



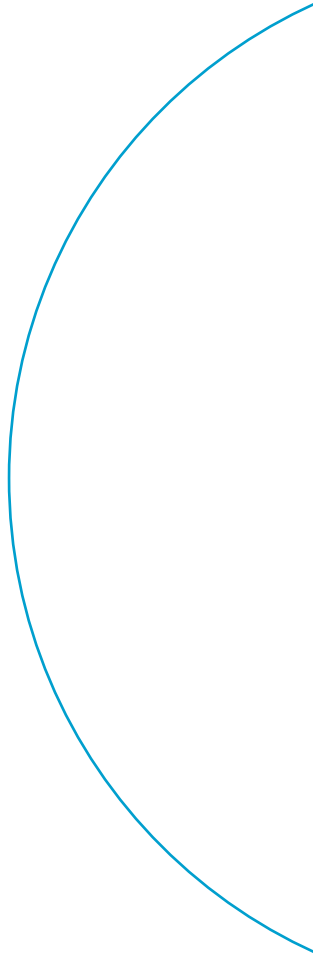
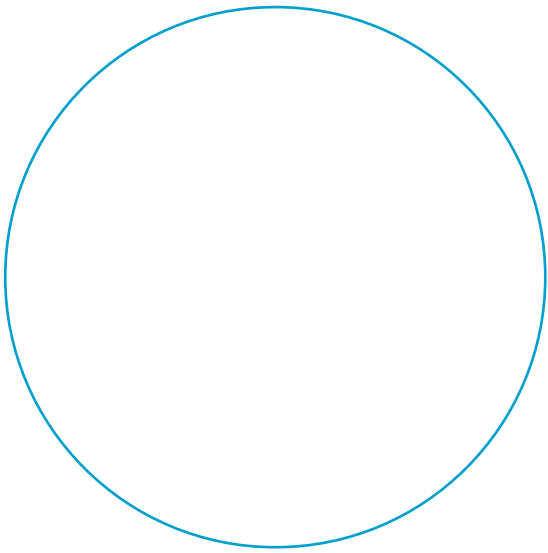
# RISKS OF OIL AND CHEMICAL POLLUTION IN THE BALTIC SEA

Results and recommendations  
from HELCOM's BRISK and  
BRISK-RU projects



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# SUMMARY

Despite the high level of regional preparedness, the trend of more traffic – and more oil transported at sea – leads to higher risks of spills of oil and hazardous substances, thus posing the risk of environmental damage. An increase in oil spills always means higher costs for the countries involved in the response actions both during and after a spill.

This is why all the Baltic Sea countries, on an initiative by the HELCOM Response Group, have during 2009–2012 conducted a comprehensive joint risk assessment through the project “Sub-regional risk of spill of oil and hazardous substances in the Baltic Sea” (BRISK).

Based on the best available knowledge the project has defined new measures to strengthen the preparedness and response both for the whole Baltic region and in specific sub-areas. The overall aim of the project was to increase the preparedness of all Baltic Sea countries to respond to major spills of oil and hazardous substances from shipping.

Based on the existing data on maritime traffic for the entire Baltic Sea and estimated risks of different accident and spill scenarios, the project calculated risks for different types of accidents and spill sizes. The project translated these scenarios into maps that define high risk areas in the region.

## **Key outcomes and recommendations include:**

- For the first time the entire Baltic Sea has been mapped with common methodology for risks of spills of oil and hazardous substances.
- Likely volumes of spilled oil, amount of oil on coast and the resulting environmental damage have been estimated for the Baltic Sea and its sub-regions.
- The efficiency of potential measures to reduce these risks has been estimated through scenarios.
- Sub-regionally differentiated response measures have been identified as essential to increase preparedness in the Baltic Sea.
- Sub-regional response agreements are thus recommended to further develop overall preparedness in the Baltic Sea region.
- Two sub-regional agreements on joint response operations have

been developed and signed between Russia (Kaliningrad) and Poland, and between Russia (Kaliningrad) and Lithuania as a result of the project.

- Three more sub-regional agreements have been modified or prepared based on project recommendations and are close to being concluded.

- Some investments are recommended to further enhance preparedness in the Baltic Sea, including:

- A Vessel Traffic System (VTS) for the entire tanker route between Skaw and Primorsk/Ust Luga, building on the existing systems in the Great Belt and the Gulf of Finland;
- Night vision equipment development and deployment as a highly efficient measure in all areas;
- Traffic Separation Schemes (TSS) as a cost-efficient means to enhance safety of navigation;
- Double-hulls in small tankers and bunker tanks in new vessels to decrease spills outside the main tanker route, including the Gulf of Bothnia and the South-Eastern Baltic Proper;
- Increasing recovery capacity in ice conditions, especially in the Gulf of Bothnia;
- Shallow water response capacity as an efficient measure in all areas.



BRISK was initiated and implemented by the national authorities responsible for oil spill preparedness around the Baltic Sea as well as the European Maritime Safety Agency (EMSA), meeting regularly within the HELCOM Group on oil spills preparedness and response – HELCOM Response. The activities to follow up and implement the project findings will also be discussed and decided within the same group.

