthic fauna of the mostly sandy to muddy level bottoms as

well as on the common mussel occurring mostly on residual sediments of coarse sand, gravel and stones occurring largely disjunctively in the shallowest and most current ridden areas. For these reasons 18 sites covering 2,632 km<sup>2</sup> of coastal sea area have been designated as EC-bird protection areas or so-called Special Protection Areas (SPAs) in the Great Belt area and south of the islands of Lolland and Fynen. Here recent surveys yielded a count of 21,364 pairs of web-footed water birds belonging to 20 species, breeding within these sites. Most numerous were common eider (9,807 pairs), cormorant (6,082 pairs), and arctic tern (2,131 pairs), whereas the remainder numbered from 2 to 818 pairs. 575 pairs of waders belonging to 8 species were also found to breed. Furthermore 419,141 web-footed water birds belonging to 27 species (not counting gulls and terns) were seen wintering within these areas. Most numerous were common eider (97,783), coot (71,630), tufted duck (59,740), mute swan (43,755), black scoter (25,695), mallard (25,685), goldeneye (14,513), greylag goose (16,956), and cormorant (11,745). The remaining species each numbered from 135 to 9,903 individuals. 16,755 waders were counted along the shores. Many more sea birds occur outside these protected areas.

All but two of the SPAs have also been proposed as EC-habitat areas or so-called Special Areas of Conservation (SACs) (some including more than one SPA) along with 10 additional sites, making up a total of 25 sites covering almost 2,789 km<sup>2</sup> to be included in the EU-Natura 2000 ecological network of nature areas. The habitat most frequently used as a basis for proposing an SAC, is the "reef" (for 19 areas). But the habitat "large shallow bays and inlets", although represented somewhat less frequently (in 15 areas), covers a much larger area, as does the habitat "shallow sand banks permanently covered with water", which is of importance in 13 areas. 2 sites are of importance to the protected otter, 6 to the protected harbour seal, and 2 to the grey seal. Several other locations around and adjacent to the Great Belt are breeding or haul-out places for seals.

In one SAC site which is also a nature reserve, located to the north-east of the island of Samsø, off Stavns Fjord, a colony of harbour seals breed on a small island Bosserne just a few nautical miles from Route T. This and several other islands in the area are wildlife reserves. 23 additional nature or wildlife reserves found in the vicinity of the Great Belt cover 706 km<sup>2</sup> altogether. Reserves aimed at protecting breeding birds and seals often include only a narrow strip of water along the shoreline. Most of the reserves thus cover less than 10 km<sup>2</sup> of sea territory - some even just a few ha - a few cover more than 50 km<sup>2</sup> and the largest, south of the island of Funen, more that 225 km<sup>2</sup>.

The Great Belt is also important to the local fishing industry using gill nets as well as pound nets to catch especially flatfishes, cod, garfish, mackerel and eel. Also trawlers, often from afar, frequent these narrow waters, much to the dissatisfaction of local fishermen who also have to compete with numerous leisure-time fishermen using gill nets and fyke nets, and with anglers. The Great Belt and adjacent waters is the main area for aquaculture (rearing of trout in net cages) in Denmark.

As along most of Denmark's low lying shores, recreation and tourism has become an industry around the Great Belt and recreational vessels plough its waters.

Furthermore, the Great Belt is a sunken paradise for archaeologists studying Stone Age artefacts, because the southern part of Denmark has sunken since the Ice Age. Also, the many instances of glacier fronts halting and receding have left their mark throughout the Great Belt area, which once served as a river outlet from a Baltic lake.

### **Vulnerability to damage by international shipping**

Given the proximity of the shorelines of the surrounding islands, the importance of many areas to species of wild animals, especially birds which are particularly vulnerable to oil slicks, and the swift and changing currents driven by wind, atmospheric pressure and the surplus outflow from the Baltic Sea, an oil spill in the Great Belt area can do massive and widespread damage to nature as well as to the local economy by impacting on tourism, fishery and aquaculture. Thousands of breeding and wintering water birds will be the first victims of an oil spill, and during the breeding season an oil

slick hitting the coast would wipe out the broods of the year as well as the parent birds. The local fishermen, commercial as well as leisure-time would suffer from an oil spill through the tainting of fish and damage to them and their prey, and an oil slick hitting the holiday-friendly beaches would be a blow to the tourist industry.

### ***Additional safety measures needed***

“Risk Analysis of Navigational Safety in Danish Waters” – Danish Maritime Authority and Royal Danish Administration of Navigation and Hydrography (2002) proposes

- dredging the Route H at Hatter to allow 19 m draught ships to pass, so they will not have to circumvent Hatter. This would be a short-term effort with immediate benefits, whereas
- establishing a land-based system for surveillance, based on an Automatic Identification System (AIS) before 2005 as agreed in HELCOM will be a beneficial long-term effort, as would
- an extension of the capacity of the Great Belt Vessel Traffic Service (VTS) centre to cover the entire Great Belt passage.

In WWF we think that compulsory pilotage could add the safety further

## **The Sound**

### ***Description of the area:***

The Sound is a strait between Denmark and Sweden, 118 km long between the SHIPPOS reporting lines Sound N and Sound S (see map above) and 4-28 km wide. The northern entrance is funnel-shaped, 3.7 km wide and 50 m deep where it is narrowest between Helsingør and Helsingborg. From there, a wide basin stretches until off the entrance to the harbour of Copenhagen where a narrow channel is still 20 m deep. Further south the roughly 3 km wide and 7 km long island of Saltholm blocks the way leaving the almost 4 km wide Drogden channel to the west and the 8 km wide Flinte Channel to the east, each about 10 m deep off the island. The combined bridge and tunnel crossing between Denmark and Sweden going via an artificial island south of Saltholm has left a 3 km wide opening over the tunnel to the west and a 490 m wide and 57 m high passage under the bridge to the east leading to Køge Bay. The deepest passage is Drogden, with a guaranteed minimum depth of only 8 m in an approximately 300 m wide and 7.5 km long lane with no traffic separation scheme.

In spite of these limitations, about 40,000 ships pass through the Sound annually. And additionally, more than 10% of the freight (by weight) handled in Danish ports, go via the Sound. In spite of about 90,000 ferry passages between Helsingør and Helsingborg at the northern entrance to the Sound, no collision and one grounding only was reported there during the 5-year period 1997-2001. The Drogden area made up for this in plenty with 9 groundings and 9 collisions.

### ***Significance of the area in relation to ecology, socio-economy and science:***

While almost the entire Danish coastline along Køge Bugt and from Kastrup Airport on the island of Amager south of Copenhagen to Nakkehoved is urbanized or with summer houses and popular beaches and harbours, the entire island of Saltholm and the southern and western parts of Amager along with large parts of the adjacent sea territory are both EC bird protection areas (SPAs) and EC habitat areas (SACs). Most of these areas are also nature or wildlife reserves as is a smaller area along Køge Bay.

But in case of an oil spill, several important nature areas further south can also be impacted on. In 4 SPAs within 80 km of Drogden and covering a total marine area of 382 km<sup>2</sup>, recent counts have yielded more than 78,000 wintering web-footed water birds belonging to 16 species (not counting gulls and terns). Most numerous were tufted duck (19,377), mute swan (14,357) and coot (10,293). The sites are even more important, however, as breeding areas for 15 species of web-footed water

birds including common eider (5,327 pairs) - especially on Saltholm where the largest breeding colony in northern Europe is located - black-headed gull (2,500), sandwich tern (351), black-backed gull (242), and little tern (30) and more than 10,000 waders, of which oyster catcher (571) and godwit (333) have been found most numerous.

These same areas and 4 more covering a total marine area of 429 km<sup>2</sup> have been proposed as SACs, primarily due to the presence of sandbanks which are slightly covered by sea water all the time (4), but also of coastal lagoons (4), large shallow bays and inlets (4), and reefs (4). Harbour seals and grey seals occur at Saltholm and harbour seals also at another location to the south.

Furthermore 8 marine wild life reserves covering 167 km<sup>2</sup> are found within the same perimeter.

In spite of the heavy traffic, the Sound and waters to the south are important fishing areas for the local fishing industry as well as for anglers fishing from shore or sailing out with touring boats. Yachting, rowing and water skiing is also a popular pastime, as is bathing from the many beaches both north and south of Copenhagen. Many people from Copenhagen and other parts of Zealand spend their summer holidays in summer cottage areas at or near these beaches or they frequent them in weekends.

#### ***Vulnerability to damage by international shipping:***

Thousands of breeding and wintering water birds will be the first victims of an oil spill, and during the breeding season an oil slick hitting the coast would wipe out the broods of the year as well as the parent birds. The local fishermen, commercial as well as leisure-time would suffer from an oil spill through the tainting of fish and damage to them and their prey, and an oil slick hitting the holiday-friendly beaches would be a blow to the tourist industry.

#### ***Additional safety measures needed***

- One way to reduce the number of groundings and collisions in the Drogden area would be to widen the Drogden channel and
- to establish a land-based system for surveillance based on an Automatic Identification System (AIS) before 2005, as agreed in HELCOM.
- It would also be beneficial to establish a Vessel Traffic Service (VTS) system as in the Great Belt and
- Preferably, piloting should be made compulsory via IMO.
- For dangerous cargos and old vessels compulsory escorting could raise the security further.

