

# THE BALTIC SEA PSSA AND NAVIGATIONAL ASSOCIATED PROTECTED MEASURES

—NEW CHALLENGE FOR NAVIGATION EDUCATION

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**Abstract** The Baltic Sea has officially been classified (2005) by the International Maritime Organization (IMO) as a new item on the short list of Particularly Sensitive Sea Areas (PSSA). A PSSA designation—which requires ships to take special care when navigating through areas of ecological, economic, cultural or scientific significance—can be used to protect a variety of marine and coastal habitats.

The Baltic Sea has some of the busiest maritime traffic in the world. Large number of islands, narrow straits and routes which are difficult to navigate, and long annual periods of ice cover greatly increase the risk of a devastating oil accident in the Baltic Sea.

A PSSA can be protected by Associated Protected Measures (APM) which are huge challenge for navigation education not only in Gdynia Maritime University but also in the rest of maritime universities around the world. It is something new that corrections in navigation course outline should be done.

In the paper the Author would like to present all aspects of that problem, including proposal of model course in operational use of APM in PSSA.

The paper discusses Baltic Sea PSSA, navigational associated protected measures (APM) and their impact on Maritime Education and Training (MET) especially teaching of Navigation.

**Keywords** navigation; safety at sea; PSSA (particularly sensitive sea area); APM (associated protected measures); MET (maritime education and training); Baltic Sea

# 1 Introduction

The Baltic Sea, as well as the Torres Straits, the Galapagos Islands and the Canary Islands, have officially been classified (2005) by the International Maritime Organization (IMO) as a new item on the short list of Particularly Sensitive Sea Areas (PSSA).

A PSSA designation - which requires ships to take special care when navigating through areas of ecological, sociological, economic, cultural, educational or scientific significance - can be used to protect a variety of marine and coastal habitats.

The Baltic Sea has some of the busiest maritime traffic in the world. Large number of islands, shallow waters bays, gulfs, banks, rocks, wrecks, obstructions, narrow straits and routes that are difficult to navigate, and long annual periods of ice cover greatly increase the risk of a devastating oil accident and pollution in the Baltic Sea.

Several protected areas, such as Baltic Sea Protected Areas (BSPA<sup>[1]</sup>, Natura 2000<sup>[2]</sup> and Ramsar sites<sup>[3, 4]</sup>), exist adjacent to oil transportation routes. The Baltic Sea is also an important migratory route for black guillemot, waterfowl, geese and waders, and provides valuable habitat for marine mammals such as grey seals, Baltic ringed seals and harbour porpoises.

New protected measures, which were adopted by the IMO, include new traffic separation schemes and a recommended deep-water route, both aimed at decreasing the risk of shipping and oil accidents.

WWF (World Wildlife Fund) is also urging ships to follow the IMO's recommendation to use pilotage when navigating from the North Sea into the entrances to the Baltic Sea for every ship with a draught of 11m or more, or by ships carrying hazardous cargo.

The paper discusses Baltic Sea PSSA, navigational associated protected measures (APM) and their impact on Maritime Education and Training (MET).

## 2 Particularly sensitive sea areas (PSSAs)

### 2.1 What is a PSSA?

A PSSA is defined as “an area that needs special protection through action by IMO because of its significance for recognized ecological, socio-economic or scientific reasons and because it may be vulnerable to damage by international shipping” (Annex 2, Paragraph 1.2 of the IMO Assembly Resolution A.927(22)<sup>[5]</sup>). A designation of an area as a PSSA can help coastal States to prevent accidents, avoid habitat damage and stop pollution by regulating the passage of ships through or away from sensitive areas.

Thus, the identification of a PSSA is linked to the special character of the sea area and the need to protect the sea area against damage arising from international shipping activities.

### 2.2 What are the criteria for an area to be designated as a PSSA?

Paragraph 5 of Annex 2 of the IMO Assembly Resolution A.927(22)<sup>[5]</sup> lists the factors to be taken into account when considering whether an area is at risk from international shipping activities.

The factors are divided into two categories; vessel traffic characteristics and natural factors. In addition to being at risk from international shipping activities, the area should fulfil at least one of the criteria listed in Paragraph 4.4 of Annex 2 of the IMO Assembly Resolution A.927(22) <sup>[5]</sup>. The criteria listed are divided into the following categories: ecology; sociology, culture and economy; as well as science and education.

### **2.3 Which associated protective measures can be adopted in a PSSA?**

The associated protective measures to be adopted within a PSSA include the following options (Paragraphs 6.1.1-6.1.3 of Annex 2 of the IMO Assembly Resolution A.927(22)<sup>[5]</sup>):

- to designate an area as a Special Area in accordance with Annexes I, II or V of MARPOL 73/78 and/or as a SOx Emission Control Area under Annex VI of MARPOL 73/78; or application of special discharge restriction to ships operating in a PSSA;
- to adopt ships' routing and reporting systems near or in the area, under the SOLAS Convention and in accordance with the General Provisions on Ships' Routing and the Guidelines for Ship Reporting Systems; and
- to develop other measures, such as compulsory pilotage schemes or vessel traffic management systems, aiming at protecting specific sea areas against environmental damage from ships.

The proposed associated protective measures may thus include measures within IMO's competence and falling within one of the below mentioned categories:

- already available in an existing instrument;
- any measure not yet existing, but falling within the competence of IMO;
- any measure proposed for adoption in the territorial sea or pursuant to Article 211(6) of the UNCLOS (United Nations Convention on the Law of the Sea)<sup>[6]</sup>.

An application for a PSSA designation must include either a proposal for one or more associated protective measures or a description of how the area is already being protected (Paragraphs 7.1-7.2 of Annex 2 of the IMO Resolution A.927(22) <sup>[5]</sup>).

### **2.4 How can national or regional associated protective measures be adopted?**

An IMO Member State or a group of IMO Member States, with joint interest in the protection of a sea area, can submit national/regional proposals for associated protective measures to be adopted within a PSSA.

Among the countries to support the Baltic PSSA were (all the Baltic countries except Russian Federation): Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden.

The proposed associated measures should not derogate from the rights and duties of the coastal States as provided for in the United Nations Convention on the Law of the Sea <sup>[6]</sup>. Likewise the proposed associated measures should take into account other rules of international law.

## 2.5 Who can designate a sea area as a PSSA?

Designation of PSSAs within internal waters and the territorial sea can be done by States, nationally as well as regionally, whereas IMO is the competent international organization for the designation of PSSAs outside the territorial sea.

All applications for PSSA designation should be submitted to the IMO Marine Environment Protection Committee (MEPC), which will make an initial review of the application. The application will then be referred to the appropriate IMO sub-committees (e.g. NAV Sub-Committee) for further consideration of the proposed associated protective measures. Only after consideration by the pertinent IMO sub-committee may MEPC make a final decision on whether or not to designate a sea area as a PSSA.