### **Three-year time span 2009–2012**

#### **The countries and partners involved in the projects covered all nine coastal countries of the Baltic Sea:**

*Denmark* (Admiral Danish Fleet Headquarters, Lead Partner)

*Sweden* (Swedish Coast Guard Headquarters)

*Finland* (Finnish Environment Institute)

*Estonia* (Estonian Board of Border Guard)

*Lithuania* (Coastal Research and Planning Institute)

*Latvia* (Marine and Inland Waters Administration of the Ministry of the Environment)

*Poland* (Maritime Institute in Gdansk & Maritime Office in Gdynia)

*Germany* (Central Command for Maritime Emergencies)

Russia was involved through a consortium of partners in a specific BRISK-RU project where the Central Marine Research & Design Institute Ltd acted as a Lead Partner.

In addition to these national authorities, the consultancy COWI A/S participated in the initiative by developing and implementing risk analyses, and by carrying out the financial management of the project.

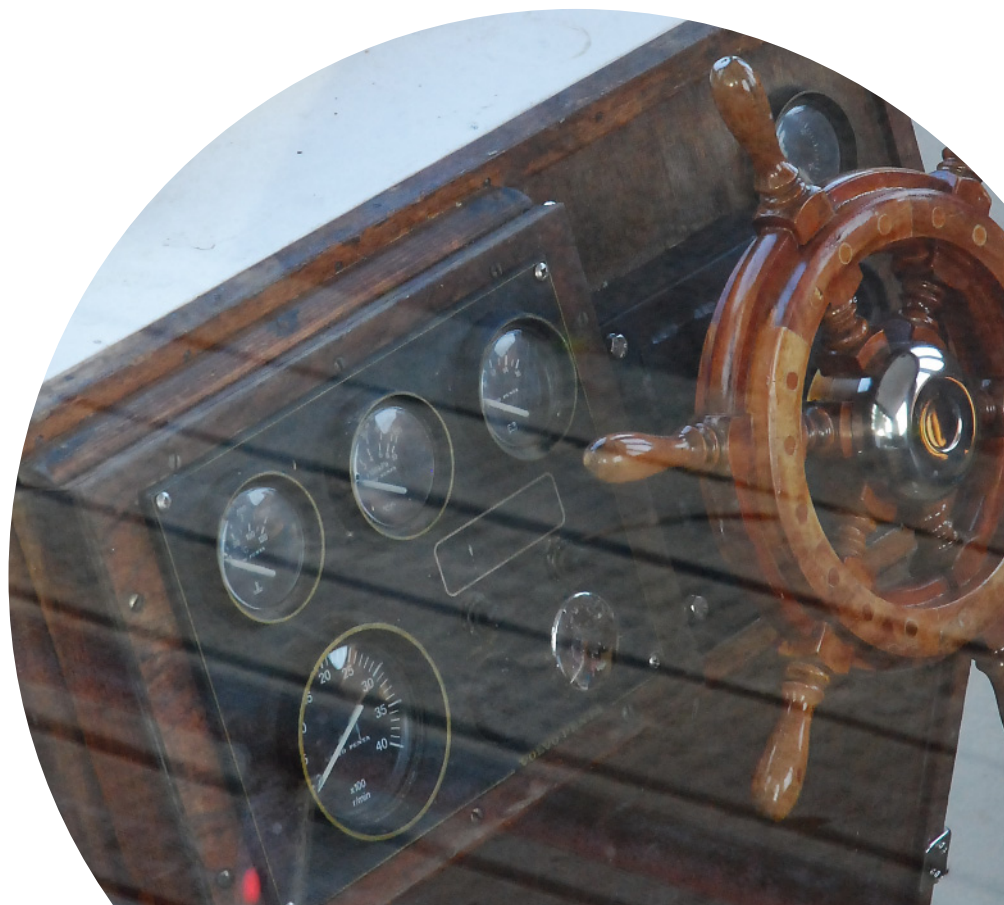
The BRISK project was partly financed by EU's Baltic Sea Regional Programme 2007–2013 with 3.3 million EUR for the period 2009–2012. The co-financing varies between 15 per cent and 25 per cent, depending on the home country of the Project Partner. The BRISK-RU project was financed by the Nordic Council of Ministers Aquatic Ecosystems working group with 200,000 EUR. The Information office of the Nordic Council of Ministers in Kaliningrad served as a facilitator in the preliminary discussions of the project and as a contact point for Russian partners.

## KEY TOPICS OF THE BRISK/BRISK-RU PROJECTS

**Baltic-wide risk assessment:** Carrying out the first Baltic-wide risk assessment on oil and chemical pollution, and its impacts, using a common methodology. Estimating through scenarios the efficiency of new measures.