## **The Kattegat**

#### ***Description of the area:***

The Kattegat from Dutch, meaning a passage so narrow that only a cat can get through of water between Denmark and Sweden and the gateway to the Danish straits. These waters situated north of the SHIPPOS reporting lines Hatter and Sound N covers more than 20,000 km<sup>2</sup>, is roughly 108 nm or 200 km N-S and is narrowest E-W - only about 34 nm or 63 km – off the Skaw to the north, and widest - about 86.4 nm or 160 km – just north of the Djursland peninsula. The deepest parts are found along the Swedish coast where a roughly 35 km wide channel with depths greater than 30 m stretches almost to the Sound. At a few locations to the north depths reach 100 m, and the 50 m depth contour reaches just past the island of Læsø, about a third of the way to the Sound. A large area covering about a third of the entire Kattegat, situated in the northwestern parts between Jutland and the islands of Læsø and Anholt has depths of less than 20 m. About half of this same area has depths of less than 10 m, primarily along the Jutland coast and south of Læsø. East of these large shallow areas there are a number of shallow offshore banks e.g. Fladen, Lilla Middelgrund, Stora

Middelgrund and Groves Flak. The whole Kattegat is characterised by brackish water, large shallow sandy bays, estuaries and a mosaic of sandy and rocky shoals.

While shallower shipping routes criss-cross these shallow waters outside the 10 m depth contour, the deep-water route, Route T, skirts the shallow area from the Skaw to Hatter.

***Significance of the area in relation to ecology, socio-economy and science:***

The shallow areas mentioned above and the adjacent offshore banks to the east are of primary (international) importance as wintering areas for water birds, especially sea ducks. In winter these areas provide an ample supply of Bluemussels and small fish, providing feed for diving seabirds. Northern Kattegat is the most important wintering area for Common Eider and Red Necked Grebe in Northwest Europe. For Razorbill and Common Scoter it is probably the most important area in the world. According to a report to the European Commission from the Danish Environmental Research Institute and Ornis Consult (1994), an average of almost a million sea ducks wintered here in 1988-93. 495,000 black scoters, 400,000 common eiders, and 82,000 velvet scoters each represented 38.1%, 13.3% and 8.2% of the NW-European winter population respectively. Large numbers of greater scaup (12,000) and goldeneye (6,425) representing 3.9% and 2.1% of the NW-European winter population respectively occurred only along the coasts. Primarily in the deeper areas east of the shallow area, on the average 129,000 razorbills, 74,300 kittiwakes, 2,900 red- and black-throated divers, and 2,350 red-necked grebes representing 10.8%, 1.1%, 2.3%, and 15.7% of the NW-European winter population respectively, wintered here during that same period.

The bottom topography at the shallow offshore banks in Kattegat is varied with ridges and ravines, stones and boulders, but also soft bottoms of sand, shell gravel and maerl. The banks display rich vegetation with high diversity and dense growth of macroalgae with e.g. kelp. The water is clear and the banks still have a rather intact ecological structure, making them potential breeding and nursery areas for a great variety of invertebrates, as well as for fish. Fladen and Lilla Middelgrund are e.g. known to be significant spawning and nursery areas for herring and bottom-dwelling fish. Moreover, they are feeding ground for the common seal and the grey seal.

About 30,000 harbour porpoises live permanently in the Kattegat area, and at the islands of Læsø, Anholt and Hesselø several thousand seals haul out and breed, although a seal epidemic reduced the population considerably in 2002.

The whole Northern Kattegat is designated as an Important Bird Area (IBAs) by BirdLife International and several areas in the Kattegat are designated or proposed as a Baltic Sea Protected Area (BSPA). Numerous areas in both Sweden and Denmark are also designated or proposed as Special Area of Conservation or Special Protection Areas to be included in the EU Natura 2000 network.

A number of SACs were e.g. selected due to the presence of reefs or sandbanks which are slightly covered by seawater all the time. 6 areas in Denmark were proposed partly due to the presence of marine 'columns' in shallow water made by leaking gases, which is a habitat peculiar to the northern Kattegat. The proposals for designation are also based on importance to harbour seal and to grey seal.

Due to the discovery already in the late 1960ies of mass occurrences of wintering sea birds along the coast of Jutland, around the islands of Læsø and Anholt, and at the entrance to the Isefjord-Roskilde Fjord complex on the north coast of Zealand, 7 fairly large coastal EC-bird protection areas (SPAs) covering 1,495 km<sup>2</sup> were designated already in the early 1980ies. In 1995, The Danish Forest and Nature Agency published the most recent counts of staging or wintering web-footed water birds in these areas. Among an average of 640,000 birds belonging to 18 species, the vast majority were eiders (435,310) and numerous were also black scoter (67,815), long-tailed duck

(50,000), velvet scoter (31,000), greater scaup (14,501, and coot (12,470). Along the shores were counted on average 111,125 waders.

Kattegat is of major importance as an area for fishing Norway lobster and numerous species of fish including sole, plaice, cod, herring, mackerel, garfish, and eel. Also all around the Kattegat, beaches appeal to tourists and the locals for bathing and strolling.

***Vulnerability to damage by international shipping:***

The large concentrations of sea birds occurring in the Kattegat, especially during their moulting season in late summer and fall and during the winter as well as the spring, make most of the Kattegat very vulnerable to oil spills. Even minute amounts of oil can be lethal to sea birds. A large oil spill along Route T at these times of year, especially during a period with winds from the east, would be a major catastrophe since the shallow north-western part of the Kattegat and adjacent banks in the eastern part are internationally important for 13 species of sea birds. In NW Europe, the northern Kattegat is the most important wintering area for razorbill, red-necked grebe, black scoter and common eider. As regards razorbill, the area is probably the most important in the world. During the breeding season an oil slick hitting the coast would wipe out the broods of the year as well as the parent birds.

The sea mammals living and breeding in Kattegat are also vulnerable to oil pollution, although less than sea birds. An oil slick hitting the haul-out areas would be especially deleterious in the breeding season in June.

The local fishermen, commercial as well as leisure-time would suffer from an oil spill through the tainting of fish and damage to them, their offspring and their prey, and an oil slick hitting the holiday-friendly beaches would be a blow to the tourist industry.

Considering that the Kattegatt is the shipping route connecting the Baltic Sea with the Atlantic there is a high risk of oil spills, which particularly endanger the wintering seabirds and the important nursery areas for bottom-dwelling fish. Shipping restrictions e.g. areas to be avoided (the shallow banks) and routing measures should be included in the PSSA proposal for this area.

**Additional safety measures needed**

- Compulsory pilotage in the whole Kattegat could raise the maritime safety
- AIS should also cover the whole area, a joint Danish/Swedish VTMS-center should be established
- Areas to be avoided should be established for the shallow and extremely vulnerable areas

**Waters around Fehmarn and Fehmarn Belt**

***Description of the area:***

The area includes the waters around the German island Fehmarn, the Fehmarn Belt up to the Danish Lolland and follows the 20 m isobath parallel to the Schleswig –Holstein coast in the western part of the Mecklenburger Bucht west of the Lübeck-Gedser-Route.

The Fehmarn Belt belongs to the main traffic route of the Baltic Sea, where to most of the deep draught ships travel. About 60.000 cargo vessels per year, a number of ferry ships use this way on the route through the Danish Belts and to the Kiel-Channel. Ferry traffic in high density crosses the Belt between Fehmarn and Roedby/Lolland. The water in the area has a salinity of 0,12% at the surface and app. 2,0% on the Ground.

***Significance of the area: ecological, socio-economic or scientific criteria***

The Fehmarn Belt and the areas around Fehmarn are part of the Belt Sea, the belt itself being a major channel for the entrance and exchange of the water body of the Baltic Sea with the North Sea.

The area encompasses one already 1996 designated BSPA (Graswarder-Werstcoast of Fehmarn/Flügger Sand) and three areas that have been proposed as offshore-BSPAs: Staberhuk, Sagas Bank and Walkyrien Ground, located on the western coast of the Mecklenburg Bay. Important are the rich benthic communities associated with stony bottoms, the offshore bank ecosystems in the transition area to the Baltic proper with up to 115 benthic species recorded. On the Walkyrien ground 21 threatened macrozoobenthos species were found and 8 threatened macrophyte species. For wintering birds this area has a specific importance for Common Eiders, Black Scoters and Tufted Ducks. The oxygen rich water and the rich benthos abundance are important sources of food for these birds. The waters around Fehmarn have proven to be very important areas for the Harbour Porpoise. During the recent and ongoing research programmes Harbour Porpoises were detected more or less permanently in these waters (more than 90% of all days). This makes these area one of the two most important areas of the German part of the Baltic Sea for Harbour Porpoises.

The economic basis in the coastal area of Schleswig-Holstein and of Lolland as well is the tourism. The most important Seaside Resorts of the Baltic Sea in western Germany are located on the west coast of the Mecklenburg Bight between Travemünde and Fehmarn.

### ***Vulnerability to damage by international shipping activities.***

The density of the ship traffic in the Fehmarn Belt makes this water sensitive to ship accident. Even though collisions and accidents with oil pollution have not occurred yet, the risk is high for such an accident. The number of large ships up to 100.000 t.d.w., bulk cargo ships and oil tankers is steadily increasing. The crossing of ferry traffic across the Belt between Roedby and Putgarden adds another risk for accidents. Being a major channel for inflowing water to the Baltic Sea a major oil or chemical spill could easily spread with the current into larger parts of the sea.