## 2.6 Which PSSAs already exist?

Only IMO Member States can propose PSSA designations. Currently there are eleven PSSAs (Table 1 - dates of designations are in brackets):

Table 1 The areas adopted as PSSA by IMO

1	the Great Barrier Reef, Australia (1991)
2	the Sabana-Camagüey Archipelago in Cuba (1997)
3	Malpelo Island, Colombia (2002)
4	the sea around the Florida Keys, United States (2002)
5	the Wadden Sea, Denmark, Germany, Netherlands (2002)
6	Paracas National Reserve, Peru (2003)
7	Western European Waters (2004)
8	Extension of the existing Great Barrier Reef PSSA to include the Torres Strait (proposed by Australia and Papua New Guinea) (2005)
9	Canary Islands, Spain (2005)
10	the Galapagos Archipelago, Ecuador (2005)
11	the Baltic Sea Area, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden (2005)

## 2.7 Ships routing measures to protect PSSAs

A PSSA can be protected by ships routing measures—such as an area to be avoided: an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or by certain classes of ships.

The IMO Publication Ships' Routing includes general provisions on ships' routing, first adopted by IMO in 1973, and subsequently amended over the years, which are aimed at standardizing the design, development, charted presentation and use of routing measures adopted by IMO.

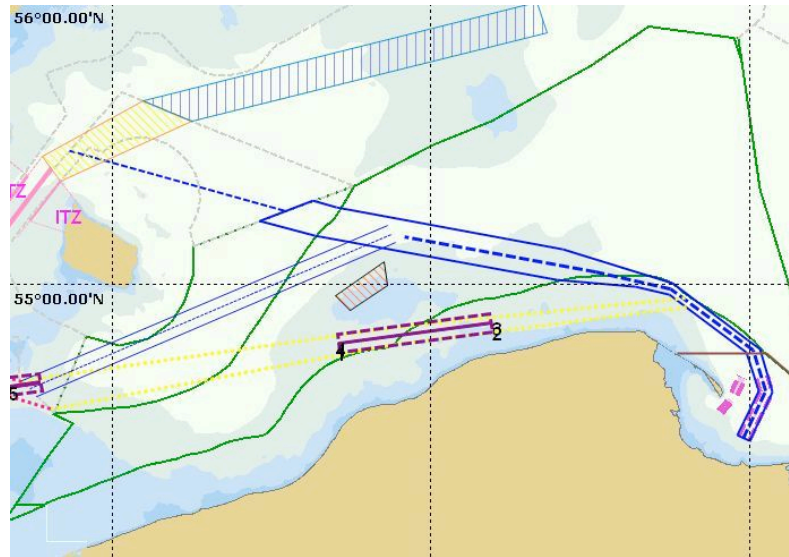


Fig.1 Ships routing measures to protect PSSAs in Polish Coast of Baltic Sea

Development of other measures, such as compulsory pilotage schemes or vessel traffic management systems, aims at protecting specific sea areas against environmental damage.

The above mentioned Associated Protected Measures (APM) are huge challenge for navigation education not only in Gdynia Maritime University but also in the rest of maritime universities and training centres around the world. It is something new—corrections in navigation course outline should be done.

- Associated Protective Measures (APMs) are binding measures regulating shipping in an area that the IMO has designated as a PSSA. The APMs are decided upon by the member states of the IMO, but a proposal is submitted by the coastal countries concerned. The APMs can be international or territorial. APMs regulate shipping, not ship structure, and hence requirement for double-hull cannot be an APM.
- Traffic separation schemes can be compared with lane divisions in motorways. Ships are referred to use a different route when travelling from north to south and vice versa.

Table 2 Existing IMO Protection Measures

Category	Measures Used
Ships Routing Systems	Traffic Separation Schemes
	Areas to be Avoided
	No Anchoring Areas
	Inshore traffic zones
	Deep water routes
	Precautionary areas
	Recommended routes
Ships Reporting Systems	IMO guidelines and criteria for Ship Reporting Systems—resolution 43(46)
	Voluntary / Mandatory
Vessel Traffic Service Systems	IMO Guidelines for Vessel Traffic Services A.857(20)

Discharge and Emission Restrictions	MARPOL Special Areas
	MARPOL Annex VI Sox Emission Control Area
	Special Discharge Restrictions for PSSA's

### 3 MARPOL special areas

It is not the first time where Baltic Sea is established as a special area. The first was MARPOL Convention <sup>[7]</sup>. Special areas under MARPOL 73/78 are as follows:

- Annex I: Regulations for the prevention of pollution by oil.

Regulation 10 identifies the following special areas with strict controls on discharge of oily wastes:

- Mediterranean Sea area;
- Baltic Sea area;
- Black Sea Area;
- Red Sea area;
- “Gulfs” area;
- Gulf of Aden area;
- Antarctic area;
- North West European Waters;
- Oman Sea area of the Arabian Seas (from 1 January 2007);
- **Annex II: Regulations for the prevention of pollution by Noxious Liquid substances.**

Regulation 1 identifies the following special areas with strict controls on tank washing and residue discharge procedures:

- **Baltic Sea area;**
- Black Sea Area;
- Antarctic area;
- **Annex V: Regulations for the prevention of pollution by Garbage.**

Regulation 5 identifies the following special areas, in which there are strict controls on disposal of garbage:

- Mediterranean Sea area;
- **Baltic Sea area;**
- Black Sea Area;
- Red Sea area;

- “Gulfs” area;
- North Sea;
- Antarctic area (south of latitude 60 degrees south);
- Wider Caribbean region including the Gulf of Mexico and the Caribbean Sea;
- **Annex VI: Prevention of air pollution by ships.**

This annex entered into force on 19 May 2005 and established the **Baltic Sea area** as a "SOx Emission Control Areas" (SECA) with more stringent controls on sulphur emissions from ships. The North Sea was adopted as a SECA in July 2005, under amendments to Annex VI adopted by the MEPC in July 2005, with expected entry into force in Nov. 2006.

## 4 Particularly sensitive sea areas (PSSAs) and marine environmentally high risk areas (MEHRAs)

### 4.1 Introduction

In 2002, the World Summit on Sustainable Development (WSSD) adopted the Plan of Implementation, which strongly reaffirmed its commitment to the Rio principles and the full implementation of Agenda 21. In this context, international shipping is under significant pressure to minimise the impact of accidents and operations on the marine environment. These pressures arise from global agreements, port initiatives and raised public awareness. Oil spills, collisions and groundings as well as waste discharges, anti-fouling systems, anchor damage, wake impacts and ship-generated noise have become increasingly important and high profile issues<sup>[8]</sup>.

### 4.2 Management Options

Ship owners and operators can take action through ensuring the integrity, maintenance and effective environmental management of their vessels and, secondly, through due consideration of the environmental requirements of any regions in which their ships will operate. In order to achieve the latter, it is important for nations individually and collectively to identify sensitive locations where a combination of high environmental and socio-economic values, and high vulnerability to shipping impacts, requires special care to be taken. Such areas are likely to benefit from further review and appraisal of the measures available to help reduce accidents and prevent pollution by controlling where ships go and what they do. As a consequence Particularly Sensitive Sea Areas (PSSAs) and Marine Environmental High Risk Areas (MEHRAs) have been proposed.

### 4.3 PSSA's

The International Maritime Organization's (IMO) 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 defines a Particularly Sensitive Sea Area (PSSA) as <sup>[5]</sup>: “An area which needs special protection through action by IMO because of its significance for recognised ecological or socio-economic or scientific reasons and which may be vulnerable to damage by maritime activities.”