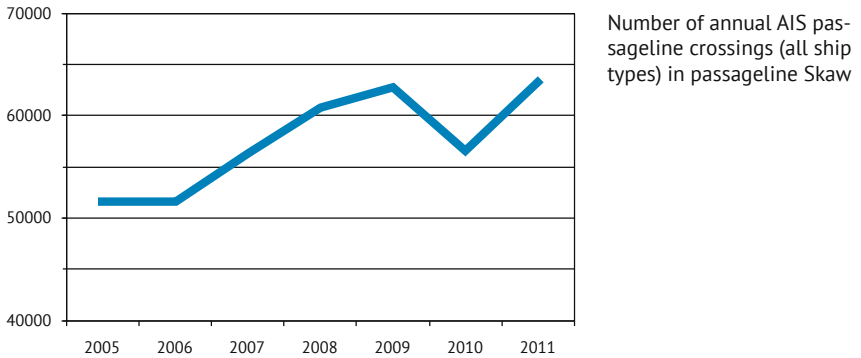
**Sub-regional measures and agreements:** Development of proposals for sub-regional agreements and measures for administrators to ensure more efficient response.

**Investment plans:** Preparation of integral and comparable investment plans for response resources based on the risk assessment and scenarios.

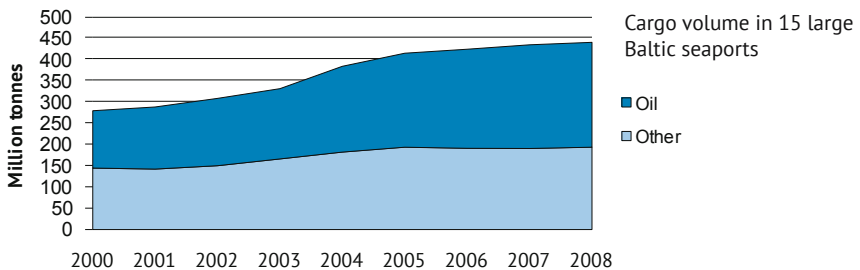


# INCREASING TRAFFIC – BETTER PREPAREDNESS

The maritime traffic in the Baltic Sea is constantly growing despite the global economic downturn during 2009. This trend can be illustrated by the ship passage statistics from key areas like the Skaw in Denmark, where an increase of over 20% has been observed between 2005 and 2011.



Especially oil transportation is expected to increase due to the construction and expansion of oil terminals in Russia. In the largest oil terminals, the annual turnover has risen from 140 million tonnes of oil to 250 million tonnes in ten years.





Through regional work carried out since 1980 under the Helsinki Commission (HELCOM), the nine coastal countries of the Baltic have managed to foster mutual trust and have created a highly operational regional system of preparedness and response to spills of oil and hazardous substances. The system, documented in the HELCOM Response Manuals, ensures that information on accidents and response capacity is shared with minimum delay. Cooperation is also tested annually in regional HELCOM Balex Delta oil response exercises.

As a result of this long term work the level of preparedness to pollution incidents at sea is at a high level in the Baltic Sea region. Nevertheless, the increasing traffic volumes and larger ships make it necessary to identify further measures to increase the safety of navigation as well as to limit harm in case of a major oil accident.



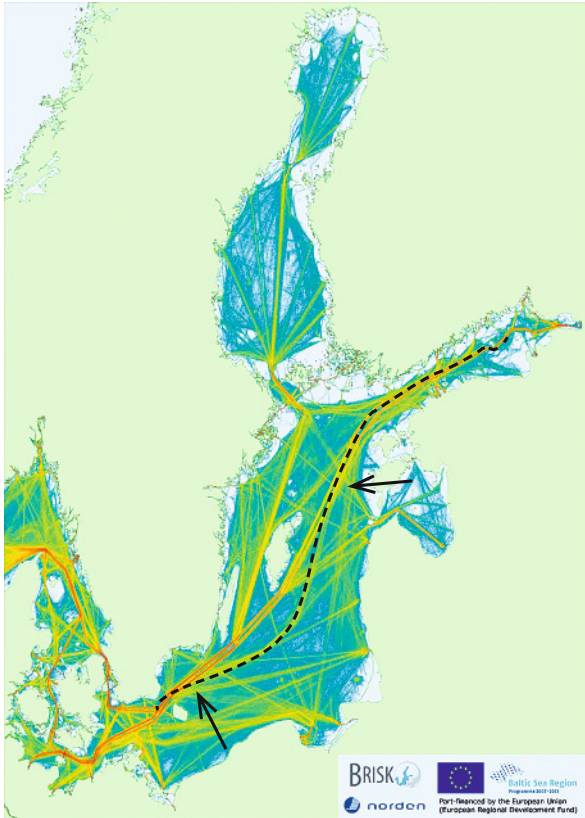


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# HIGH RISK AREAS

According to the assessment results, most pollution risks are concentrated along the main route that crosses the Baltic Sea from the Danish straits to St. Petersburg.

Areas north and south of Gotland stand out as areas with particularly high risks. In these areas large vessels, due to their deeper draught, deviate to the Baltic deep-water route while smaller vessels continue on the shortest route.