In case of a pollution large areas in the Kiel Bight and in the Mecklenburg Bight would be affected and the biodiversity and the species and habitats would be seriously damaged.

### **Additional Safety measures needed**

- The area should be included in the traffic guidance and reporting system of the Great Belt (VTMIS) where compulsory routing especially for certain ships and cargoes should be established
- Compulsory pilotage should be applied within the system for the whole Route T
- For ships representing safety risks compulsory escort towing should start in this area

## **Kadet Trend and adjacent waters**

### ***Description of the area:***

The marine area located between the German peninsula Darss-Zingst and Rügen to the east and the Danish islands Falster and Mön to the west, belongs ecologically to the most important areas in the Baltic Sea. Regarding shipping it is the most sensitive and nautically difficult area in the southern Baltic Sea and it is part of the main shipping route for large ships in the Baltic Sea. From the geomorphologic and bio geographical point of view it represents with the Darss Sill a border separating the western Baltic Sea from the Arkona Sea. This marine area has a salinity of up to 0,13 ‰, on the shallow Darss Sill the depth does not exceed 13 m, the Kadet Trench, at the narrowest point only less than 2000 (the deep channel only 800m) metres wide, is in the deepest parts 25 m deep. Every year more than 60.000 vessels pass the Kadet Fairway, among them daily 4-5 large tankers and about 5 bulk carriers of up to 100.000 tdw. Along with the general development in the Baltic Sea, traffic is extremely increasing during the last years and will further increase when the new ports in the eastern Baltic Sea countries will operate.

### ***Significance of the area: ecological, socio-economic or scientific criteria***

According to ecological criteria the Kadet Trench and the Darss Sill are bio geographical borders between the Belt Sea and the Arkona Sea. The Kadet Trench and its slopes host a very high

diversity of habitats and species. Due to partly high transparency the photoic zone reaches down to more than 20 m. In these areas partly high densities of *Laminaria saccharina* can still be observed down to 18 m and the red algae *Delesseria sanguinea* on silt grounds down to 24 m. The adjacent waters to the German EEZ are shallow with rich bivalves occurrence around the Prerow bank and the Plantagenet Ground. Those waters represent important wintering areas for birds namely long tailed Duck (100.000) Black Scoter (16.000), Red breasted Merganser (3.000). This area is part of the IBA covering the Rügen and Darss lagoons and for wintering birds the most important area in the Baltic Sea.

In recent studies on the occurrence of harbour porpoise the occurrence of these endangered marine mammals could be detected almost permanently with more than 70% of the samples with positive signals of animals in the area. This indicates additional to findings that the area is important for the population of harbour porpoise.

Socio economically, tourism is for both the German and the Danish coasts the dominant economic basis. All the stakeholders in the region are extremely aware of what a larger oil spill or shipping accident will mean to the regions economy, especially after the oil pollution caused by the Baltic Carrier in 2001.

### ***Vulnerability to damage by international shipping activities.***

The passage is known as Kadet Fairway. With some 60.000 ships per year, a daily average of 150 ships , among them 4-5 large tankers and as many as 5 bulk cargo ships up to 100.000 t.d.w. this fairway is high frequented. Due to the shallowness of only 17 m deep draught ships have to restrict to the Kadet fairway. A traffic lane does not exceed 800 m at the narrowest part. Apart from these conditions a specific feature of this fairway leads to nautical problems: for half of its length the Kadet Fairway describes a curve of 80° which ships must closely hug to. Other specific conditions are currents up to 4 knots and water level changes of up to 2 metres. These conditions made the Kadet Fairway to be an accident black spot for the Baltic Sea. From 1991 to 2001 16 ships with a draught of more than 10,5 m. went aground in the Kadet Fairway, 14 of them at the same point. Even though only one serious collision happened, that of the Bulk Carrier “Tern” and the tanker “Baltic Carrier” in 2001, such an accident could happen every day. Not only heavy cargo ship travel is the rule, but ferry lines with more than 25 departures per day, carrying more than one Million passengers per year cross the fairway to the west. The Baltic Carrier oil pollution happened under calm weather conditions. Under bad conditions the permanent threat of an accident and of heavy oil pollution is even more serious.

During the Baltic Carrier oil pollution about 20.000 seabirds were polluted, as well as the beaches of the Danish islands north-west of the area. In the wintering period of the sea birds this scenario can be by far worse. For the tourism industry this would ruin a whole region on the German and on the Danish side.

### ***Additional Safety measures needed***

- The area should be included in the traffic guidance system (VTMIS) using the Rostock traffic centre and using the existing AIS as a basis for a joint German/Danish system
- The existing deep water way, and traffic separation scheme must be continued as well as radar surveillance
- Compulsory pilotage is a major measure to raise the maritime safety standard
- For vessels representing maritime safety risks compulsory escort towing should be part or the measures
- Combating facilities and regular practising as well as emergency towing capacities should be in place in the area to allow quick response within very short time
- Offshore installations representing additional risk for shipping should be excluded

## **The Polish coast (Area 2)**

The area covered principally represents the eastern Baltic coastal waters from Liepaja in Latvia westwards to the Polish-German border, and extending offshore to the 40m depth contour. However, the Southern Midsjö Bank, located in the Polish EEZ in the Baltic Proper, is included. Thus the area is roughly determined by the bathymetry and for the coastal strip by the width of the littoral and sub-littoral zones. The area is dominated by sandy quaternary deposits with gravel and only few and insignificant areas of softer material, and the coasts fringing the area are smoothed by abrasion and accumulation with major sedimentation processes limited to the north-western part of the Gulf of Gdansk.

The lower sub-littoral bordering the study area is marked by the Baltic Proper with an average depth of 67 m. Three deeper areas are found in the Baltic Proper: the Bornholms Deep with a maximum depth of 105 m in the northern part of the Polish EEZ, the Gdansk Deep with a maximum depth of 116 m in the Gulf of Gdansk (Poland) and the East Gotland Deep with a maximum depth of 249 m in the Polish, Lithuanian and Latvian EEZ. Two of the main shallow areas found in the broad ridge formed between Gotland and the Polish coast are located in the area: The Slupsk Bank, 40 km N of Ustka in Poland with a minimum depth of 8 m and the Southern Midsjö Bank, 90 km NW of Kolobrzeg in Poland with a minimum depth of 13 m. In the western part of the area the Polish part of the Pomeranian Bay forms part of the largest shallow plain found in the Baltic Sea with approximately 6000 km<sup>2</sup> below 30 m water depth. Centrally in the Pomeranian Bay, Oder Bank is located.

The biology of the area can be characterised by three types of large-scale habitats: near-coastal waters influenced by fresh-water outlets and shallow sub-littoral waters and offshore banks with limited influence from fresh-water and anthropogenic sources. The biodiversity and importance of the different parts of the area to wintering waterbirds follow the same general trend showing increasing importance from the coastal areas towards the offshore areas. This increasing trend reflects changes in a number of parameters along the coast-offshore gradient; the more important being decreasing disturbance, increasing occurrence of gravel and stones and improved oxygen and light conditions. Towards the lower sub-littoral in the Baltic Proper both biodiversity and numbers of waterbirds markedly decrease. The conditions in the higher sub-littoral support a relatively rich macroflora and associated fish and fish predators as well as a variety and rich supply of benthic animals, which in turn give rise to the development of important benthic biotopes.

One of the most striking effects of the varied and rich supply of pelagic and benthic food is the aggregation of wintering waterbirds found throughout the area, as reflected by the seven important bird areas designated in the area (Skov et al. 2000). In total, an average of 1.8 million waterbirds winter in the area; the most abundant being long-tailed duck, velvet scoter, common scoter, red- and black-throated diver, little gull, great crested grebe and red-breasted merganser.

Although the threats to marine biodiversity generally decrease as one ventures into the richer offshore waters of the area, the sensitive offshore areas are more at risk from oil pollution related to shipping, either as accidents or as deliberate discharges of oil. This is due to the exposed nature of the area and the location of main shipping routes and fishing grounds in offshore waters.

The following important shipping routes traverse the offshore sector of the area:

- Route connection Buddinge oil terminal to international shipping corridors in Baltic Proper
- Route connecting oil terminal in Ventspils to international shipping corridors in Baltic Proper
- Route connecting the harbour of Gdansk to international shipping corridors in Baltic Proper
- Route connecting the harbour of Klaipeda to international shipping corridors in Baltic Proper
- Route connecting the harbour of Liepaja to international shipping corridors in Baltic Proper

- Route connecting the harbour of Swinoujscie to international shipping corridors in Western Baltic

## **The Pomeranian Bay (Area 2)**

### ***Description of the area:***

The area is defined as the wide area of shallow water (< 30 m) extending over a sandy plain from Rügen, Germany in the west to Kolobrzeg, Poland in the east. The total area is 8,800 km<sup>2</sup> with approximately 6,000 km<sup>2</sup> in Poland. The width of the area is 25-80 km off the Polish coast. The only other shallow area of comparable size in the Baltic Sea is the North-western part of the Kattegat. The major part of the Pomeranian Bay is a gentle, undulating bank with depths between 12 and 18 m. The 10 m depth contour is generally located less than 10 km offshore. However, centrally in the Pomeranian Bay, the Odra Bank with depths around 8 m is located. Behind the coastline several large brackish lagoons are situated. To the north, the Pomeranian Bay is separated from the Adlergrund and Rønne Bank by a narrow channel more than 30 m deep and 3-5 km wide.