This resolution updates and replaces, in an abbreviated form, resolutions A.885(21)–Procedures for Designation of Particularly Sensitive Sea Areas and the adoption of associated protective measures; and A.720(17)–Guidelines for the Designation of Special Areas.

The guidelines set out by IMO for an area to gain PSSA status are separated into three categories, which are then subdivided into further criteria. For a PSSA to be designated it must meet any one of the following criteria (see: Tab.3 and Tab.4):

Table 3 PSSA categories and criteria [8]

PSSA Categories	Criteria to be met
Ecological	Uniqueness, dependency, representativeness, diversity, productivity, naturalness, integrity and vulnerability
Social, cultural and economic	Economic benefit, recreation and human dependency
Scientific and educational	Research, baselines and monitoring studies, education and historical values

Having established exceptional value(s) the purpose of a PSSA is to identify areas where these values or environmental assets are vulnerable to damage by international shipping. Associated Protective Measures (APMs), within the purview of IMO can be proposed to determine the most appropriate way to address any vulnerability. This should also take into account oceanographic, ecological, local vessel traffic and other conditions that make the area sensitive to shipping impacts, together with the impact of any proposed APM on the safety and efficiency of navigation. The need for critical evaluation of this information and consensus building is important as achieved by the Wadden Sea feasibility study <sup>[9]</sup>.

#### 4.4 MEHRA’s

Marine Environmental High Risk Areas (MEHRAs) are a UK national initiative to improve the safety of shipping and increase protection of the environment <sup>[8]</sup>. MEHRAs can be defined as: “Comparatively limited areas of high sensitivity which are also at risk from shipping. There must be a realistic risk of pollution from merchant shipping.”

Routeing measures aim to encourage ships to follow routes where vessels are less likely to collide with each other, run ashore or get into difficulties. They also aim to reduce the scope for a disaster if a ship does get into difficulty and direct ships away from areas where pollution would be highly damaging. Given the right of vessels to use such areas, the purpose of MEHRAs is to draw attention to where extra protection from shipping is desirable. To give MEHRA's maximum effect the intention of the UK government is to restrict any ‘designations’ to relatively small areas of coastline. Publicised information in the form of charts and electronic navigational aids will be made available to ship masters, which should be taken into account when planning passages. The master is then expected to observe the highest standards of care, exercising extreme caution when transiting through these areas.

Table 4 PSSA criteria for an area to be identified as a PSSA it must meet at least one of the following criteria<sup>[8]</sup>

PSSA Criteria	Description of Criteria
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Ecological criteria	
Uniqueness	An ecosystem can be unique or rare. An area is unique if it is “the only one of its kind”. Habitats of endangered species that occur in one area are an example.
Dependency	Ecological processes of such areas are highly dependent on biologically structured systems. Such biotically structured ecosystems often have high biodiversity, which is dependant on the structuring organisms. Dependency also embraces area <u>representing the migratory routes of marine fish, reptiles, birds and mammals</u> .
Representativeness	These areas have highly representative ecological processes, or community or habitat types or other natural characteristics.
Diversity	These areas have a high variety of species or include highly varied ecosystems, habitats, communities, and species.
Productivity	The area has high natural productivity.
Naturalness	The area has high naturalness, as a result of the lack of human-induced disturbance or degradation
Integrity	The area is a biologically functional unit, an effective, self-sustaining ecological entity. The more ecologically self-contained the area is, the more likely it is that its values can be more effectively protected
Vulnerability	The area is susceptible to degradation by natural events or the activities of people. Communities associated with the coast may have a low tolerance to changes in environmental conditions, or they may exist close to the limits of their tolerance.
Social, cultural and economic criteria	
Economic Benefit	The area is of particular importance to utilisation of living marine resources
Recreation	The area has special significance for recreation and tourism
Human Dependency	The area is of particular importance for the support of traditional subsistence and/or cultural needs of the local human population
Scientific and educational criteria	
Research	The area has high scientific interest
Baseline and monitoring studies	The area provides suitable baseline conditions with regard to biota or environmental characteristics
Education	The area offers opportunity to demonstrate particular phenomena
Historical Value	The area has historical and/or archaeological significance

The following combination of maritime and environmental considerations is highlighted by the Table 5:

Table 5 Considerations for MEHRA status

Maritime Considerations	Environmental and Socio-economic Considerations
The number, type and size of vessels passing and the nature of <u>their cargoes</u>	Existence of wildlife feeding or breeding sites of international significance or the presence of biological communities of flora or fauna of particular interest or rarity; nature conservation designations such as Special Protection Areas under the EC Birds Directive (1979) or Special Areas of Conservation under the Habitats Directive (1992)
The distance of the usual shipping lanes from the shore	

Any circumstances giving rise to an increased risk of collision such as a significant amount of traffic going across the normal flow	will normally be regarded as evidence of this
Hydrological conditions relevant to safe navigation, such as lack of safe anchorages	The existence of commercially exploitable biological resources and mariculture sites
Prevailing meteorological and tidal characteristics	The extent to which the area provides a public recreational amenity

#### 4.5 Complementary designations

The Wildlife Trusts and WWF recognise the importance of using both PSSAs and MEHRAs together in order to help deliver an ecosystem-based approach that incorporates environmental considerations within the management of shipping activities. Both protection measures are important tools in the prevention of potentially devastating shipping impacts <sup>[8]</sup>.

Table 6 A comparison of PSSAs and MEHRAs

PSSAs	MEHRAs
International concept (larger size)	National concept (smaller size)
Applied anywhere throughout the world as long as the country of jurisdiction is a member of the IMO	Only applicable in territorial waters (12 nautical miles from coastal baseline)
More likely to be recognised by ship masters	Masters likely to be unfamiliar with MEHRA concept
Can employ a range of associated protective measures such as routeing, Areas To Be Avoided, pilotage, Vessel Traffic Services, reporting and information monitoring	Primarily aimed at raising awareness. Measures include routeing provisions (e.g. Traffic Separation Schemes) and response measures (e.g. availability of oil spill response equipment)
Requires IMO approval for designation	Does not need IMO approval for designation, but can receive greater recognition if the designation and associated protective measures are brought to the attention of IMO.

## 5 Guidelines for management of Baltic Sea protected areas

### 5.1 HELCOM and the Baltic marine environment

The Helsinki Commission has been assessing the effects of nutrients and hazardous substances on ecosystems in the Baltic Sea for the past 25 years. The resulting assessment reports contain unique compilations of data and detailed analysis based on the scientific research carried out around the Baltic Sea, including the special monitoring programmes co-ordinated by HELCOM<sup>[1]</sup>.

HELCOM measures and monitors airborne and waterborne inputs of nutrients and hazardous substances (including radioactive substances), as well as the state of all the various compartments of the marine environment (water, sediments and biota). HELCOM's monitoring work provides valuable data to help experts understand and assess the interactions between the physical environment and all forms of marine life, with particular attention paid to the many and varied impacts of human activities. HELCOM's assessments help to improve our understanding of marine ecological processes and allow experts to evaluate the impacts of our activities on the

marine environment. This work also helps in the setting of objectives for environmental quality, the formulation of policies, and the setting of priorities for actions designed to protect the marine environment, and ensure it is used sustainably.

