Ref. Ares(2025)3620680 - 05/05/2025

Co-funded by the European Union

BRISK II

Data collection note

5.5.2025 Deliverable 2.2, draft 1

Submitted by the BRISK II Core Team

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APPENDICES

1 Introduction

The present data collection note is part of the long-term risk analysis for oil and hazardous and noxious substances (HNS) pollution of the Baltic Sea (BRISK II).

The data collection note describes the data requirements of the BRISK II project. It is based on the requirements and experience from the BRISK I project and is aimed at the beneficiary countries of the project who need to collect the corresponding data for most analyses. The beneficiary countries are all the EU Baltic Sea countries which are from now on referred in this note as ‘countries’.

The data collection note is divided into the following chapters:

- Chapter 2: Ship traffic data
- Chapter 3: Transport data
- Chapter 4: Vulnerability data
- Chapter 5: Accident and spill data
- Chapter : Response data
- Chapter 7: Sea ice
- Chapter 8: Checklist

The checklist contains an overview of who is required to deliver which data.

The following chapters do not only describe the type of data requested but also the precise data format. Due to the large number of involved countries, it is essential that the indicated formatting requirements are met. This will allow for the smooth integration of the data in the model and thus contribute to meeting the agreed time schedule.

2 Ship traffic data

2.1 HELCOM AIS data

General

HELCOM's AIS database is the primary data source for establishing the traffic model. It records AIS messages of all AIS-equipped vessels in the HELCOM area. Data for the entire Baltic Sea will be delivered to the BRISK II project by HELCOM for the entire calendar year 2024. This period has been chosen, because

- it is the latest available year
- winter 2023/2024 was cold and in the Fennoscandia the period from October to January was colder than average and thus the ice cover was large. In the future, more extreme weather conditions are expected: either very mild or very cold
- in this year AIS spoofing and falsified AIS locations were not that frequent, meaning that they do bias the AIS data

Data collection procedure

No further action by the countries required.

2.2 S&P Sea-web

General

S&P Sea-web (the former Lloyd's Register) contains a series of details for every sea-going vessel of 300 GT and more. Some smaller vessels are equally included but are without the scope of the BRISK II project, both because of their low damage potential and because AIS transponders are not compulsory for those ships.

Access to the register is already established.

Data collection procedure

No action by the countries required.

2.3 VTS data and similar statistics

General

Data collected by VTS centres and similar data are a valuable means of verifying the obtained AIS data. Details on VTS data collection are described below, see Section 3.2.

Data collection procedure

See Section 3.2.

3 Transport data

3.1 Goods transport to and from ports

General

Goods transport data is understood as data describing the number of tons of specific substances shipped to and from individual ports. The BRISK II Core Project Team will define a specific number of representative port-to-port relations (see appendix 1). Data only needs to be collected for these.

Goods transport to and from ports is registered by the ports themselves as well as information providers such as Lloyd's List Intelligence (LLI) or SafeSeaNet.

Data collection procedure

The countries are kindly asked to collect the below-described data from their relevant ports and/or other information providers (e.g. SafeSeaNet, LLI).

Data scope

The following data are required:

- Dangerous goods reports (oil and hazardous and noxious substances (HNS)) for relevant ports (specified below) for two entire years: 2019 and 2024. The year 2024 is the year reflected by the AIS data and the year 2019 is added for comparison as it is the last year before the COVID-19 outbreak and the war in Ukraine. Dangerous goods reports contain the details of the shipments of dangerous goods in a port. A precise definition of oil and HNS types is provided in the BRISK II Method note (Deliverable 2.1).

- Import/export data on total oil and HNS in tonnes for relevant ports (specified below) for the years 2019 and 2024[1].

Specific data requirements

The following specific data requirements shall be met:

Dangerous goods reports

The details of dangerous goods reports shall at least contain:

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[1] 2024 is the reference year for the "current" situation. For this year, all data are needed, both AIS and cargo on ships.

The reason for asking for 2019 data above is that it will help identifying a trend in the development of goods tonnage. This is an input for the prognosis. 2019 AIS data are not needed for this, since the prognosis model is much more elaborate than just looking at trends in ship traffic numbers. Instead, it looks at goods transport development and at the development of the average ship size, see also the method note.