Due to the outlet of the Odra River, which drains an area of 119,000 km<sup>2</sup>, the area has extensive estuarine and anthropogenic impact. The area is located in the sub-littoral euphotic zone with predominantly sandy bottoms to the west and gravel bottoms and boulders in the southeastern part. A euryhaline benthic community dominated by *Macoma baltica* and *Mya arenaria* is found over a large area. The salinity is 7-8 ‰.

The area represents an important habitat for non commercial and commercial fish stocks including freshwater fish species and a spawning and nursery ground for eg. herring. More than one million seabirds winter in the area, representing the most important wintering site in the whole Baltic Sea.

The Pomeranian Bay and the large sandbanks are important areas for the coastal fishery. The coasts on the Polish mainland as well as Wolin Island and the German islands Usedom and Rügen and the Danish Bornholm are all centres of the national tourism. A major oilspill would seriously harm the tourism as a main economic backbone of these areas.

### ***Existing level of environmental protection:***

The Pomeranian Bay is from the coastal side neighbored by two coastal national parks (Wolinski National Park and Nationalpark Jasmund) and a biosphere reserve Biosphere Reserve South-East Rügen. The inner coastal Waters of the Odra lagoon and the Greifswald Lagoon are, as well as the marine Part of the Jasmund National nominated as BSPAs as well as the Adlergrund in the North of the area. None of the sites itself was so far nominated as Natura 2000 areas, whereas the German Government is currently discussing to nominate parts of the area as SPA and SAC. Almost the whole area is due to its global importance part of the IBA network Polish and German Part.

### ***Significance of the area: ecological, socio-economic or scientific criteria***

More than one million seabirds winter in the Pomeranian Bay, including bivalve-eating and fish-eating species. This makes the area unique on a global scale with as much as ten seabird species occurring in concentrations of international importance. Apparently this is the largest concentration of wintering seaducks in Europe. The area is further considered of global importance to Slavonian grebe, long-tailed duck, velvet scoter and the Baltic race of black guillemot.

The new scientific studies on the distribution of harbour porpoises indicate that during early summer which is the breeding season for these mammals, high concentrations with estimated 15% of the endemic population could be threatened.

The area contains important feeding areas for freshwater fish species as well as spawning grounds for herring and nursery areas for different species of flatfish. The threatened *Coregenus lavaretus* migrates between feeding grounds in the Pomeranian Bay and spawning grounds in the lower regions of the Odra river. The rich fish fauna gives rise to a widespread set net fishery.

The ecological significance of the area is recognized by several networks: the Helcom BSPA's, Ramsar and IBA's and as proposed Areas for the Natura 2000 network. Large submarine shallow sandbanks are priority habitats as well as the reef structures in parts of the Odra Bank and Adler Grund as well as the Rönne Bank.

The coast of the Pomeranian Bay is used by locals for bathing and strolling, and several places are becoming increasingly important for tourism. Kolobrzeg is an important yacht harbour.

### ***Vulnerability to damage by international shipping activities***

Given the status of naturalness and the global importance of the area for biodiversity, shipping is a major threat to the area. Even though the major ship transport routes do not lead directly through the area, important shipping takes place on a minor route south of Bornholm to the Polish, Kaliningrad and Lithuanian ports (1997: 2000 passages, estimate 2015: 25.000), and to Swinouiscie through the south-western part of the area. Passenger traffic from Poland to Sweden and between Germany and Bornholm resp. Germany and Baltic States and Russian Ports have to be added as well as coastal pleasure boat traffic. The traffic guidance and reporting system and co-ordination of ship traffic is poorly developed in comparison with other sea areas so that incomplete control and rescue systems enlarge the risks by shipping in that area. Should the plans for large wind power parks be implemented, the risk by those artificial obstacles would even be enlarged.

The unique importance of the area for wintering waterbirds renders it as one of the most sensitive areas to oil pollution in European waters. Even small oil spills will potentially kill thousands of waterbirds at any time during the year between August and May. Large oil spills (> 1000 tons) could have catastrophic consequences for several waterbird species, and could impact on wider ecosystems in recruitment areas of Russia and Fennoscandia.

The local fishermen, commercial as well as leisure-time would suffer from an oil spill through the tainting of fish and damage to them, their offspring and their prey, and an oil slick hitting the holiday-friendly beaches would be a blow to the tourist industry.

### **Additional Safety measures needed**

- The area should be included in the traffic guidance and reporting system (VTMIS) together with Poland and Denmark
- Compulsory pilotage should be applied for ships representing high maritime safety risks
- The shallow waters around the Odra Bank, Slupsk Bank and Adlergrund should be areas to be avoided for certain vessels representing high maritime safety risks
- Offshore installations representing additional risk for shipping should be excluded

## **The Central Polish Coast**

### ***Description of the area:***

The area is located within the Polish 12 mile zone and comprises the coastal and offshore area extending 200 km from the Pomeranian Bay to the Hel Peninsula. The most important part of the area in terms of biodiversity is the area covered by the depth range of 0 to 15 m, from the Polish coast and 10-15 km offshore. This area has a size of 2,725 km<sup>2</sup>. The majority of the area is characterised by sandy sediments with some gravel. To the north, the Central Polish Coast is connected to the Slupsk Bank.

***Significance of the area in relation to ecology, socio-economy and science:***

The area is of international importance for wintering seaducks. Approximately 220,000 long-tailed ducks and 27,000 velvet scoters have been estimated for the area. Most of these seaducks are found in the offshore zone over depths of 8 to 15 m.

The coastal zone is a traditional area of mass recreation and tourism activity. Areas with concentration of tourists are typically found near the large dunes and coastal lakes. The coastal zone boasts a number of protected areas, including the Slowinski National Park north of Slupsk, the Koszalin protected coastal landscape and the protected coastal areas east and west of Ustka.

***Vulnerability to damage by international shipping:***

The area is considered sensitive to oil pollution mainly as a result of the concentration of wintering seaducks. The offshore area is most sensitive and oil spills in these exposed waters would potentially kill thousands of seaducks during the period between November and May.

Oil slicks hitting the holiday-friendly beaches during summer would be a serious blow to the large tourist industry.

***Additional Safety measures needed***

- The area should be included in the traffic guidance and reporting system (VTMIS) together with Germany and Denmark
- Compulsory pilotage should be applied for ships representing high maritime safety risks
- The shallow waters around Slupsk Bank should be Areas to be avoided for certain vessels
- Offshore installations representing additional risk for shipping should be excluded

## **The Gulf of Gdansk**

***Description of the area:***

The area stretches from the Hel Peninsula to the Russian border (Kaliningrad) extending along the coast within the 12 miles zone. Two areas within this region are of particular importance in relation to potential impacts from shipping activity: the Puck Bay-Hel Peninsula and the mouth of the Wisla River. The Puck Bay-Hel Peninsula covers about 52 000 ha of water and extensive sandy beaches, and is located in the north-western most corner of the Gulf. The Puck Lagoon close to the Hel Peninsula, which comprises 10,400 ha, has an average depth of only 3 m, while the rest of Puck Bay to the east is much deeper. The area also includes some coastal meadows near Jastarnia (8 ha), Wladyslawowo (30 ha), the Reda river mouth (200 ha) and the area between Reda and Mechelinki (150 ha). These areas belong to remnants of coastal, temporarily flooded halophilous meadows, which were formerly a common feature along the Polish Baltic coast. The Puck Bay is surrounded by many small fish harbours and two large sea harbours in Gdynia and Gdansk.

The Wisla river mouth includes sandy peninsulas, mobile sandflats, small sandy offshore islets, delta lagoons with adjacent dunes, coastal freshwater lakes on either side of the riverbed, a small patch of coastal forests and a strip of meadows along a right bank from the Przegalina sluice to the river mouth.

The major shipping lane crossing the area is the route to/from the harbours of Gdansk and Gdynia, which also cross the southern part of Puck Bay. The Wisla river mouth is traversed by river traffic.

***Significance of the area in relation to ecology, socio-economy and science:***

Eight species of migrating and wintering waterbirds occur regularly in the Puck Bay in concentrations of international importance, including slavonian grebe, mute swan, tufted duck, smew and goosander. These birds mainly concentrate in the shallow lagoon. Nine species of migrating and wintering waterbirds occur regularly at the mouth of the Swina river in

concentrations of international importance, the most important being tufted duck, scaup, goldeneye, white-tailed eagle and little gull. The little tern has an important breeding population in this area.

The area boasts an important fishery, including gill net fishery for salmon, trawling for sprat and herring and set nets for a wide variety of benthic species of fish.

Tourism is an important industry in the region with concentrations of tourists found at the Hel Peninsula and near Gdynia and Gdansk. The Puck Bay-Hel Peninsula are covered by two protected areas: the Beka Nature Reserve (200 ha of coastal meadows) and the Nadmorski Landscape Park (11,000 ha). The area to the west of the Wisla Mouth is covered by the Redlowo Nature Reserve.