HELCOM coordinates several monitoring programmes covering the whole Baltic Sea and its catchment. The resultant data is used in:

- annually updated indicator fact sheets;
- thematic reports on various topical issues;
- holistic assessments of the state of the Baltic marine environment.

Recalling HELCOM Recommendation 15/5, the Commission recommended to the Governments of the Contracting Parties to the Helsinki Convention <sup>[1, 10]</sup>:

“that management plans be established for each BSPA (Baltic Sea Protected Area) to ensure nature protection and sustainable use of natural resources. These management plans shall consider all possible negatively effecting activities, such as: extraction of sand, stones and gravel; oil and gas exploration and exploitation; dumping of solid waste and dredge spoils; constructions; waste water from industry, municipalities and households; intensive agriculture and intensive forestry; aquaculture; harmful fishing practices; tourism; transport of hazardous substances by ship through these areas; military activities...”

## **5.2 The need for management**

The need for management arises from conflicts of interest and from specific nature conservation goals. But also the aim to keep an area as it is and to focus on an undisturbed natural succession needs to be described within a management plan. Conflicts between conservation interests and anthropogenic exploitation or side effects from such and other human activities detrimental to nature must be avoided in a BSPA. On the other hand, an activity by man, such as environment friendly farming practices may be essential for the upholding of conditions needed for certain species or habitats.

## **5.3 Required background information**

Available information concerning the state of the environment and the flora and fauna and their interactions with outside areas have to be compiled. Additional information should be gathered through literature studies including ecological changes, or base-line studies must be undertaken to gather new information.

Existing legal and administrative structures pertaining to the area and constraints already put on the area must be clarified, e.g., existing frameworks for coastal fisheries, marine transportation and other relevant controls on present use of the area. In both instances, and most likely in the latter, it may be necessary to follow up by monitoring at appropriate intervals depending on regeneration potential and the impact and frequency of detrimental activities, in order to assess the need for management. Actual and potential ecological stress factors, conflicts and threats have to be scrutinized in order to assess their effects on the environment and on the flora and fauna. Maps and charts with all relevant data including conflicts should be produced.

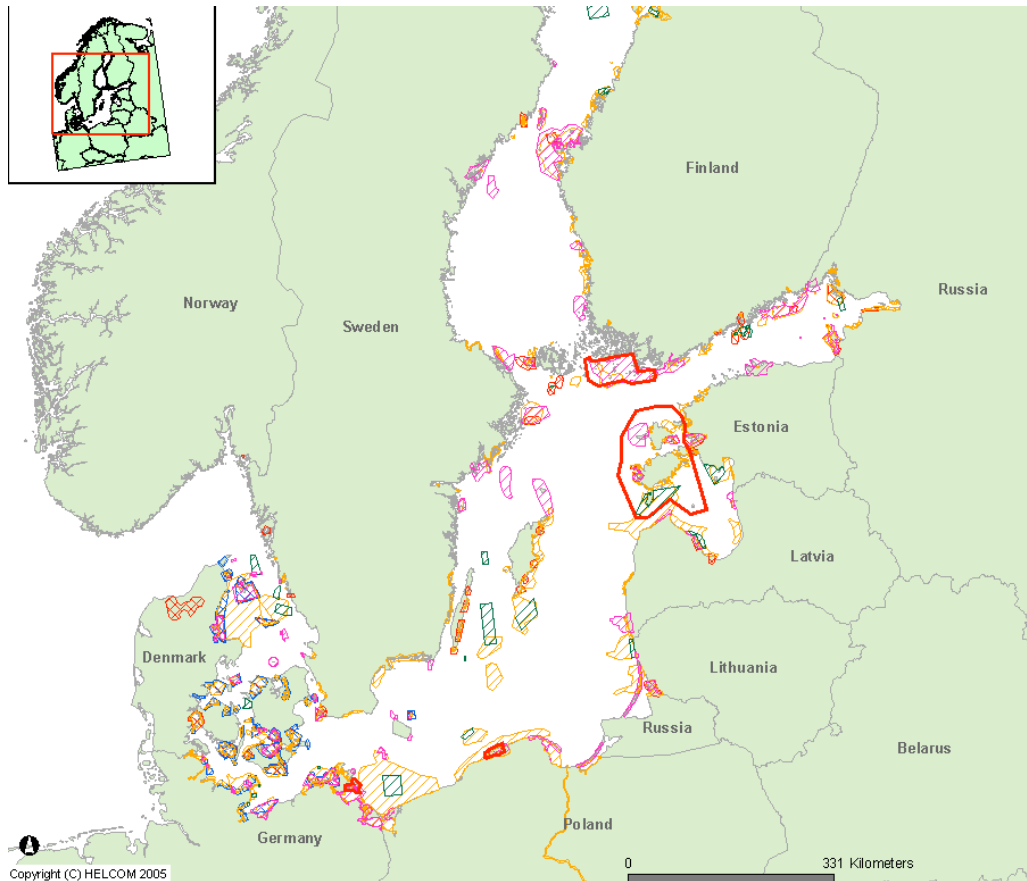


Fig.2 Baltic Sea Protected Areas<sup>[10]</sup>

#### 5.4 General and specific aims of management

Baltic Sea Protected Areas have been chosen as examples of typical biotopes of ecological significance occurring in each of the Baltic Sea sub-regions. The general aim of management of these areas is to ensure the conservation and/or restoration of a representative set of biotopes and habitats in order to preserve biodiversity and sustainable use of natural resources where appropriate.

To reach the general aim in an area, it is necessary to focus on a number of specific aims, depending on the conservation needs of the area. Zoning could be a useful tool to reach the specific aims. Elements in need of specific protection within a BSPA must be described comprehensively.

#### 5.5 Required administrative elements

An assessment of the arrangements including financial, human and physical resources required to establish the BSPA and to manage it effectively could cover the following items, including budget and timetables<sup>[11]</sup>:

- staffing;
- equipment and facilities;
- training;
- interpretation and education;

- monitoring and research;
- maintenance and/or restoration;
- surveillance;
- enforcement;
- evaluation and review of effectiveness.

One nature conservation authority should be responsible for the management of each BSPA or for BSPAs.

## **5.6 Management options in BSPAs**

In compliance with the guidelines for designating BSPAs, the aim of protection should be described and, when appropriate, assigned to IUCN categories for protected areas<sup>[11]</sup>. When a zoning system with different protection categories is appropriate, separate regulations should apply for each zone.

Specific forms of sustainable land use should be regulated when appropriate. Scientific research should be controlled by the management authority that should be responsible for education and public awareness too.

The following options exist to regulate or compensate harmful human activities<sup>[11]</sup>:

- a. restriction of activities in extent;
- b. restriction of activities in space (including zoning);
- c. restriction of activities in time (ban of certain activities for a specific period, e.g., during breeding seasons or spawning periods);
- d. maintenance of sustainable and traditional use when appropriate;
- e. alteration of procedures (e.g., reintroduction of traditional land and sea use practices);
- f. substitution of materials or substances (e.g., to avoid contamination);
- g. total ban of activities or demolition of construction (e.g., demolition of dykes);
- h. restoration, reintroduction.