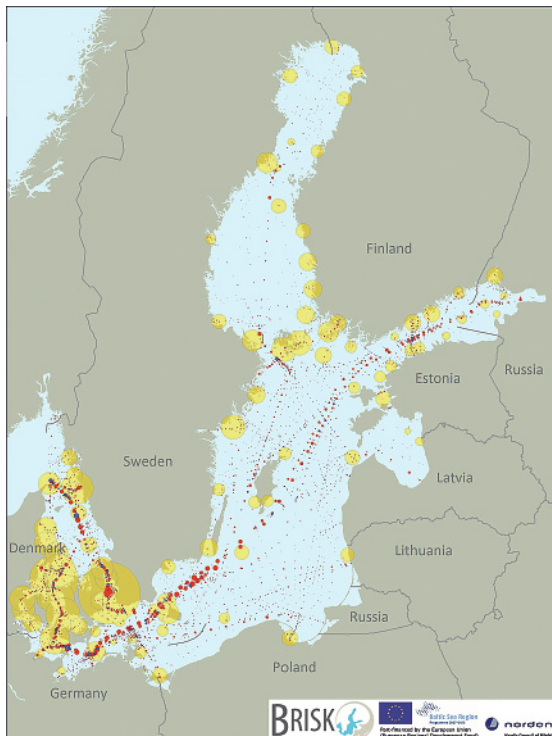
**Ship traffic patterns in the Baltic Sea** with the Baltic deep-water route indicated with dashed line and arrows to mark some of the high risk areas due to deviating/merging traffic streams.

# LIKELY VOLUME OF SPILLS

The likelihood of spilled oil on the water surface was estimated based on where the accidents are likely to happen and where the oil is transported (see figures). The likely accident areas include traffic crossings, main shipping lanes, as well as high risk areas for groundings.

This information was combined with estimations of the size of spills (from statistics on ship sizes and accident types); the type of oil expected to be spilled (bunker, crude, vegetable); likely movement patterns (drifting by wind and current, spreading, dispersion and fate); and the anticipated effectiveness of the recovery and response action.

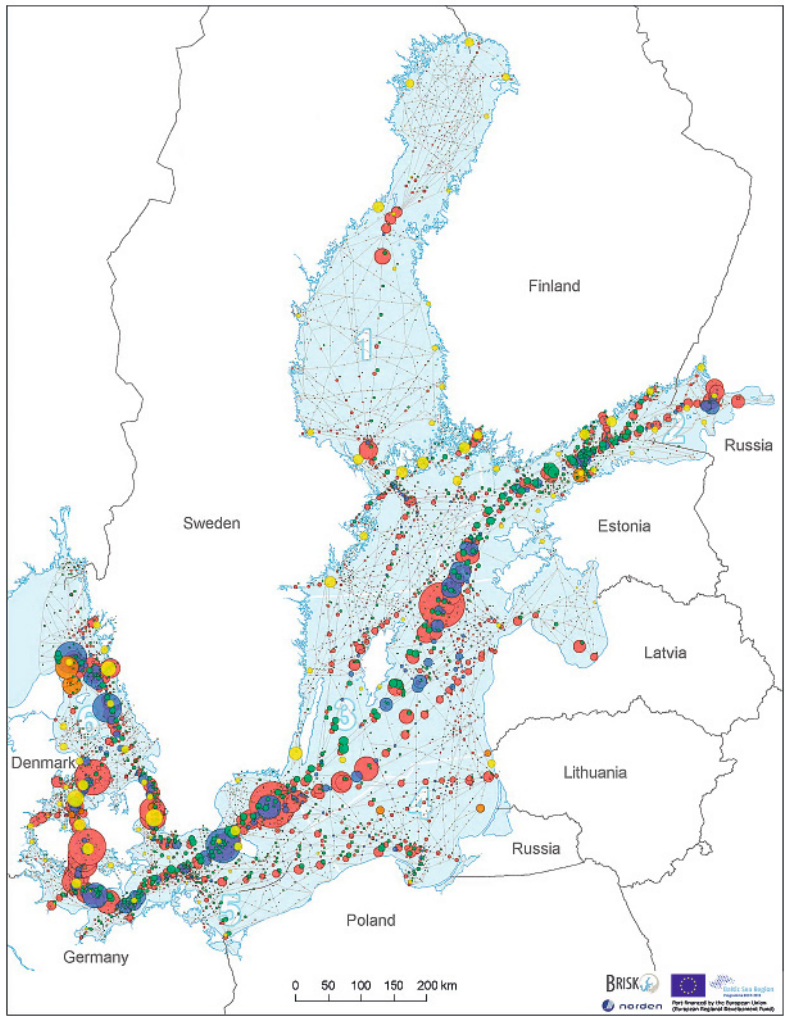
The probability of each process was taken into account and summarised for all events. The result is an estimation of the expected amount of accidentally released oil per area of sea surface.



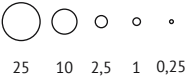
## The risk of collisions and groundings.

The size of the bubbles corresponds to the accident risk, i.e. the expected number of accidents per year.