#### ***Vulnerability to damage by international shipping:***

Both the Puck Bay-Hel Peninsula and the Wisla River is potentially at danger of oil spills from shipping and from the large harbours in Gdansk and Gdynia. The enlargement of the Container Terminal in that area (about 500.000 TEU annually are planned) raises the risk from large vessels traveling in that area.

Due to the proximity of the large shipping lanes and harbours the sensitive concentrations of waterbirds in the Puck Bay and the recreational assets of the Hel Peninsula are under constant threat from oil pollution. In addition fishing activities in the Gulf are at risk. Any oil spill at Gdansk and Gdynia harbours can potentially cause huge damage to recreational interests and cause the death of large numbers of birds.

#### ***Additional Safety measures needed***

- The area should be included in the traffic guidance and reporting system (VTMIS) and the landbased AIS together with Germany and Denmark
- Compulsory pilotage should be applied for ships representing high safety risks
- Offshore installations representing additional risk for shipping should be excluded
- If traffic to the harbour will increase dramatically, traffic separation system from the harbours to the main shipping route and deep water ways should be considered.

### **The Slupsk Bank and Southern Midsjö Bank**

#### ***Description of the area:***

The Slupsk Bank is a large offshore bank of approximately 600 km<sup>2</sup> located in the Polish EEZ 35 km from the Polish coast. The area is under limited anthropogenic impact and supports unspoiled vegetation and an euryhaline benthic community dominated by *Mytilus edulis* and *Gammarus salinus*. The bottom is covered with sandy sediments and gravel with stones and boulders. The bank is largely determined by the 20 m depth contour and is surrounded by deeper waters of the Baltic Proper. High biodiversity and large numbers of wintering waterbirds are associated with the shallow bank.

The Slupsk Bank is separated from the Southern Midsjö Bank by a distance of 60 km. The Southern Midsjö Bank is located on the shoal extending southwards from Gotland approximately 90 km from the Polish coast, and it shares many characteristics with the Slupsk Bank. However, the Southern Midsjö Bank has been object of gravel exploitation activities.

The banks lie on either side of the main international shipping lane through the Baltic Proper, and the Slupsk Bank is often traversed by ships travelling to/from the harbours of Gdansk and Gdynia.

#### ***Significance of the area in relation to ecology, socio-economy and science:***

Although plans exist for utilisation of raw materials from the Slupsk Bank, the benthic ecosystem of the area is still intact. In spite of gravel exploitation on the Southern Midsjö Bank the larger part of

this area may still be representative of the unique offshore banks in the Baltic Proper. Both banks should be considered as potential future SACs under the EU Habitat Directive.

The stony part of the Slupsk Bank supports unspoiled vegetation and euryhaline benthic community, with *Mytilus edulis-Gammarus salinus* biocoenosis dominating. In total 32 species of macrozoobenthos have been recorded. The bank and especially the dense mussel shoals support a variety of fishes, and is an important spawning ground for herring and sprat and a nursery area for flatfishes. Both banks support important set net fisheries. Large numbers of seabirds are wintering on the banks, notably long-tailed duck (Slupsk Bank 50,000) and black guillemot (Slupsk Bank 3000, Southern Midsjö Bank 800).

#### ***Vulnerability to damage by international shipping:***

Both banks are at risk for chronic pollution with oil from ships due to their proximity to the major shipping lane in the Baltic Proper, the existence of vulnerable elements of the benthic ecosystems (macroalgae) and the concentration of wintering waterbirds. Small oil spills will damage the vascular plants, potentially kill waterbirds and affect the conditions of fish eggs and larvae. Larger oil spills (> 1000 tons) could possess a serious threat to the ecosystem of the banks by killing macroalgae vegetation, fish eggs and larvae and thousands of waterbirds.

The banks have been suggested as suitable sites for the development of marine wind farms. Collisions between ships and wind turbines are a potential threat to these areas, which has to be considered during the feasibility stage of wind industry developments.

#### ***Additional Safety measures needed***

- The area should be included in the traffic guidance and reporting system (VTMIS) together with Germany and Denmark
- Compulsory pilotage should be applied for ships representing high safety risks
- The shallow waters around Slupsk Bank should be Areas to be avoided for certain vessels
- Offshore installations representing additional risk for shipping should be excluded
- Extended air surveillance could reduce illegal oil spills and their harmful effects on marine life

## **Lithuania (Area 3)**

#### ***Description of the area:***

The area extends along the entire Lithuanian coast, and it covers inshore waters to the 30 m depth contour. The Lithuanian coastal waters may be split into a southern sector off the Curonian Spit and a northern sector north of Klaipeda. The southern sector is characterised by sandy bottoms between the coast and the 20 m depth contour and aleurites and pelitic muds between the 20 m and the 30 m depth contours. The area is important for a wide range of waterbirds during the non-breeding season.

The coastal sector north of Klaipeda is under estuarine impact from the Curonian Lagoon (Nemunas river). Stones, pebbles and gravel prevail, with some patches of sand and mud. The water masses are well-mixed throughout the year with variable transparency, and salinities between 2 ‰ and 8 ‰ in the surface layer, and between 6.6 ‰ and 8.4 ‰ in the bottom layer. The area forms part of a long-shore 2-15 km wide highly diverse, stony bottom region with macrophyte vegetation and *Mytilus edulis* communities extending northwards into Latvian coastal waters. The area is important for non-breeding, mainly piscivorous waterbirds.

Traffic lanes from Klaipeda harbour and the Buddinge Oil Terminal cross through the Lithuanian coastal zone.

***Significance of the area in relation to ecology, socio-economy and science:***

The importance of the southern sector to waterbirds is associated with cold winters, when internationally important concentrations of seaducks move from the ice-covered Gulf of Riga to the area. The main species during cold winters are red/black-throated diver (1000), long-tailed duck (70,000) and velvet scoter (160,000).

The northern sector boasts a high diversity of macrozoobenthos and macrophytes, and supports the major spawning areas for herring in Lithuanian waters. Fish, which are usually found in freshwater habitats occur commonly in the area including *Rutilus rutilus*, *Perca fluviatilis*, *Culter alburnus*, *Abramis brama* and *Lucioperca lucioperca*. In addition, the area is the second-largest wintering site in the Baltic Sea of the globally threatened steller's eider along the coast off Palanga city. The concentration represents 5 % of the wintering population in the Barents, White and Baltic Seas.

Set net fisheries are thriving in the inshore waters, while both set net, trawl and drift net fisheries take place in offshore waters. The sandy beaches support an important tourism and recreational industry. The inshore zone (3 km from the shoreline) of the southern sector is protected as the aquatic part of the Kuršiu Nerija National Park, while nearly half (13,5 km of the shoreline) of the northern sector (in a distance of up to 2,5 km from the shore) is protected as the aquatic part of the Pajurio Regional Park.

***Vulnerability to damage by international shipping:***

The whole coastal strip of Lithuania is highly vulnerable to oil pollution. The vulnerability of the southern sector is mainly related to cold winter, due to the aggregation of seaducks, while the vulnerability of the northern sector is present throughout the year. A large oil spill in the southern sector during cold winters has the potential to kill more than 10% of the European winter population of velvet scoter. A large oil spill in the northern sector could damage the unique benthic ecosystem and kill large numbers of waterbirds. Oil pollution is a growing problem in Lithuanian coastal waters, both as a function of management problems at the Buttinge Oil terminal and the increase in traffic.

***Additional Safety measures needed***

- The area should be included in the traffic guidance and reporting system (VTMIS)
- Compulsory pilotage should be applied for ships representing high safety risks
- The shallow waters around the Odra Bank and Slupsk Bank should be Areas to be avoided for certain vessels
- Offshore installations representing additional risk for shipping should be excluded
- Extended air surveillance could reduce illegal oil spills

**Latvian waters from Lithuanian border to Liepaja (Area 3)**

***Description of the area:***

The area stretches from the Lithuanian border to Liepaja from the coast to the 30 m depth contour. The area shares the same characteristics as the northern sector of the Lithuanian coastal waters. Fine-grained sand, silt and silty sand dominate in the vicinity of the coast, while the bottom of the deeper part of the site is covered by sand and gravel with pebbles. The traffic lane to/from Liepaja passes through the area. The traffic to/from the harbour of Liepeja is believed to increase rapidly in the near future.

### ***Significance of the area in relation to ecology, socio-economy and science:***

Macrophyte vegetation (*Furcellaria* sp.) is found in the area. Large numbers of waterbirds visit the area during cold winters, especially goosanders (up to 9,500). The coastline is an important recreational site, and set net fisheries are common in the area.

### ***Vulnerability to damage by international shipping:***

Oil spills could affect the diverse benthic ecosystem, set net fisheries and coastal recreation sites. Most damage to wildlife would happen during cold winters due to aggregations of sensitive waterbirds.