The following activities and threats should be regulated<sup>[10]</sup>:

- (1) extraction of sand, stone and gravel;
- (2) oil and gas exploration and exploitation (incl. accidental spillage of oil) and of other natural resources like amber;
- (3) dumping of solid waste and dredged spoils;
- (4) constructions (including coastal defence measures and infrastructure);
- (5) waste water (from industry, municipalities and households) and other harmful emissions;
  - a. emission of nutrients and biodegradable organic substances,
  - b. emission of heavy metals and other hazardous substances such as pesticides, antifouling agents, chemicals and radioactive substances;
- (6) aquaculture;
- (7) transport of hazardous substances by ship through these areas;
- (8) military activities;
- (9) installation of wind-farms (including offshore wind-farms);
- (10) submarine cables.

The following activities and threats should be regulated, where appropriate:

- (1) agriculture and forestry incl. water regulation;
- (2) fishing and hunting;
- (3) tourism and recreational activities;
- (4) ship's routing.

## **5.7 Ramsar**

The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands, i.e. to stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value.

The official title is The Convention on Wetlands of International Importance, especially as Waterfowl Habitat. The convention was developed and adopted by participating nations at a meeting in Ramsar, Iran in 1971 and came into force in 1975 <sup>[4]</sup>. The Ramsar List of Wetlands of International Importance now includes over 1,550 sites (known as Ramsar sites <sup>[3]</sup>) covering around 1,339,000 km<sup>2</sup>, up from 1,021 sites in 2000. The nation with the highest number of sites is the United Kingdom at 163; the nation with the greatest area of listed wetlands is Canada with over 130,000 km<sup>2</sup>, including the Queen Maud Gulf site at 62,800 km<sup>2</sup>.

Presently there are 150 contracting parties, up from 119 in 2000 and from 18 initial signatory nations in 1971. Signatories meet every three years as the Conference of the Contracting Parties (COP), the first held in Cagliari, Italy in 1980. Amendments to the original convention have been agreed to in Paris (in 1982) and Regina (in 1987). There is a standing committee, a review panel and a secretariat. The headquarters is located in Gland, Switzerland shared with the IUCN<sup>[3]</sup>.

Table 7 WWF's proposal: List of additional protective measures needed (marked with x) in

different parts of the Baltic Sea<sup>[11]</sup>. The numbered areas are illustrated in Fig.3.

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

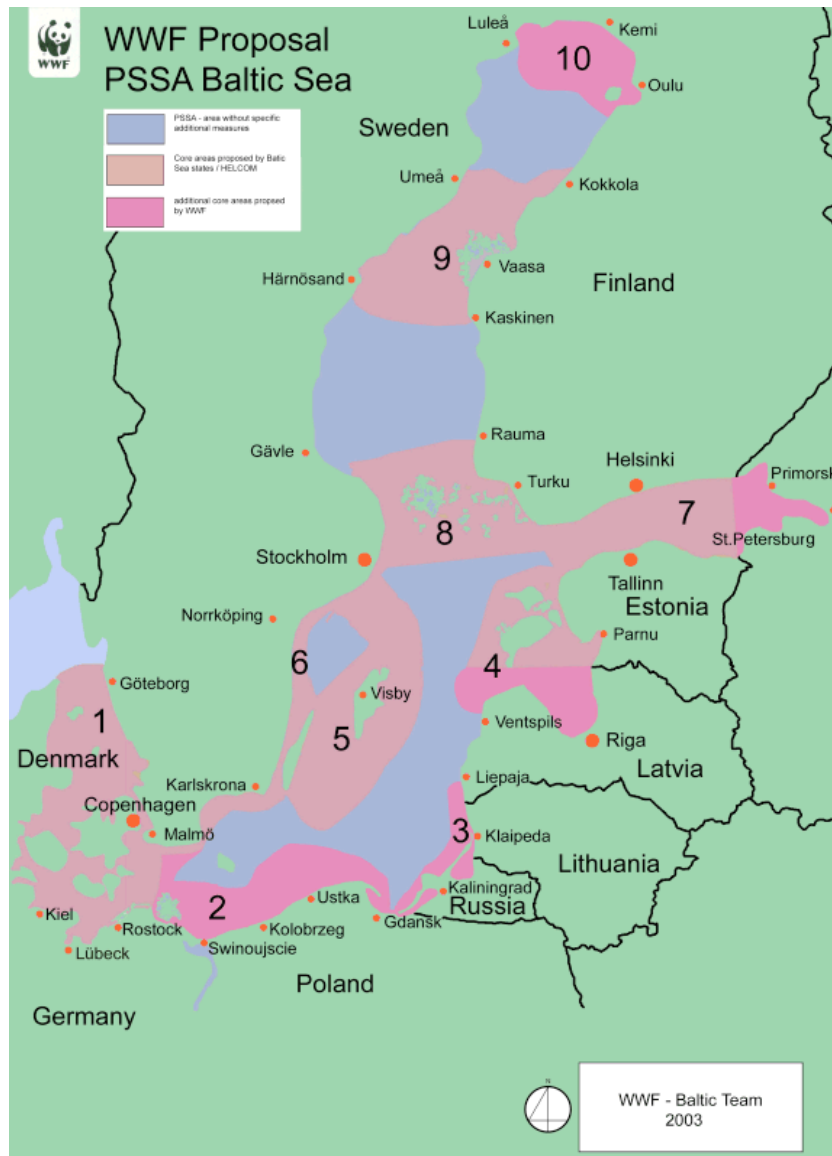


Fig.3 WWF's proposal concerning the core areas which need additional safety measures in the Baltic Sea PSSA<sup>[12]</sup>

### 5.8 Natura 2000

In May 1992 European Union governments adopted legislation designed to protect the most seriously threatened habitats and species across Europe. This legislation is called the Habitats Directive and complements the Birds Directive adopted in 1979. At the heart of both these Directives is the creation of a network of sites called Natura 2000. The Birds Directive requires the establishment of Special Protection Areas (SPAs) for birds. The Habitats Directive similarly requires Special Areas of Conservation (SACs) to be designated for other species, and for habitats. Together, SPAs and SACs make up the Natura 2000 series. All EU Member States contribute to the network of sites in a Europe-wide partnership from the Canaries to Crete and from Sicily to Finnish Lapland.

Natura 2000 sites can be designated on both land and water. Marine Special Areas of



Conservation might include reefs or lagoons, intertidal areas, areas which are always covered by the sea or perhaps land near the sea which is used by marine wildlife. Marine Natura 2000 areas are protected by innovative conservation measures to ensure they are not over-fished, or affected by pollutants from sewage or shipping traffic <sup>[2]</sup>.

## 6 Baltic master Project

Baltic Master is an international project which aims to improve maritime safety by integrating local and regional perspectives. The focus is on the Baltic Sea Region and issues concerning preparedness, prevention and marine spatial planning.

Fig. 4 and Fig. 5 corresponds directly to the general scheme of the first phase of BalticMaster Project (WP2), PSSA mechanism in accordance with the IMO rules and procedures, Associated Preventive Measure assessment process scheme, and Maritime Safety concept in the Baltic according to Copenhagen Agreement.