Table 3.1 Requirements to dangerous goods reports

Field	Type	Description
Reporting Country	Text	Country of current report
Reporting Port	Text	Port of current report
Year	Integer	Year of loading/unloading in current port
Date	Date	Date of loading/unloading (DD-MM-YYYY)
Time	Time	Time of loading/unloading (HH:MM) (24h)
Ship name	Text	Ship name
IMO number	Integer	IMO number of the ship
MMSI number	Integer	MMSI number of the ship
Call sign	Text	Call sign of the ship
Ship type	Text	Choose from following options: crude tanker, product tanker, gas tanker, chemical tanker, OBO, bulk carrier, container vessel, RoRo, general cargo ship, other
Gross tonnage	Real number	Gross tonnage
Activity	Text	*Load/unload*
Amount	Integer	Amount of oil/HNS in tonnes
UN number	Integer	Four-digit number that identifies hazardous substance
Country of departure	Text	Country of departure
Port of departure	Text	Port of departure
Country of destination	Text	Country of destination
Port of destination	Text	Port of destination

Oil and HNS types shall be specified as detailed as possible to allow grouping the substances in different ways.

Import/export data

Import/export data shall contain the ports the cargo has been shipped from or to.

Table 3.2 Requirements to import/export data

Field	Type	Description
Reporting Country	Text	Country of current report
Reporting Port	Text	Port of current report
Year	Integer	Year of loading/unloading in current port
Activity	Text	*Load/unload*
Amount	Integer	Amount of oil/HNS in tonnes
UN number	Integer	Four-digit number that identifies hazardous substance
Country of destination	Text	Country of destination
Port of destination	Text	Port of destination

3.2 Goods transport across control lines

General

When registering goods transport to and from ports, the actual route of the transport is often unknown. Measuring goods transport across control lines is therefore an important source of information, which describes the actual flow of goods on major sea routes. The required data are typically collected by VTS centres or other systems at the entrances of the Baltic Sea (Danish straits, Kiel channel) or other bottlenecks (Gulf of Finland, Gulf of Bothnia) would be of special relevance.

Data collection procedure

Each country is kindly asked to provide available statistics on transport across control lines. The precise data period and format are defined below. If available, please also provide data regarding the so-called shadow fleet (commercial ships sailing without AIS).

Data period

The BRISK II project uses AIS data recorded between 1 January and 31 December 2024. Therefore, this is also the obvious data period for goods transport data. If no data are available for this period, data from earlier years are equally useful. Ideally, the data period will reach over an entire year.

Data format

The data format can be any standard table format that your national authority might be using. The following pieces of information are relevant for BRISK II:

- Vessel ID (Name, IMO number, MMSI number, call sign) – *can be omitted, if gross tonnage and ship type is indicated for each ship*
- Date
- Ship size (DWT, if available also GT)
- Ship type
- Cargo type (if ship is in ballast, indicate "ballast")
- Cargo quantity (metric tons)
- Control line ID (if there is more than one control line, where ship traffic is registered)
- Sailing direction (ingoing/outgoing *or* eastbound/westbound, northbound/southbound *or* indication of port of departure/part of next call)
- Part of the so-called shadow fleet (defined as all vessels that lack Western insurance and belong to companies from non-EU/G7 countries).

3.3 Goods transport development and prognosis

General

In addition to the present situation, the BRISK II project regards equally the expected traffic and transport situation in 2036. As described in the Method Note, the future traffic situation (i.e. ship movements) is primarily modelled as a function of the expected future flow of goods (together with other parameters such as fleet development). Therefore, the data about the expected future goods transport measured in tonnes per cargo type and route need to be collected. This can be in two ways:

- By providing data of the historical development during the last few years (can be used for making a prognosis)
- By providing readily available prognoses that have previously been prepared

During BRISK I, the following prognoses provided a useful basis:

- The EU-financed *Baltic Maritime Outlook 2006*
- Regional analyses financed by the Finnish government (*Oil transportation and terminal development in the Gulf of Finland, 2004* and *Transportation of liquid bulk chemicals by tankers in the Baltic Sea, 2006*).

The aim is to collect similar types of reports.