### ***Additional Safety measures needed***

- The area should be included in the traffic guidance and reporting system (VTMIS)
- Compulsory pilotage should be applied for ships representing high maritime safety risks
- Extended air surveillance could reduce illegal oil spills

## **The Gulf of Riga (Area 4)**

The Gulf of Riga is a large water-body to the south from the West Estonian Archipelago. It is connected to the Baltic Proper by relatively narrow Irbe Strait in the West and Moonsund in the North. The Gulf is very shallow with deepest parts around 50 meters deep and the mean depth less than 20 metres. There are some coastal islets in Estonia and two inhabited off-shore islands – Kihnu and Ruhnu (Runö). Major ports of the gulf are (in order of size) Riga, Pärnu and Roomassaare (Saaremaa). A larger complex protection area (Sea Park) is being established to the North-East Gulf of Riga involving Kihnu Island adjacent shallow sea and coast of mainland in the area. The park is meant to preserve diverse wildlife (sea birds, fish, seals, natterjack toads), semi-natural habitats and cultural heritage of the region. Seal sanctuaries are proposed to the islets off the Saaremaa south coast. Northern part of the Gulf is inhabited by both grey and ringed seals, as the nature does not provide many places for these animals to haul out, the few places accessible to seals are very densely populated. The biggest proportion of Baltic herring catches in Estonia comes from the Gulf. Unique cultural heritage of Kihnu island is very much dependant on use of marine resources, nowadays also tourism.

The Gulf freezes partially in the medium and severe winters, ice movements in the Irbe Strait complicate navigation in this narrow channel.

### **West Estonian Archipelago and Väinameri (Moonsund)**

West Estonian Archipelago is formed by four major inhabited islands and several tens of smaller islets and reefs. The straits between the islands are very shallow (mean depth less than six metres) and coast are flat and low, which makes the area very suitable habitat for various local natural communities, migratory birds and marine mammals. The archipelago sustains local population of approximately 70 000 people who are extremely dependant on fisheries and tourist industry. Essential part of the Moonsund waters are included into Matsalu Nature Reserve and Kassari Hiiumaa islets Ramsar site. The West Estonian Archipelago host endangered and rare species of birds (e.g. white-tailed sea eagle, barnacle geese, avocet), animals (seals, otters) and vulnerable communities. The islets and reefs of the area are very low and densely populated by nesting sea-birds – in Vilsandi National Park European highest densities of nesting eider ducks (*Somateria molissima*) are recorded. Few outer skerries of the Archipelago serve as resting and breeding places for the Baltic grey seal. The southernmost population of ringed seals in the World inhabit the inner straits of the area.

Although majority of the area is very shallow that renders navigation in these waters difficult, the area is in general accessible for spills and pollution from the open sea. Low coastal habitats and island communities would suffer substantially from spill or illegal outlets and dumping.

### ***Additional Safety measures (for both Areas around the Gulf of Riga)***

- The area should be included in the traffic guidance and reporting system (VTMIS)
- Compulsory pilotage should be applied for ships representing high safety risks especially in the areas difficult to navigate
- Standardized ice classification should be obligatory in winter
- Extended air surveillance could further reduce illegal oil spills

## **Sweden (Area 5)**

### **The waters surrounding Öland and Gotland**

#### ***Description of the area:***

The area includes the coastal and offshore waters surrounding the Swedish islands Öland and Gotland including the shallow offshore areas Hoburgs bank, Norra Midsjö banken, Södra Midsjö banken, Knolls grund and Ölands södra grund.

#### ***Significance of the area: ecological, socio-economic and scientific criteria:***

The coastal area east of Gotland consists of very low-lying peninsulas and/or islands with gravel covered limestone foundation. This area is rich in breeding bird species and is important as wintering grounds for e.g. Long-tailed duck (*Clangula hyemalis*). It also supports large numbers of migrating swans and geese, and Grötlingboholme is the most important Baltic moulting ground for Grey-Lag goose (*Anser anser*). The Karlsö islands, two cliffs situated south west off Gotland, supports a large number of breeding auks, including 75% of the Baltic breeding population of Guillemot (*Uria aalga*). The shallow offshore banks surrounding Öland and Gotland have a rich macrozoobenthic fauna dominated by extensive amounts of blue mussels and are very important feeding and wintering areas for seabirds. The shallow areas are important breeding and nursery areas for a great variety of species associated with hard and soft bottoms as well as for fish (e.g. turbot). It is for example of international importance to long-tailed ducks and black guillemots. Hoburgs Bank has been designated as a Special Area of Conservation (EU Habitats directive) by the Swedish Government. Hoburgs bank, Norra Midsjö banken, Knolls grund and Ölands södra grund are proposed as offshore Baltic Sea Protected Area (BSPA). Parts of the area are listed as Important Bird Areas (IBA) by BirdLife International.

Öland and Gotland are very important for tourism during the summer period and because of that of high socio-economic importance.

#### ***Vulnerability to damage by international shipping activities:***

Extraordinary high frequencies of oil pollution incidents from the international shipping lane greatly affect the marine environment of the area. Large numbers of long-tailed ducks are currently killed during the winter months. Insufficient traffic separation schemes apply, which lead tankers close to the eastern boundary of Hoburgs bank. During prevailing winter weather conditions (southwesterly winds), discharges of oil from tankers are swept across Hoburgs bank.

#### ***Additional Safety measures needed***

- The area should be included in the traffic guidance and reporting system (VTMIS) and AIS
- Compulsory pilotage should be applied for ships representing high safety risks
- The shallow waters around the Hoburgs Bank and other shallow offshore areas should be Areas to be avoided for certain vessels
- Offshore installations representing additional risk for shipping should be excluded
- Compulsory routing measures and traffic separation systems should be applied including special rules for loaded or unloaded vessels.

## **Swedish mainland coast (Area 6)**

### ***Description of the area:***

The area extends along the Swedish coast from the southern part of Stockholm Archipelago to Skåne. There are a great variety of different habitats from lagoons, shallow bays and coastal meadows to exposed stony bottoms. Large parts of the area consist of typical archipelago biotopes with shallow waters and hundreds of islands and skerries (e.g. St. Anna Archipelago and Torhamns Archipelago). The outer areas represent truly offshore biotopes.

### ***Significance of the Area: ecological, socio-economic and scientific criteria:***

The diverse archipelagos, seashores and underwater ecosystems of the Swedish coast have high ecological values. This is also shown by the fact that there are a number of protected areas (or proposed protected areas) and similar conservation areas along the coast e.g. NATURA 2000 areas, Ramsar sites, Nature Reserves, IBA's, BSPA's, etc.

The coastal zone as a whole including the archipelagos is of outmost importance for local people as well as tourists and fishermen. The archipelagos and beaches are very important recreational areas for people using the sea for boating, fishing, bird-watching etc. The southern part of the area, in Skåne, has e.g. some of the most popular sandy beaches in Sweden.

The coastal zone is important as breeding and wintering areas for a wide range of seabirds. Species found in the area are e.g. White Tailed Eagle (*Haliaeetus albicilla*), Caspian Tern (*Sterna caspia*), Turnstone (*Arrenaria interpres*), Oystercatcher (*Haemantopus himantopus*) and Grey-Lag goose (*Anser anser*). Osprey (*Pandion halieatus*), Black Guillemot (*Cephus grylle*), Razorbill (*Alca torda*), Goldeneye (*Bucephala clangula*), Smew (*Mergus albellus*) and Goosander (*Mergus merganser*) occur as well. The Blekinge Archipelago holds the largest winter concentrations of Tufted Duck (*Aythya fuligula*) in Sweden. Sweden's southernmost archipelago (Torhamns Archipelago) is one of its most important bird observation sites for migratory species.

Grey seal (*Halichoerus grypus*) colonies exist within a number of sites e.g. in St. Anna / Missjö Archipelago.

Shallow bays and other coastal areas with a high density of macrophytes are important spawning areas for a range of fish species and the Bornholm depth, south of the area, is one of the most important breeding areas for cod.

### ***Vulnerability to damage by international shipping activities:***

The whole coastal strip of south-eastern Sweden is highly vulnerable to oil pollution. A large number of islands, routes that are difficult to navigate, the slow water exchange in the Baltic Sea and long periods of ice cover render this sea an especially sensitive area. A large oil spill could severely damage the unique benthic ecosystem and kill large numbers of seabirds. The big shipping lane through the Baltic Sea passes very close to the southern parts of the Swedish coast, between Bornholm and the coast of Skåne. The accident with the Chinese ship Fu Shan Hai that foundered off Danish island of Bornholm, in the Baltic Sea, illustrates the need for increased control of shipping. Shipping close to important breeding areas for birds or seal colonies may also disturb the marine wildlife.

### ***Additional Safety measures***

- The area should be included in the traffic guidance and reporting system (VTMIS) and AIS already in place for the Gulf of Finland.

- Compulsory pilotage should be applied in certain areas, especially for Stockholm bound vessels
  - The shallow waters including small islands should be Areas to be avoided for certain vessels
  - A standardized Ice-classification system during wintertime is a major measure in this area ?
- Speed reduction should be necessary close to sensitive habitats

## **The Gulf of Finland (Area 7)**

### **Description of the area:**

The Gulf of Finland is like a large delta area. The length of the Gulf of Finland is 400 km, the width is between 48-135 km and its area is 29 570 km<sup>2</sup>. It is a very shallow water body with an average depth of 37 m and a maximum depth of 123 m. Due to the shallowness its volume is only about 5 % of the total volume of the Baltic Sea. The western part of the Gulf is open to the Baltic Proper and, therefore, the water exchange is relevant. The general direction of currents is anti-clockwise, along the Finnish coast from east to west.