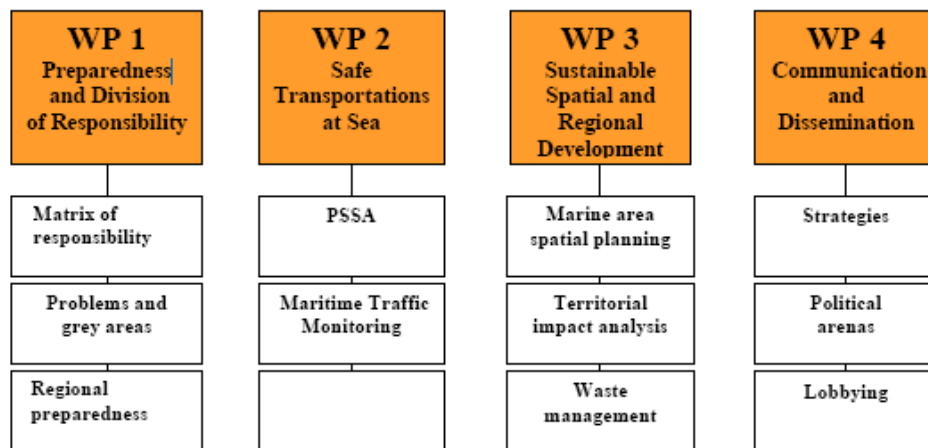


Fig. 4 General scheme of the first phase of the Baltic Master Project

Baltic Master Project aims to improve maritime safety by integrating and bringing forward local and regional perspectives. This includes measures to improve the prevention and the preparedness for ship accidents.

Maritime safety in a wider perspective, including regional development and spatial planning, will also be investigated further. For example there will be focus on conflict risks due to increased use of the sea and the coastal areas (Fig. 5).

The project consists of four work packages. Each work package entails several activities and outcomes, for example scenarios, think tanks, conferences, studies and reports. The titles of the four work packages are:

- Preparedness and Division of Responsibility;
- Safe Transportation at Sea,
- Sustainable Spatial and Regional Development;
- Communication and Dissemination.

The partnership is cross-sectorial, including national authorities, regions, municipalities and international organizations. This will guarantee that local and regional priorities are promoted and considered in the spirit of dialogue and cooperation.

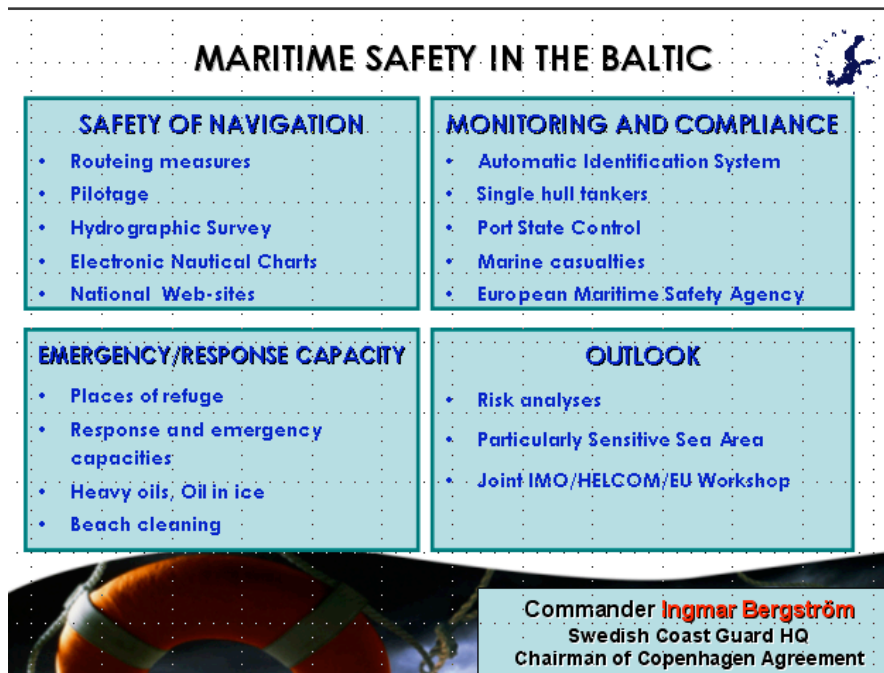


Fig. 5 Maritime safety in the Baltic Sea scheme

## 7 Model course in operational use of APM in PSSA

The model course in operational use of APM in PSSA should cover the following training areas<sup>[13, 14]</sup>:

### **Task 1**

Measures to provide protection to the Baltic Sea PSSA (and other PSSAs) from specifically identified maritime activities in accordance with the IMO rules and procedures:

- studying of measures to provide protection to PSSA;
- identification of navigational dangers on the Baltic Area;
- analysis of routes and fairways to main ports of the Baltic Coast;
- analysis of routes and fairways to secondary ports of the Baltic Coast;
- accident and pollution risk assessment using ENC and ECS at the Baltic Sea;
- accident and pollution risk assessment using AIS monitoring system at the Baltic;
- FSA of data presented on paper and electronic navigational charts covering Baltic Sea;
- analysis of the existing and planned PSSA measures at the Baltic Sea taking into account transport forecast at that region;
- results dissemination and implementation;

- variant assessment and evaluation;
- providing of supporting information for a the Baltic Safety Management System.

### **Training Area 1.1**

Traffic separation schemes at Baltic Sea PSSA:

- analysis of Traffic Separation Schemes (TSS) at Baltic Sea adopted by IMO;
- analysis of Traffic Separation Schemes (TSS) at Baltic Sea adopted by local Maritime Administrations;
- identification of present maritime traffic patterns at Baltic Sea Traffic Separation Schemes (Baltic TSS);
- analysis of compatibility of existing TSS and maritime traffic patterns at Baltic Sea;
- identification of future trends in maritime traffic patterns at Baltic Sea Traffic Separation Schemes (Baltic TSS);
- analysis of compatibility of existing TSS and future trends in maritime traffic patterns at Baltic Sea;
- analysis of possible changes to existing Baltic Sea TSS based on future trends in maritime traffic patterns at Baltic Sea;
- analysis of implementing new TSS at Baltic Sea based on present maritime traffic patterns and future trends;
- results dissemination and implementation.

### **Training Area 1.2**

Routing and maritime traffic patterns at the Baltic Sea PSSA:

- identification of navigational dangers at the Baltic Area;
- identification of areas to be avoided at the Baltic Sea PSSA;
- identification of no anchoring areas at the Baltic Sea PSSA;
- analysis of routing measures at the Baltic Sea;
- identification of maritime traffic patterns at the Baltic Sea;
- analysis of compatibility of routing measures and maritime traffic patterns at the Baltic Sea;
- analysis of routes and fairways to main ports of the Baltic Sea;
- analysis of routes and fairways to secondary ports of the Baltic Sea;
- analysis of pilotage measures at the Baltic Sea PSSA;
- analysis of possible additional measures in pilotage and routing at the Baltic Sea;
- results dissemination and implementation.