Data collection procedure

Every country is asked to provide available

- historical data on goods transport from the last 5 to 10 years
- readily available prognoses on goods transport and/or ship traffic

These data and prognoses can relate to the entire country, to one or several ports or other regional units (e.g. Kiel Canal, Danish Straits, Gulf of Finland, Gulf of Bothnia etc.). The goods flows should be indicated as tonnes per goods type, year and direction (i.e. destination/origin or ingoing/outgoing or eastbound/westbound, northbound/southbound).

3.4 Passenger transport development and prognosis

General

As with goods transport (see above), both data on the past development and readily available prognoses will be used.

Basic information about the number of transported passengers per route and year can be gathered from sources such as the annual Shippax Market Reports. They include both ferry and cruise traffic and makes some very limited indications of the past development.

However, the numbers from this type of source are rather sparse, when considering the goal of plotting trends of the past development to make predictions about the future. Therefore, the countries are asked to provide more detailed information for their respective countries.

Data collection procedure

Each country is asked to provide the following information for each national passenger route (passenger ferries, RoPax ferries) in their country and for each international route starting/ending in their country:

- Definition of the route, i.e. names of the ports at the ends of the route.
- Number of passengers for each year during 2015-2024 (if this is not possible: Please indicate numbers for the available years)
- Number of ferry trips for each year during 2015-2024 (if this is not possible: Please indicate numbers for the available years)
- *If available:* Any available prognoses on the future development of passenger numbers and ferry trips per route and year

3.5 Oil and other substances carried for own propulsion (bunker fuel)

General

Oil and other substances carried for own propulsion (so-called bunker fuel) are not cargo in the strict sense. Nonetheless, the different types of bunker fuel are hazardous substances that are carried on board of ships in relatively large quantities and can give rise to significant spill events.

In BRISK I, bunker fuel was modelled based on indications from a Danish bunker oil provider, indicating a split of:

- IFO 380: 75 %
- IFO 180: 10 %
- Refined oil products: 15 %

In the meantime, new types of fuel have been introduced with a broad range of differing properties. For the BRISK II model, these new fuel types will be simplified into two types:

- Co-processed oils (a portion of the crude oil is replaced with renewable or recycled raw materials)
- Very low-sulphur fuel oils (0.1%-0.5% sulphur)

Moreover, both hydrogen, ammonia and methanol are in the narrower selection as future ship fuels. Of these, only methanol is liquid under atmospheric conditions (note that gases such as hydrogen and ammonia are not covered by the BRISK spreading and fate model). Thus, the following non-oil fuel will be included:

- Methanol

Data collection procedure

Please indicate the share of ships using hybrid oils, low-sulphur oils and methanol based on your experience, your assumptions and/or your expectations both for 2024 and 2036:

Table 3.3 Requirements to data/estimates on usage of new bunker fuels

Type of bunker fuel	Percentage of ships 2024	Percentage of ships 2036	Comments (e.g. which thoughts is the estimate based on)
Hybrid bunker oils	Percentage	Percentage	Text
Low-sulphur bunker oils	Percentage	Percentage	Text
Bunker methanol	Percentage	Percentage	Text

4 Vulnerability data

4.1 Seasons

In accordance with the BRISK I approach, six seasons are chosen. The seasonality (division of the year in relevant periods) is based on the traditional meteorological season and on the periods of solid ice.

4.1.1 Environmental seasons

The traditional meteorological seasons consist of 3-month periods as described below:

Table 4.1 Meteorological seasons

Season	Month
Winter	December, January, February
Spring	March, April, May
Summer	June, July, August
Autumn	September, October, November

4.1.2 Ice effect seasons

The ice conditions in the Baltic Sea have been assessed according to the period where the ice has significant influence on shipping, mainly in terms of routing. It was agreed among the experts that the following period *on average* can be considered affected significantly by ice in the northern Baltic regions (Gulf of Bothnia and Gulf of Finland).

Table 4.2 Period of significant effect of ice on shipping in Gulf of Finland

Ice effect	Months
Significant ice effects	January, February, March
No significant ice effects	April, May, June, July, August, September, October, November, December

4.1.3 Resulting seasonality

Combining the above periods results in six periods, which vary between 1-, 2- or 3-months duration. This seasonality includes the seasonality of the environment (effect side) as well as the seasonality of the traffic/accidents/spills (impact side). The resulting seasonality is illustrated in Table 4.3 below:

Table 4.3 System for resulting seasonality

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
season	wi	wi	sp	sp	sp	su	su	su	au	au	au	wi
ice	ice	ice	Ice									
period	1) wi, ice		2) sp,ice	3) sp		4) su			5) au			6) wi

The above table indicates that the four environmental seasons are expanded to 6 seasons to also account for the effect of ice.