- En-route collision
- Crossing collision
- Grounding



**The risk of oil spills.**  
(tonnes/year)

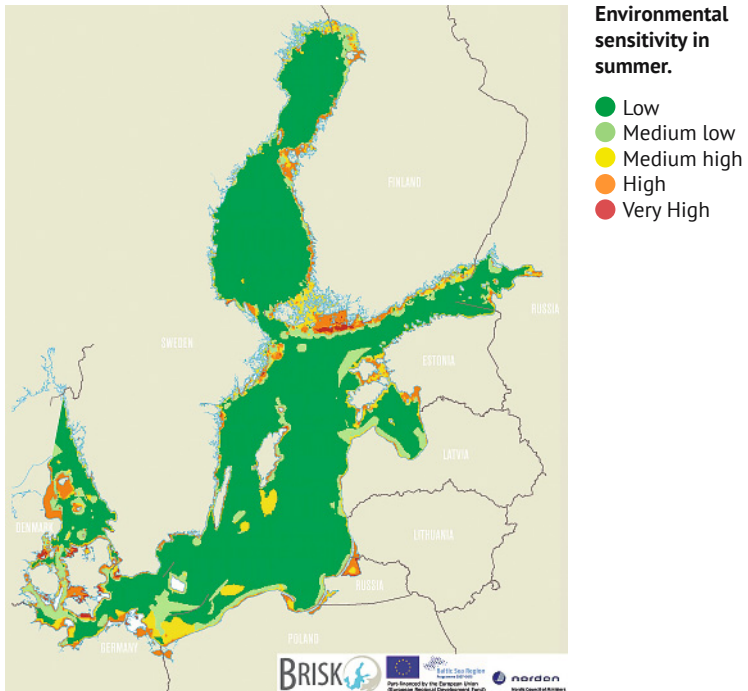


- Groundings
- Collisions at intersections
- Overtaking and head-on collisions
- Collisions with fixed objects and spills from offshore platforms, terminals, bunkering and STS operations
- Illegal spills

# MAPPING SENSITIVE AREAS

In addition to risks of oil accidents, the BRISK project mapped the areas most vulnerable to environmental damage in the entire Baltic Sea. Even if this kind of mapping has been made on a national scale, the novelty is in using the same mutually agreed classification system for the whole Baltic Sea area – from Skagen to Haparanda.

The environmental sensitivity was determined for each of the four seasons. The maps illustrate that the sensitivity is highest on the coast, in archipelagos and in shallow water areas.

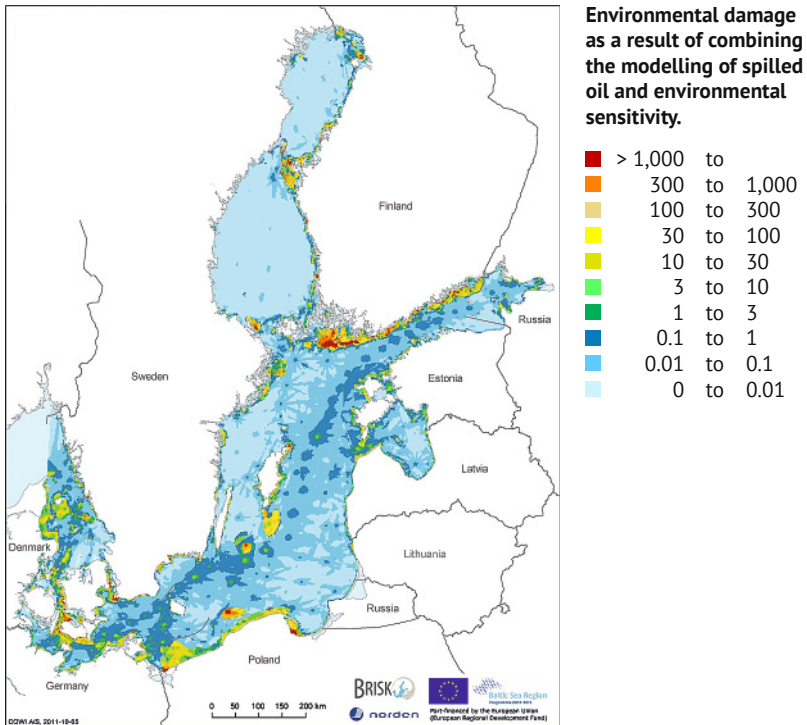


# RISK OF DAMAGE TO ENVIRONMENT

Combining information on oil impacts with seasonal environmental sensitivity gives the distribution of environmental damage from oil spills. A spill in a high sensitivity area causes more damage than the same spill in a low sensitivity area.

The Northern Baltic Sea has areas of high sensitivity to oil damage but low level of ship traffic. When accidents occur they have a great impact because of the ice coverage, making oil recovery more challenging.

The Danish coasts are generally vulnerable because of the narrow straits, due to both traffic density and the proximity of the shoreline. The risk of damage is high around the Danish islands and the Finnish archipelago.



# RECOMMENDATIONS – KEY ROLE OF SURVEILLANCE

The general recommendation from the BRISK/BRISK-RU projects is that the most cost-efficient risk reduction investment in high-traffic areas is increased surveillance. This is simply because vessels make fewer errors if they know that they are observed and if they communicate with others.