### **Training Area 1.3**

Collision regulations and collision avoidance at Baltic Sea PSSA:

- analysis of international and local regulations concerning movement of vessels and collision avoidance at the Baltic Sea;

- analysis of contravening international and local regulations at VTS and TSS areas at the Baltic Sea;
- analysis of contravening international regulations at open sea at the Baltic Sea;
- identification of areas of high risk of collision at the Baltic Sea;
- analysis of preventive measures at areas of high risk of collision at the Baltic Sea;
- analysis of recommended measures at areas of high risk of collision at the Baltic Sea;
- analysis of existing tools of collision avoidance at the Baltic Sea;
- analysis of implementation of new ways of collision avoidance at the Baltic Sea;
- results dissemination and implementation.

### **Training Area 1.4**

The Passage Planning of Vessels Transiting the Baltic Sea:

- design of the Passage Plan based on information available on board;
- gathering and analyze of additional information related to safety of the passage;
- developing of the recommendations for application of additional safety margins and measures, based on additional factors impeding the safety of the passage;
- design of the Contingency Plans;
- simulation tests for some of the Contingency Plans and for an alternative routes for the various vessel types;
- developing of the additional Recommendations on Passage Planning;
- results dissemination in form of practical guide for masters and navigating officers on the passage planning of vessels transiting the Baltic Sea.

### **Training Area 1.5**

Hydrographic Survey - Coverage of Electronic Navigational Charts at the Baltic Sea:

- collecting of required BA Nautical Charts & Publications for the Baltic Sea;
- definitions and present status of electronic navigational charts and electronic charts systems;
- analysis of electronic navigational charts coverage at the Baltic Sea;
- identification of co-operation between hydrographic offices at the Baltic Region;
- collecting of required Electronic Navigational Chart cells of Primar Stavanger and IC-ENC RENCs covering the Baltic Sea;
- hydrographic survey analysis at the Baltic Sea;
- accident risk assessment using ENC and electronic chart systems;
- pollution risk assessment using ENC and electronic chart systems;
- FSA of data presented on paper and electronic navigational charts covering the Baltic Sea;
- analysis of electronic charts as measures to provide protection to the Baltic Sea PSSA;
- results dissemination and implementation;
- variant assessment and evaluation.

## **Training Area 1.6**

Vessel reporting and traffic surveillance based on VTS and AIS monitoring measures at the Baltic Sea:

- analysis of VTS centres operating at the Baltic Sea;
- analysis of information gathered at VTS centres at the Baltic Sea;
- analysis of information broadcasted at VTS centres at the Baltic Sea;
- analysis of AIS Monitoring System at the Baltic Sea;
- analysis of vessel monitoring within VTS areas at the Baltic Sea;
- analysis of vessel monitoring outside VTS areas at the Baltic Sea;
- analysis of existing and planned hydro-meteorological monitoring system;
- analysis of ship's reporting systems at the Baltic Sea;
- analysis of monitoring system of vessels transporting dangerous goods at the Baltic Sea;
- identification of weak points in monitoring vessels and ways to improve;
- identification of ways to improve vessel monitoring at the Baltic Sea;
- analysis of places of refuge at the Baltic Sea;
- accident risk assessment using AIS Monitoring System at the Baltic Sea;
- pollution risk assessment using AIS Monitoring System at the Baltic;
- results dissemination and implementation.

### **Task 2**

Associated Preventive Measures assessment process to provide protection to the Baltic Sea PSSA from specifically identified maritime activities in accordance with the IMO rules and procedures:

## **Training Area 2.1**

- Present status of PSSA measures at the Baltic Sea;
- definition and present status of routeing system at the Baltic Sea;
- definition and present status of area to be avoided at the Baltic Sea;
- definition and present status of no anchoring area at the Baltic Sea;
- definition and present status of ship's reporting systems at the Baltic Sea;
- definition and present status of vessel traffic services (VTS) at the Baltic Sea;
- definition and present status of AIS monitoring systems at the Baltic Sea;
- present status of hydrographic survey at the Baltic Sea;
- present status and coverage of electronic navigational charts at the Baltic Sea;
- definition and present status of discharge restrictions at the Baltic Sea;
- definition and present status of places of refuges at the Baltic Sea.

## 8 Conclusion

PSSA designation brings with it international recognition. It is also consistent with adopted guidelines that advocate a precautionary approach and the polluter pays principle. Whilst APMs to control shipping impacts are integral to the PSSA concept, it is not a requirement of PSSA designation to introduce any APMs and provision is also made for the introduction of APMs at a later date. Notwithstanding the importance of raised awareness and global publicity, the real and immediate effectiveness of any PSSA will relate to the introduction of appropriate APMs firmly linked to risk assessment studies.

At a national level MEHRAs are proposed to identify areas where pollution would be particularly damaging to critical natural and socio-economic assets.