The winter period is divided into a winter season without ice (December, season no. 6 marked in teal in Table 4.3) and a winter season with ice (January and February, season no. 1 marked in light blue). Consequently, spring is divided into a spring season with ice (March, season no. 2 marked in blue,) and a spring season without ice (April and May, season no. 3 marked in light green). The summer season (June, July, August, season no. 4 marked in green) and autumn season (September, October, November, season no. 5 marked in red) remain identical to the meteorological seasons.

4.2 Environmental indicators

The environmental indicators (parameters) shall represent what in general is understood as "representatives for good marine environment regarding impacts of oil and hazardous substances".

In the following a list of indicators used in BRISK I is presented. These are compared with data layers that are readily available in the HELCOM Map and Data

Service (HELCOM MADS) and are proposed to be used instead of data collection from countries to ease the reporting burden and to make best use of existing data. The HELCOM Working Group on Biodiversity, Protection and Restoration will be consulted on this decision, and if needed, data layers can still be collected from other sources for certain environmental indicators.

The project will use the same background data as used by HELCOM.

Table 4.4 Comparison of environmental indicators used in BRISK I and data layers available for environmental indicators in BRISK II.

Nr.	BRISK I Environmental indicators	Corresponding environmental indicators available for BRISK II	Data source
1	Rocky shores and stone reefs	Reefs 1170 *Possibly adding another map layer for rocky shores?*	HD Annex 1 reporting
2	Estuaries	Estuaries 1130	HD Annex 1 reporting
3	Coastal lagoons	Coastal lagoons 1150	HD Annex 1 reporting
4	Shallow inlets and bays	Large shallow inlets and bays 1160 /OR Boreal Baltic narrow inlets 1650	HD Annex 1 reporting
5	Underwater sand banks (on shallow water < 10 m)	Sandbanks 1110 /OR Estuaries 1130	HD Annex 1 reporting
6	Sandy beaches (general)	Sandbanks 1110	HD Annex 1 reporting
7	Seagrass meadows	Zostera marina distribution	HOLAS 3 (2016-2021)
8	Spawning area on shallow water for fish with demersal eggs	Spawning areas for herring and Baltic flounder.	PanBalticScope project (2021)
9	Nursery areas for fish on shallow water (< 10 m)	Nursery areas for flounder; and Recruitment area for perch and pikeperch.	PanBalticScope project (2021)
10	Offshore spawning areas for fish with pelagic eggs (i.e. mainly cod and sprat)	Spawning areas for cod, sprat and European flounder.	PanBalticScope project (2021)
11	Wintering areas for sea and shore birds	*Remains to be checked, as HELCOM data for functional bird habitats is only gathered within protected areas.*	tbd
12	Staging areas for migrating sea and shore birds	*See above*	tbd

13	Breeding areas for sea and shore birds	*See above*	tbd
14	Moulting areas for sea birds	*See above*	tbd
15	Marine mammals (breeding and haul out site for seals)	Distribution maps for grey seal, ringed seal, harbour seal and harbour porpoise.	HOLAS 3 (2016-2021)
16	Protected areas	HELCOM MPAs and Natura 2000 sites	Latest update: 2022
		Baltic Sea EBSAs	Latest update: 2021
17	Aquaculture	*Remains to be checked*	tbd

4.3 Indicator descriptions (maps)

Maps with each of the indictors for the BRISK I project are displayed on the following pages. The same type of data needs to be delivered for BRISK II. Already available indicator maps will be preferred over new data submissions.

For those environmental indicators which do not have readily available maps, delivery of distribution maps shall comprise not only a figure or a map but also the full digital data and description so that the data can directly be imported into the overall mapping system. All maps are to be provided as maps in a word document as well as GIS maps. The preferred GIS will be ArcGIS. All data will be stored in the coordinate reference system European Terrestrial Reference System 1989 (ETRS89) and the projection Lambert Azimuthal Equal Area (ETRS89-LAEA) as recommended by the European Commission and used by HELCOM.