To this end, both the Vessel Traffic System (VTS) and Traffic Separation Schemes (TSS) provide the central risk reduction measures regarding oil spills and environmental damage. Increased surveillance is recommended especially for the entire tanker route between the Skaw and Primorsk/Ust Luga, building on the existing systems in the Great Belt and the Gulf of Finland.

In areas with little traffic the Electronic Chart Display and Information System (ECDIS) and double-hull tankers have major influence. Both the mandatory use of ECDIS and carrying oil by double-hull tankers are regulated by the International Maritime Organization (IMO).

In general, the most cost-effective approach is to prevent an accident from happening. However, if a major accident does occur, response capacities need to be in place. The projects investigated the needed additional response capacities for each sub-region.

Night vision equipment is the most cost-efficient investment, exceeding the effect of acquiring more booms and skimmers.

Investment in shallow water response capacities will have an effect on the ability to recover the oil from the sea and on the coast, especially in the Danish area.

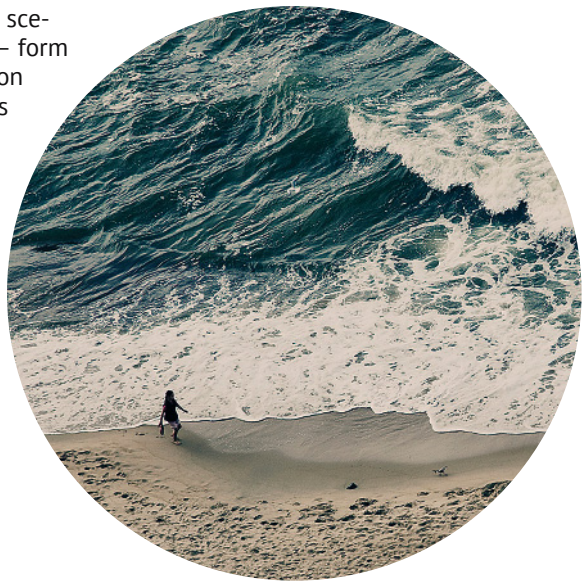


# SUB-REGIONAL DIFFERENCES AND SOLUTIONS

The results of risk scenarios showed that different parts of the Baltic Sea need different measures due to sub-regional differences in traffic patterns, risks and environmental sensitivity, for example. This is why the Baltic Sea was divided into six sub-regions in the BRISK/BRISK-RU projects; more thorough regional conclusions and recommendations were made for each sub-region.

Within each sub-region, the countries carried out bilateral and multilateral discussions to share experiences and challenges on sub-regional risk reduction and response measures. This dialogue was built on earlier cooperation in HELCOM and resulted, for example, in a number of bilateral agreements on joint response operations to cover the risks of accidents and oil spills, including the agreements between Russia (Kaliningrad) and Poland, and Russia (Kaliningrad) and Lithuania.

In addition, the agreed response scenarios – based on risk analysis – form the foundation for the preparation of sub-regional investment plans comprising the identification of the proposed response level; potential resources; costs of the resources, cost benefit calculations; the selection of preferred resources; and the timetable for procurement. For more detailed summaries on each sub-region visit [www.brisk.helcom.fi](http://www.brisk.helcom.fi)



# SUB-REGION DIVISIONS

**1: The Gulf of Bothnia** (Sweden, Finland)

*Lead country: Sweden*

**2: The Gulf of Finland** (Finland, Estonia, Russia)

*Lead country: Estonia*

**3: The Northern part of the Baltic Proper** (Sweden, Estonia, Latvia)

*Lead country: Sweden*

**4: The South-Eastern part of the Baltic Proper** (Lithuania, Russia, Poland)

*Lead country: Poland*

**5: The South-Western part of the Baltic Proper** (Sweden, Denmark, Germany, Poland)

*Lead country: Germany*

**6: The Sound and Kattegat** (Sweden, Denmark)

*Lead country: Denmark*





# BRISK IMPLEMENTS HELCOM'S COMMITMENTS

Denmark, Estonia, the European Union, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden cooperate within the Helsinki Commission, or HELCOM, to protect the marine environment of the Baltic Sea from all sources of pollution.

HELCOM cooperation in response to pollution accidents started in 1980 and has been a highly successful field of regional work.

The Baltic Sea countries follow the legal requirements of the Helsinki Convention as well as the HELCOM Response Manual which both contain principles, rules and operational procedures for joint, international response operations.

Monika Stankiewicz, Executive Secretary of the Helsinki Commission, explains why the BRISK project is unique:

“The project has remarkably improved our knowledge of the pollution risks associated with shipping accidents in the Baltic Sea. For the first time ever the risk analysis has systematically covered the whole maritime area of the Baltic Sea, thus allowing us to identify hot spots with the highest threat of spills. This creates a sound basis for relevant authorities to undertake further specific measures to improve capabilities for emergency response and navigation safety.”