Ecological functions of the Gulf of Finland are largely consist in supporting spawning grounds for fish and breeding and moulting areas for seals as well as being an important resting site for arctic migrants in spring time. Not the least is the importance as a recreational area for several million people living in the region.

The network of conservation areas covers large parts of the Gulf of Finland, both islands and sea areas. There are official conservation programmes on global level (UNESCO's man and Biosphere, Ramsar Convention), EU level (NATURA 2000) and on national level (bird and shore conservation programmes, national parks and nature reserves).

### ***Significance of the Area: ecological, socio-economic and scientific criteria:***

The diverse archipelagos, seashores and underwater ecosystems of the Gulf of Finland have high ecological values. This is also shown by the fact that there are numerous protected areas and similar conservation areas both in Estonia, Russia and Finland (NATURA200 areas, Ramsar sites, national parks, IBA's, seal sanctuaries, BSPA's, etc.) The archipelagos and seashores of the Gulf of Finland are very important recreational areas for hundreds of thousands of people using the sea for boating, fishing, bird-watching etc.

The economic significance of the Gulf of Finland is in its importance for salmon fishery and as a spawning area for the Baltic herring, as well as a recreational area. The coastal zone as a whole has become to be of highest economic importance for local people as well as tourists and fishermen. The major economic beneficiaries in the area are local communities and small-scale fisheries as well as regional authorities, oil and cargo companies, etc.

### ***Vulnerability to damage by international shipping activities:***

One major threat to the area is shipping, the total number of passages in the Gulf of Finland was 34 000 (year 2000). The Gulf of Finland is an important route for oil transportation (6360 oil tankers in the year 2000) as there are several important oil terminals around the Gulf of Finland in Russia, Estonia and Finland and some new ones are under construction or planning. During the last 6 years the amount of oil transported in the Baltic Sea have doubled being currently about 40 million tons per year. By the year 2005 it is expected to increase up to 80 million tons. Without any additional measures the risk will increase accordingly. The oil- and chemical transportation is expected still to increase up to 160 million tons by 2010. Risk for a major accident especially in the Gulf of Finland is increased by the crossing passenger traffic between Helsinki and Tallinn.

According to the information compiled by HELCOM (<http://www.helcom.fi/manandsea/shipping/oilpollution.html>) altogether 119 ship accidents occurred in the Baltic Sea during the period 2000 – 2001. They occurred mostly near port areas and the straits, especially in the Gulf of Finland and the entrance of the Baltic Sea. Since 1980 twenty major oil incidents where the oil outflow has been more than 100 tons have occurred. Also some of these accidents have happened in the Gulf of Finland

An oil or chemical accident could have disastrous effects on the vulnerable nature of the Baltic sea, such as fish spawning areas and breeding and resting areas for the birds and marine mammals. Already unfortunate illegal oil spills from vessels can cause effects on birds and marine mammals. Oil smothering of birds is the greatest threat to bird populations. Oil smothered seals lose their insulation and buoyancy and die of hypothermia or drowning.

### **The illegal oil spills are also a severe problem in the Gulf of Finland.**

Vessel traffic has also other effects. In harbours or narrow and shallow water areas, vessels cause mixing of the water column and nutrients can be released from the sediment enhancing eutrophication. Fish are disturbed by vessel traffic as fish eggs are more easily flushed away from submerged vegetation that has been covered with eroding material. Thus fish are less likely to breed successfully close to ferry routes.

Seasonal variation is characteristic for the Baltic Sea, especially in the northernmost parts. In the Gulf of Finland surface water temperature varies annually between 0 and 20 °C and the sea normally have an ice cover for 100 days each year. Ice movements are assumed to be harsher along ferry routes than at other shores. The waves can spread under the ice and lift and lower the ice and cause damage. Ice breaking along ferry routes can also be harmful for breeding seals (especially for the ringed seal), which are depended on ice blocks and warming snow caves. Statistically, winter is the most dangerous time for oil shipping.

The risk of an oil accident in the Gulf of Finland will increase fourfold with the increase in oil transport in the Gulf of Finland from the 22 million tons annually in 1995 to 90 million tons in 2005. At the same time, the cruises between Helsinki and Tallinn have increased tremendously, and this route is crossing the main routes of vessels transporting hazardous substances.

Seasonal variation is characteristic for the Baltic Sea, especially in the northernmost parts. In the Gulf of Finland the sea normally have an ice cover for 100 days each and ice breaking along ferry routes is needed. This can also be harmful for breeding seals (especially for the ringed seal), which are depended on ice blocks and warming snow caves. Statistically, winter is the most dangerous time for oil shipping.

and that's why standardized ice classification is needed for the Baltic Sea, at least for the northernmost parts, Bothnian Bay and the Gulf of Finland.

### ***Additional Safety measures needed***

WWF recognizes with satisfaction the initiative of the Finnish Government to build a vessel traffic monitoring system (VTMS) together with Russia and Estonia in the Gulf of Finland. This will be a good beginning and a major step forward to reduce the risk of accidents and should be taken in use in the planned timetable in July 2004.

- Compulsory pilotage and escort towing are very much needed in the area, especially in shallow coastal waters and narrow channels
- The shallow waters including small islands should be areas to be avoided e.g. areas close to seal sanctuaries and seals' breeding areas as well as some bird areas
- A standardized ice-classification system during wintertime is a major measure in this area
- Speed reduction could be necessary close to sensitive habitats

- For vessels representing major risks compulsory escort towing should be applied

## **Archipelago Sea between Finland and Sweden (Area 8)**

### ***Description of the area:***

In the Northern Baltic Sea, Archipelago Sea and the Åland Sea are characterized by an enormous topographic complexity, including some 30500 island, over 20000 km shoreline covering an area of more than 15 000 km<sup>2</sup>. The average water depth is only 23 m, but has some deep trenches reaching over 100 m. The mosaic structure and sharp environmental gradients (salinity, temperature, oxygen, exposure etc) create numerous biotopes, and complicated ecological webs.

The Archipelago Sea National Park is the largest marine national park in Finland. Within the National Park there is also a NATURA 2000 site as well as BSPA-site. In the Archipelago Sea there are also several protected areas on privately owned land. The national park is surrounded by a larger Archipelago Sea Biosphere Reserve established in 1994 by UNESCO. Two seal sanctuaries are situated in south of the park or partly out of the park, near the border of territorial waters. There are also various conservation programme areas as Shore Conservation Programme areas and Waterfowl Habitats Conservation Programme areas.

### ***Significance of the Area: ecological, socio-economic and scientific criteria:***

The Archipelago Sea has a specific value in the nature of Finland. This is emphasized by national and international agreements: parts of this area belong to The Archipelago National Park or they are included in the MAB-programme of the UNESCO as a biosphere reserve. For human use, the Archipelago Sea is important as a recreational area, having thousands of summerhouses, which are used by people coming from all parts of the country. In the fisheries, the Archipelago Sea is the most important area in Finland, as there the catches of many fish species (e.g. baltic herring) are higher than elsewhere. The environmental changes in the Archipelago Sea caused e.g. by shipping have vast socio-economic consequences in the society.

Although biodiversity is a natural process, the diversity change has become a social process as well. Environmental resources supply a flow of direct and indirect services to society. The nature values as well as economic values of the Archipelago Sea are enormous. It is a very important spawning area, especially for the Baltic herring. The area is also very valuable recreational area for thousands of Finnish inhabitants as well as for foreign tourists. The amount of leisure boats and summerhouses in the Archipelago is increasing.

From a socio-economic point of view oil spills could lead towards a less valuable state of the ecosystem with detrimental effects on fishing, tourism and leisure activities.

### ***Vulnerability to damage by international shipping activities:***

Due to the mosaic structure of nature in which 22 000 islands are located with the total length of shoreline more than 20000 km, the Archipelago Sea is very vulnerable to damages caused by shipping activities. The water depth in the Archipelago Sea is very shallow and ferry routes are very narrow making the risk of collisions and groundings very high, which in turn increase also a risk of oil spill. A mosaic of islands and skerries of varying size would make the cleaning of oil extremely difficult and laborious.

Two important ports are located in this area, the port of Turku (multipurpose port) and the port of Naantali, which is also oil terminal. The entrance channel of the Naantali port will be deepened to the depth of 15.3 m, thus the large tankers can enter the port in fully laden after the dredging works have been completed in 2004 – 2005. There is also intensive passenger-ferry traffic in the Archipelago Sea.

The mechanical effects of vessel traffic such as erosion on soft substance shores and changes in algal vegetation along rocky shores are documented phenomena in the Archipelago Sea.

The species composition will change when a shore is exposed to continual wave-wash and surge of vessels. Large vessels produce both up-welling of nutrients from the seabed and a momentary or prolonged turbulence of the water column.

In the Archipelago Sea ice conditions can also be very severe for shipping increasing the risk of oil accident.

Taking into account the short distances in the Baltic Sea, the archipelago area as well as the Gulf of Finland, is vulnerable also in case of oil tanker accident occurs in the Northern Baltic Proper.

In the year of 2000 there were 2160 oil tankers shipping oil in the Archipelago Sea.