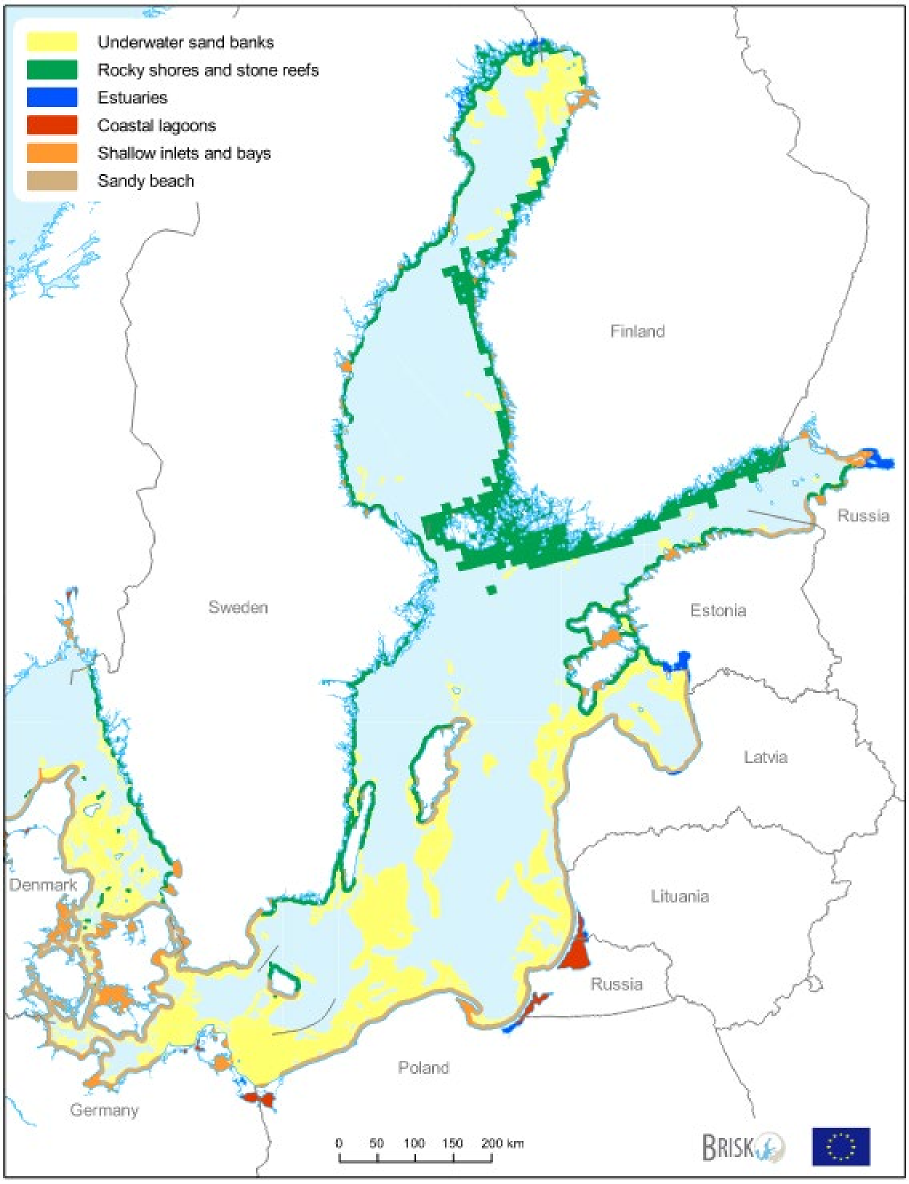

Figure 4.1 *Indicator #1 Rocky shores and stone reefs*
Indicator #2 Estuaries
Indicator #3 Coastal lagoons
Indicator #4 Shallow inlets and bays
Indicator #5 Underwater sand banks (on shallow water <10 m)
Indicator #6 Sandy beaches (general)

Figure 4.2 Indicator #7 Seagrass meadows

Figure 4.3 Indicator #8 Spawning area on shallow water for fish with demersal eggs

Figure 4.4 Indicator #9 Nursery areas for fish on shallow water (<10m)