*What does BRISK mean to HELCOM?*

“The sensitivity of the Baltic marine environment to pollution makes it necessary to continuously improve our understanding of risks, to find new technical solutions for detecting and combating oil at sea, and to work out new ways of building response capacities. BRISK is exactly about these three crucial points. Its philosophy comes from the Baltic Sea Action Plan, adopted by HELCOM Ministers in 2007, whereby the resources of the neighbouring countries are assessed and pooled together for a given sub-region, such as the Gulf of Finland, instead of looking at risks from a national perspective.”

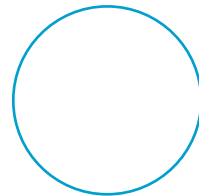


*What does the participation of Russia mean to the project and the end results?*

“The involvement of all coastal countries, including Russia, has made it possible to cover the whole Baltic Sea area by the risk assessment and recommendations for improvements. In addition, Russian colleagues have brought their expertise, data and information to the project. As major oil tanker routes in the Baltic Sea have their port of origin in the eastern Gulf of Finland, a project like BRISK would simply not fully serve its purpose without having Russia on board. This was possible only thanks to the financing by the Nordic Council of Ministers.”

*In what way does BRISK promote the future cooperation between the Baltic Sea countries?*

“We are now wiser about how to increase our preparedness for major spills of oil or hazardous substances in the Baltic Sea. Based on the BRISK recommendations, plans for investments in response equipment have been prepared. Additionally, a BRISK follow-up project has been developed to implement some of these investments and we hope it will be granted the necessary financing. And as single response ship can cost as much as several million euros, we have to work in parallel to ensure navigation safety.”



# *RUSSIAN PARTICIPATION – CRUCIAL BOTH FOR BRISK AND RUSSIA*

It has been of high importance for Russia to participate in the BRISK project according to Mrs. Natalia Kutaeva from the State Marine Pollution Control, Salvage and Rescue Administration of the Russian Federation.

“It is crucial for Russia to be involved in BRISK via the BRISK-RU project since the complex risk assessment of oil spills of the entire Baltic Sea – not just its separate areas and based only on national interests – was made for the first time ever.”

During the project, the agreements on international response operations between the countries have been concluded and Kutaeva finds that the agreements strengthen the preparedness to accidents in the Baltic Sea.

“The Ministry of Transport of the Russian Federation and the Russian Marine and River Fleet pay great attention towards preparedness and response operations to accidents causing seawater pollution, and to the implementation of a consistent and comprehensive policy on strengthening response capacity to accidents. HELCOM member countries carry out the same policy on national levels. The International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC 90) appealed to the Contracting Parties to sign bilateral agreements on response operations. It would be right to say that BRISK contributed to and facilitated the preparation and signing of these agreements, which will allow discussions on acute questions related to response preparedness to oil spills during the annual meetings of national competent authorities, as well as practising skills and joint response operations during training exercises on an annual basis,” says Kutaeva.



Initially the project involved only the EU countries, but facilitated by the Information office of the Nordic Council of Ministers in Kaliningrad, Russia had the opportunity to join the project via BRISK-RU, financed by the Nordic Council of Ministers Aquatic Ecosystems working group.

Russia's participation has been significant to the project in order to be able to collect comprehensive information on traffic, environmental sensitivity and environmental damage covering the entire maritime area of the Baltic Sea.

“Without information from all the coastal countries around the Baltic Sea, we could not have made this unique database which describes the environmental sensitivity in the entire sea area,” says Arne Grove, Director of the Information office of the Nordic Council of Ministers in Kaliningrad.

“Like all the other partners, Russia is able to influence the outcome of the work being done. If there are specific areas Russia wants to particularly focus on, it is now possible to have an impact they would not have had without participating in the project,” underlines Grove.



# MANAGING A CHALLENGE

The Admiral Danish Fleet HQ (ADF) has been the Lead Partner in the BRISK Project.

Because of the Danish Fleet's experience in management from a similar risk analysis project for the Danish Waters in 2008, the HELCOM Response Group asked them to take the lead in the BRISK Project.

Mr. Peter Søbørg Poulsen was appointed overall Project Manager of the BRISK project. His main role was to carry out the administrative processes of a major project and thereby facilitate its progress. Furthermore, all participating parties had to agree on the same methodology for the assessment of risk and environmental damage.

"Apart from being a technically innovative project, the diplomatic aspects of so many countries working so closely together was a great challenge," he says.

According to Mr. Poulsen, all the countries around the Baltic Sea get a common picture of the risk and hence common ground for mutual dialogue about the risk of spills and what can be done about it.

"All countries can now see how the risk is distributed in their sub-region compared to other sub-regions," he explains and continues:

"Important results are the ranking of a long list of options for improvement with respect to how much the options help reduce the risk and what they cost. For this reason, BRISK provides a qualified and highly necessary basis for decision making when the future preparedness in each sub-region and each country has to be developed."

In what way does BRISK promote the future cooperation between the Baltic Sea countries?

"It highlights the paramount necessity for cooperation within preparedness and response to medium and major events."

"The Russian experts have influenced the method and the analysis to a high degree. After having agreed on a common developed approach and consequent results, Russia – as the largest stakeholder – has given much substance and international acceptability to the project and its results," states Poulsen.