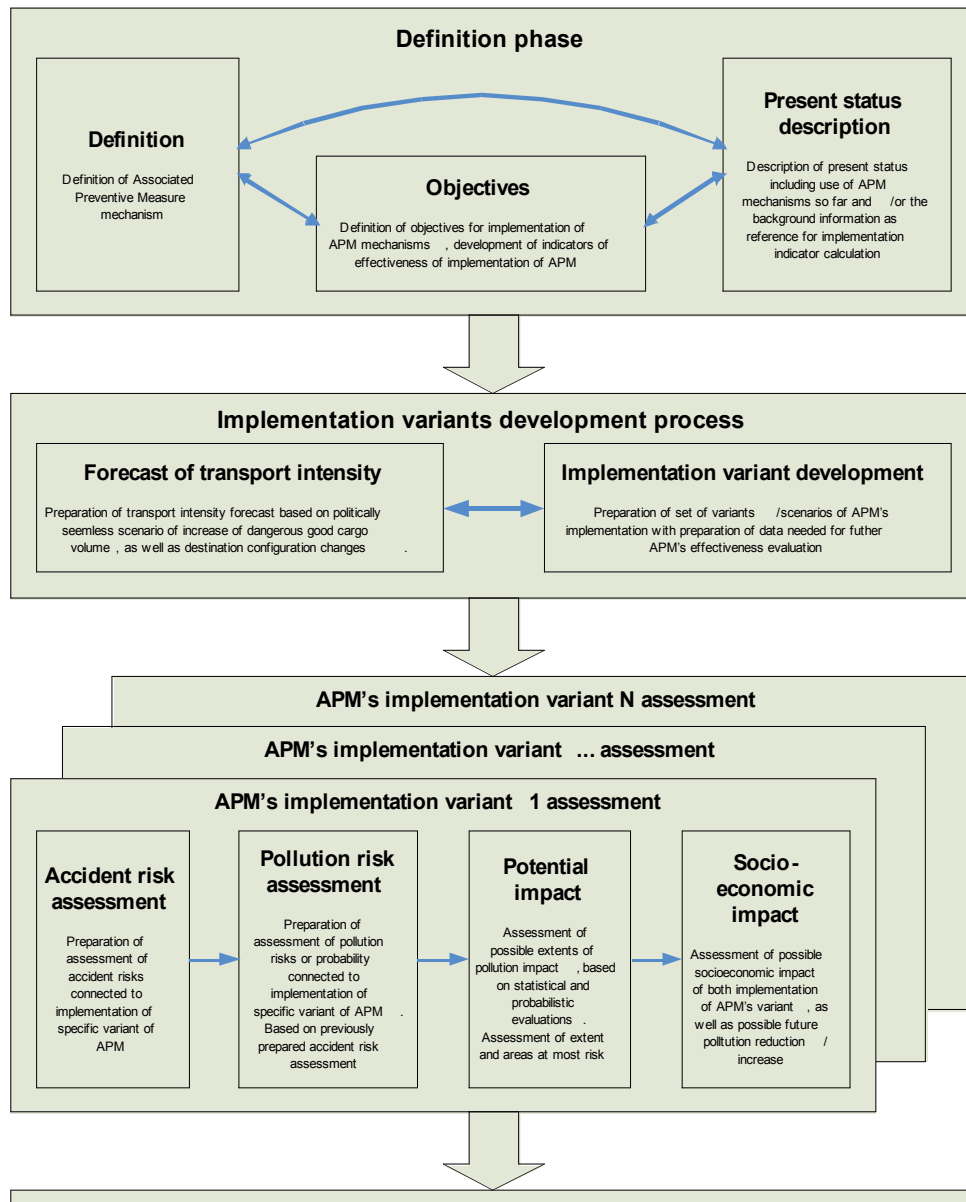


Fig. 6 APM (Associated Preventive Measures) assessment process

PSSAs, BSPAs and MEHRAs, particularly when developed as a tiered approach, can significantly contribute to a sustainable shipping policy and management regime. As demonstrated at the Baltic Sea, the two concepts complement each other to create a strong integrated marine spatial planning and management tool for reducing potential shipping impacts. In many ways this approach can be likened to the establishment of core zones within terrestrial protected areas, where the level of protection (on land this generally means restricted access) from, for example, trampling, is highest. The challenge is to gain the balance between the respective size of PSSA's and local special areas. It would not be desirable for special areas to be too small, as they might become a lost mark on a navigational chart.

Whilst the PSSA concept represents an element of marine spatial planning, encouraging international co-operation and ensuring that shipping and shipping route decisions will be compatible with other activities, it retains a strong sectoral focus and further work is needed to achieve the necessary co-ordinated overall framework for marine areas.

Table 8 Possible Protection Measures for PSSA's

Area Categories	Potential Measures
Territorial Sea	Special passage planning requirements
	Special anchoring requirements
	Special activity restrictions
	Discharge restrictions
	Air pollution limitations
Measures Pursuant to UNCLOS Article 211.6	Description of oceanographic and ecological conditions that make the area vulnerable to shipping
	Highlight inadequacies in existing international rules and standards
	Suggestion of measures to be used in the Exclusive Economic Zone similar to those for the territorial sea
Additional Measures	Measure to reduce the potential for damage to the marine environment by ships on an area specific basis
	Example: no anchoring area in Florida Keys PSSA
	Separate proposals for amendments to an existing instrument or a new instrument would be required in accordance with IMO procedures

## 8.1 Recommendations

- Future PSSA proposals would benefit from the scrutiny of a properly constituted formal technical evaluation group. Such an expert group of MEPC could consider in detail any proposals and supporting evaluations produced by or on behalf of applicant nations. This would provide a far more objective process than the current, sometimes political, checklist vetting within a time constrained MEPC session and would provide IMO with a more secure and scientific decision base.
- WWF have taken a lead with the formulation of a draft guidance document to assist IMO Member Governments in identifying appropriate APMs for PSSA's. Greater use can also be made of the implicit authority available under UNCLOS for port states and coastal states to adopt measures to protect their marine environment and resources. The process for this, however, could be made clearer.
- In order to achieve ecosystem-based planning and management there is considerable merit in a tiered approach whereby a PSSA identifies a wider area of vulnerability and MEHRAs target the most vulnerable areas, whether these are inside or outside the PSSA. In effect this achieves the original core and buffer area concept envisaged for PSSA's and perhaps, in view of custom and practice, such a system should also be recognised by IMO.
- Overall objectives should be developed for PSSA's and local special areas (BSPAs, MEHRAs) based on a forward looking agenda, considering multiple uses and taking into account transboundary and cumulative effects.
- Integration of the PSSA/BSPA concept in developing the policy and legal framework for



marine spatial planning, and ensuring compatibility with other marine activities including the development of offshore renewable energy will need further consideration.

- PSSA and Associated Protected Measures should be the part of educational system of IAMU members - corrections in navigation course outline should be done.

## 8.2 Final Conclusion

The Baltic Sea Area comprehensively meets the criteria established by IMO for PSSA designation, albeit that the ecological criteria of naturalness and integrity must be substantiated. The Guidelines (MEPC 46/6 Annex 2 paragraph 4.5) state that:

“The criteria relate to PSSAs within and beyond the limits of the territorial sea. They can be used by IMO to designate PSSAs beyond the territorial sea with a view to the adoption of international protective measures regarding pollution and other damage caused by ships. They may also be used by national administrations to identify Particularly Sensitive Sea Areas within their territorial seas.” In the opinion of the author benefits of Baltic Sea PSSA designation outweigh burdens on the basis that:

- The PSSA concept recognises the competence of existing as well as any proposed additional risk management and reduction measures;
- The costs to international shipping associated with PSSA designation are relatively modest, largely linked to any proposed additional measures and consistent with the polluter pays principle;
- The PSSA criteria reflect the importance of the full range of economic activities associated with the Baltic Sea Area, many of which depend upon a clean and well functioning environment;
- A PSSA designation would reinforce the supra-regional environmental importance of the Baltic Sea, particularly in terms of vulnerability to risks associated with international maritime activity, consistent with the precautionary principle;
- The direct and indirect costs of dealing with a major pollution incident on a soft sediment shoreline are significantly more than for a rocky shoreline;
- The threat to the Baltic Sea environment from the impact of international shipping is largely derived from maritime activity in the adjacent water; and
- The students of maritime universities, especially navigational faculties, should understand and fill very well above mentioned problems; PSSA and APM (Associated Preventive Measures) assessment process should be included into education programme.

An overriding benefit is considered to be the message that PSSA designation sends out internationally as to the value of the Baltic Sea.

A significant risk to the Baltic Sea environment from international maritime activities exists. The exceptional density of commercial shipping, together with the presence of fishing vessels and recreational craft in the Baltic Sea and adjacent waters make the region vulnerable to accidental and operational pollution. The combination of meteorological, hydrological, oceanographic and additional complicating factors (e.g. marine exploitation activity) make the region navigationally complex. Other considerations, such as past incidents, also highlight the advantages of a more

co-ordinated trilateral approach.

In response to the combination of vessel traffic characteristics and natural hazards in the Baltic Sea, significant measures are in place to help ensure the safety of shipping and to integrate shipping and other activities in the Baltic Sea and adjacent waters (Great Belt, Little Belt, The Sound, Skagerrak and Kattegat). The study has confirmed that:

- Navigational hazards are offset by means of a comprehensive navigational warning system and DGPS for position fixing;
- Collision avoidance is enhanced by IMO routing systems;
- Pilotage is targeted at ship types posing the highest risk but weather, fatigue of ship's officers and cost of deep sea pilots (voluntary) are all considered relevant;
- Evidence to support the effectiveness of current measures to reduce operational impacts is variable and enforcement of these measures is a problem internationally.

Significant attention internationally has been given to the identification of maritime risks and their reduction. Prospective future international measures, regional agreements and local initiatives (harmonisation) will help protect the Baltic Sea.

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