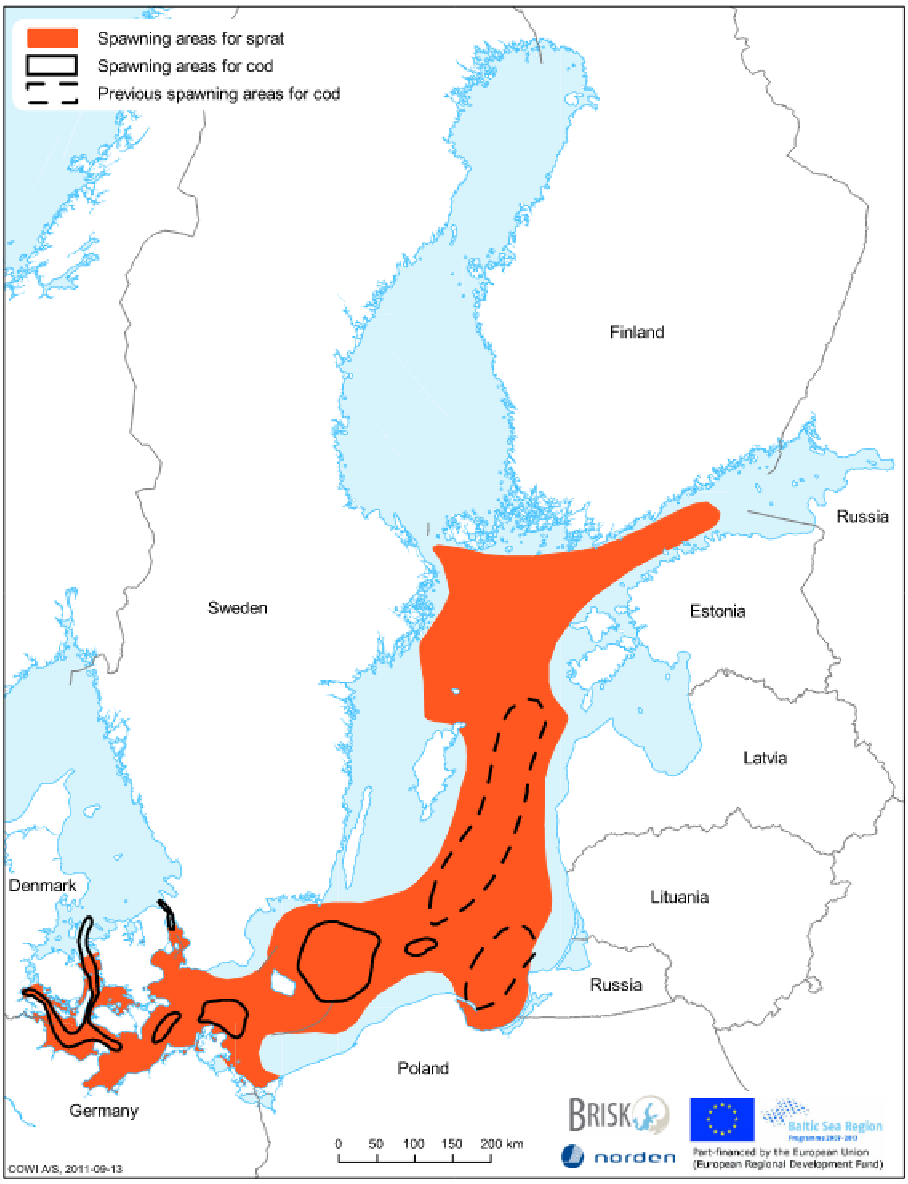

Figure 4.5 *Indicator #10 Offshore spawning areas for fish with pelagic eggs (i.e mainly cod and sprat)*

Figure 4.6 Indicator #11 Wintering areas for sea and shore birds

Figure 4.7 Indicator #12 Staging areas for migrating sea and shore birds

Figure 4.8 Indicator #13 Breeding areas for sea and shore birds

Figure 4.9 Indicator #14 Moulting areas for sea birds

Figure 4.10 Indicator #15 Marine mammals (breeding and haul out site for seals

Figure 4.11 Indicator #16 Protected areas

Figure 4.12 Indicator #17 Aqua culture

4.4 Environmental weight

General

As a starting point, the environmental weights for each indicator and each season from BRISK I are still assumed to be valid. The experts in the HELCOM Working Group on Biodiversity, Protection and Restoration will be consulted on this weighting. If needed, a workshop meeting will be organised to allocate new weights.