#### ***Additional Safety measures needed***

- Vessel Traffic Monitoring and Information System should cover also The Archipelago Sea (there is already VTS-system in practice).
- Compulsory pilotage should be applied
- The shallow waters including small islands should be Areas to be avoided for certain vessels
- Compulsory routing measures and traffic separation systems should be applied in connection with the VTMISS-system
- A standardized ice-classification system during wintertime is a major measure in this area
- Speed reduction is necessary close to sensitive habitats and in narrow channels
- For vessels shipping oil or other hazardous chemicals compulsory escort towing should be applied

## **The Quark Area (Area 9)**

### ***Description of the area:***

The threshold between the Bothnian Sea and the Bothnian Bay is called The Quark (Merenkurkku). As a narrowest part of the Gulf of Bothnia the area is a natural migration route for many bird species. On the mainland, on both sides of the sea, there are important sites for birds to rest, especially ducks and geese.

The whole area is a very shallow, mostly less than 10 meters deep. Due to the Ice Age, landuplift is still an on-going process along coastal areas in the Quark area. Slow but permanent landuplift process (8,5 mm/y) leads to a birth of particular phenomenon: shallow fladas and oxbow-lakes.

The Quark is characterized by a rapid turn-over of water. Strong currents are running anti-clockwise, northwards on the eastern side, and southwards on the western side. The Quark is a productive area being important for seabirds and also playing an important role for many fish species and seals.

Some parts of the Quark have been designated as NATURA 2000 sites (EU Habitats directive/EU birds directive). There are also some areas, which are (Parts of the area are) listed as an Important Bird Area by BirdLife International. Furthermore, some sites in the area are nominated by HELCOM to be concluded in the network of marine protective areas in the Baltic Sea (BSPA's). Some areas are protected under the Ramsar convention, concerning internationally important resting

and breeding sites for wetland birds. In the Finnish territorial waters there is one seal sanctuary since 2001. The area has been proposed as a World Heritage Site.

Some areas are protected under Shore Conservation Programme, Waterfowl habitats Conservation Programme and Decision on the Protection of the Mikkelsaaret islands.

***Significance of the Area: ecological, socio-economic and scientific criteria:***

The high productivity and, the unique character of the benthic flora and fauna make the Quark a very important area. The powerful land-uplift, as well as the physical and ecological processes it causes, are more obvious and instructive in the Quark than in any other area, even on a global perspective. Biologically, fladas, glos, glo-lakes and lakes form very special biotopes of the highest ecological value. The Quark is also an internationally important area for seabirds.

Grey seals inhabit many skerries in the Quark area. The ringed seal, a relict species of glacial period, is most often found in the northern parts of the Quark.

Many fish species have their spawning sites in the Quark. For their reproduction most of them are strongly tied to the river mouths, fladas and glo-lakes where the springtime temperature is relatively high and plenty of food is available.

The amount of nature-tourists and nature-tourism enterprises is rapidly growing in the area emphasizing the significance of local marine and coastal nature.

Pleasure boat traffic is also increasing. For example, in the five central municipalities in the eastern parts of the Quark, Korsholm, Malax, Korsnäs, Maxmo and Vaasa, there are more than 5000 registered boats.

***Vulnerability to damage by international shipping activities:***

The traffic of cargo-ships in the Gulf of Bothnia involves risks for oil- and chemical spills, minor oil spills in ports as well as incidents involving normal traffic. The largest oil spill in The Quark happened in 1984, when the cargo-ship, m/s Eira, ran aground south of the Nordvalen lighthouse. 200 tons of heavy fuel oil leaked out. Since this happened, the co-operation between civil servants has improved a lot.

The ice conditions in The Quark and Bothnian Bay area are most difficult in the Finnish territorial waters. Here, in the narrowest part of the Bothnian Bay icebreaking can disturb grey and ringed seals, especially in breeding season, February-April.

***Additional Safety measures***

- The area should be included in the traffic guidance and reporting system (VTMIS) including AIS, together with Sweden.
- Compulsory pilotage should be applied
- The shallow waters including small islands should be nominated as areas to be avoided for certain vessels
- Compulsory routing measures and traffic separation systems should be applied in connection with the VTMIS-system
- A standardized ice-classification system during wintertime is a major measure in this area
- Speed reduction could be necessary close to sensitive habitats

**Gulf of Bothnia /Kemi (Area 10)**

### ***Description of the area***

Due to the Ice Age, land uplift is still an ongoing process along coastal areas, especially here in the northern parts of Gulf of Bothnia. A slow but permanent land uplift process (8,5 mm/y) leads to a birth of particular phenomenon: shallow fladas and oxbow lakes. These areas are usually very rich in their birdlife, especially Liminganlahti Bay, which is a very large and diverse wetland complex, including sea bays, archipelagos and farmland. It is located in the vicinity of Oulu City. This is important breeding and staging area for numerous species. A very high proportion of populations of many northern species stage on the area. Area is important for bird species such as lesser white-fronted goose, graylag goose, goldeneye, cranes, white-tailed eagle and caspian stern. There are several bird watching towers and wooden trails at Liminganlahti Bay. Species such

The salinity is very low in this area, only 0-3 promilles).

The Tornio river delta encompasses forested islands, rocky islets shoreline vegetation and brackish water. Human impact has detrimentally affected the area, resulting in eutrophication and overgrowth of wetlands and meadows.

### ***Significance of the Area: ecological, socio-economic and scientific criteria:***

The most important group of islands for birds in the whole Bothnian Bay are located here which is reflected as a network of Important Bird Areas (IBA-areas) and NATURA2000 areas. The numbers of lesser black-backed gulls and Caspian terns are perhaps the most significant. The area is also one of the most important staging areas for moulting grey-lag goose (1200 birds) in the country. Species of global conservation concern that do not meet IBA criteria is white-tailed eagle.

### ***Vulnerability to damage by international shipping activities:***

The traffic of cargo-ships in the Gulf of Bothnia involves risks for oil- and chemical spills, minor oil spills in ports as well as incidents involving normal traffic. The ice conditions in Bothnian Bay area are most difficult in the Finnish territorial waters. Icebreaking is needed every year and it can disturb grey and ringed seals, especially in breeding season, February-April. In case of oil accident several bird species should be threatened as well as the whole diverse wetland complex of the Liminlahti Bay.

### ***Additional Safety measures needed***

- The area should be included in the traffic guidance and reporting system (VTMIS) and AIS together with Sweden.
- Compulsory pilotage should be applied ?
- The shallow waters including small islands should be Areas to be avoided for certain vessels
- A standardized Ice-classification system during wintertime is a major measure in this area
- Speed reduction could be necessary close to sensitive habitats

## Glossary of terms and abbreviations used

**BSPA** = Baltic Sea Protected Area; network of Baltic marine protected areas established by the HELCOM

**Ecoregion** = Global 200 areas. The Global 200 is a science-based global ranking of the Earth's most biologically outstanding terrestrial, freshwater and marine habitats. It provides a critical blueprint for biodiversity conservation at a global scale. Developed by WWF scientists in collaboration with regional experts around the world, the Global 200 is the first comparative analysis of biodiversity to cover every major habitat type, spanning five continents and all the world's oceans. The aim of the Global 200 analysis is to ensure that the full range of ecosystems is represented within regional conservation and development strategies, so that conservation efforts around the world contribute to a global biodiversity strategy.

**IBA**=Important Bird Area

**IMO** = International Maritime Organisation

The IMO= International Maritime Organisation was founded in 1948 as an organisation of the United Nations with the aim to improve co-operation between the countries concerning issues of shipping. Shipping Safety, improvement in navigation and prevention of pollution of the sea by ships are named explicitly in the foundation document. Today, 162 countries belong to the IMO.

**NATURA2000** = Natura2000 is the cornerstone of EU Nature Conservation Policy, involving the creation of a network of sites designated at European level in order to protect rare and endangered species and natural habitats.

EU Nature Conservation Legislation is based on two Directives – the ‘**Birds Directive**’ and the ‘**Habitats Directive**’. Article 4 of the Birds Directive (1979) requires Member States to take special measures to conserve the habitat of certain listed threatened species through the designation of **Special Protection Areas (SPA’s)**. 1600 SPA’s are currently designated, covering in excess of 100000km<sup>2</sup>. The subsequent Habitats Directive (1992) has the fundamental purpose of establishing a network of protected areas to conserve the distribution and abundance of threatened species and habitats, designated as **Special Areas of Conservation (SAC’s)**. SAC’s are created at the end of a selection procedure whereby each Member State submits a list of proposed Sites of Community Importance (pSCI’s). This list is evaluated in order to identify finalised lists of SCI’s, each of which must in turn be designated as a SAC by the Member State within 6 years of its inclusion in the Community List. Together, the SPA’s and SAC’s will form the Natura2000 Network, which is expected to cover 12% of the EU Territory and consist of between 12000 and 15000 sites.

**PSSA**= A Particularly Sensitive Sea Area is an area that needs special protection through actions of the *International Maritime Organisation (IMO)* because of its significance based on recognised ecological, socio-economic, or scientific reasons. IMO will also decide, on the basis of a proposal from a Member Government/ Governments, what kind of associative protective measures will be adopted and put in place in each PSSA.

**RAMSAR**= The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 136 Contracting

Parties to the Convention, with 1287 wetland sites, totaling 108.9 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance.

**WWF = World Wide Fund for Nature, the Conservation organisation**