# WHAT HAPPENS NEXT?

For the time being, coordinated investment plans are under consideration by the sub-regions aimed at the improvement of response capacities. These activities include tests for using new technology for reducing the risks of accidents as well as improving the capacity for recovering oil in the event of a spill.

In addition to optimizing oil spill response preparedness, the BRISK and BRISK-RU projects have investigated a number of navigation aid scenarios. This additional analysis serves to open up a more general perspective on how the risk of a spill could be reduced.

It should be emphasized that the expected effect of the respective navigational aids is based on a number of assumptions in order to make direct comparison between the different optional scenarios possible. Any decision on specific measures should, however, be based on specific and more detailed analyses.

The Baltic-wide and sub-regional conclusions and recommendations will be further discussed and considered by the competent authorities in all Baltic Sea countries within the HELCOM Response Group. The aim is to form a basis for future work on investment plans for the needed improvements in response capacities in the Baltic Sea region, according to the HELCOM Baltic Sea Action Plan.

The programmes will prepare the ground for investments in emergency and response resources in order to ensure timely and well organized emergency response and, if needed, respond to pollution incidents to minimize the environmental damage they cause.





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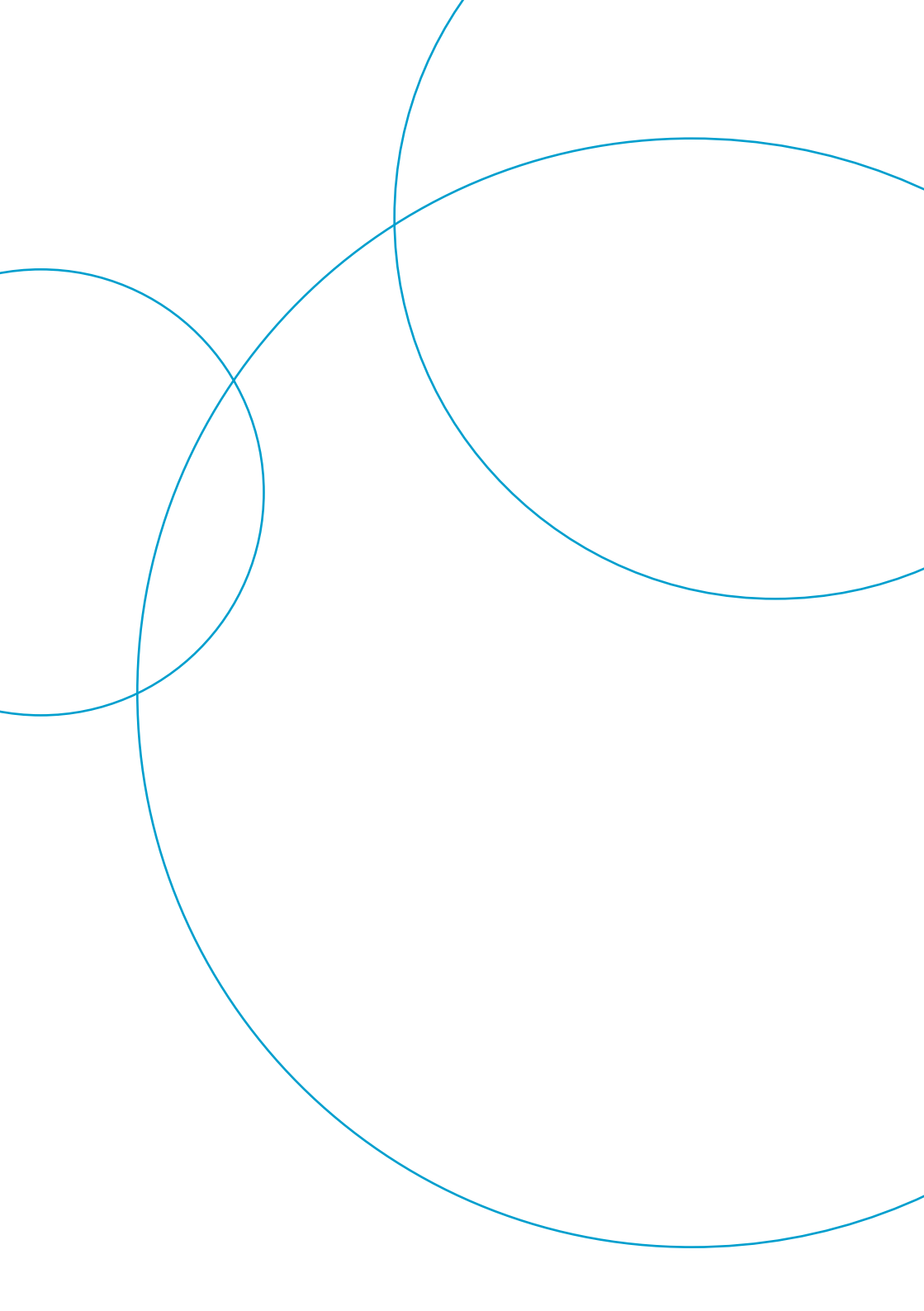
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