It is important to stress that, while there is only one environmental map per indicator for the entire year, there will be six environmental weight factors per indicator, i.e. one per season.

Data collection procedure

Input will be requested via a consultation process from the experts of the HELCOM Working Group on Biodiversity, Protection and Restoration.

5 Accident and spill data

5.1 Data on accidents at sea

General

Historical accident data are important for calibrating and validating the results of the accident model. HELCOM maintains a database which includes accidents at sea. However, it appears that the quality of the data sent to HELCOM has not been constant over the years. Experience from BRISK I shows that data reported in national formats and data collected by HELCOM do not always match. Therefore, it is necessary to supplement the HELCOM database with national accident data from each Baltic Sea country.

Data collection procedure

A list based on HELCOM's accident database, together with other relevant sources, will be distributed together with the present note in MS Excel format (*HELCOM accidents at sea.xlsx – under preparation*). Every country is asked to go through their national accident database and to make sure that each entry in the national accident register also exists in the HELCOM database. If an entry in the accident register is missing in the HELCOM database, please type it into the provided template (*Additional accidents at sea.xlsx – under preparation*). The details on data period, format and scope are described below.

It is important that accidents without known coordinates are equally included!! In this case, you can enter geographical information as free text or drop the geographical description altogether (see details on the data format below).

Data period

It is decided to use data from the last 10 years, i.e. from 01.01.2015 to 31.12.2024. A shorter period can be problematic for sub-areas with few accidents per time unit and would lead to statistically insignificant conclusions. A larger period would necessitate the usage of older data (before 2015), which is not considered to represent the current traffic and accident situation well enough.

Data format

A template file in MS Excel format is distributed together with this note (*Additional accidents at sea.xls – under preparation*). It contains the following fields:

Table 5.1 Requirements to accident data

Field	Type	Description
Country	Text	Country, in whose EEZ the accident occurred
Year	Integer	Year of occurrence
Date	Date	Date of occurrence (DD-MM-YYYY)
Time	Time	Time of occurrence (HH:MM)

Latitude	Real number	Expressed in degrees and decimals (e.g. 64.23°, not 64°14')
Longitude	Real number	Expressed in degrees and decimals (e.g. 14.56°, not 14°34') If coordinates are unknown: Convert geographical information roughly to the most likely coordinates (e.g. "20 miles east of Gotland" → 57.23° N, 19.52° E; "Gulf of Finland" → 59.90° N, 25.48° E, i.e. roughly the centre of the Gulf of Finland)
Alternative geographical information	Text	If there are no coordinates, please enter any available geographical information here (e.g. "20 miles east of Gotland" or "Gulf of Finland")
Ship name	Text	Ship name
IMO number	Integer	IMO number of the ship
Call sign	Text	Call sign of the ship (this is especially important for ships, whose IMO number is not known)
Ship category	Text	Choose from following options: *Cargo, Tanker, Passenger, Other, Unknown*
Hull type	Text	*Single* or *Double* (only relevant for tankers and bulk carriers), *Unknown*
Gross tonnage	Real number	Gross tonnage
Accident type	Text	Choose the first applicable option from the following in hierarchical order: *Collision with vessel, Collision with object, Grounding, Fire, Sunk other cause*, *Hull damage other cause, Pollution other cause* (E.g. a ship that leaks oil and sinks due to a collision with another ship is counted as "Collision with vessel", not as "Sunk other cause" or "Pollution other cause")
Ice condition	Text	Choose from following options: *Yes, No, Unknown*
Piloted	Text	Choose from following options: *Yes, No, Unknown*
Pollution	Text	Choose from following options: *Yes, No, Unknown*
Pollution size	Real number	Pollution size in tonnes
Pollution type	Text	Choose from following options: *Volatile oil (diesel, petrol etc.), Non-volatile oil, Animal/vegetable oil, Other hazardous substance (except gas), Non-*

		hazardous substance (incl. gas), N/A (no leakage), Unknown
Pollution type comments	Text	Any further comments regarding the pollution type

Data scope

The following accidents shall be omitted:

- Accidents outside the national EEZ of your country
- Accidents at ports and harbours
- Leakages from ships sunken during earlier periods, i.e. due to corrosion leading to additional degradation of the hull.
- Accidents with ships smaller than 300 GT (if a ship below 300 GT collides with a ship above 300 GT, indicate only the one that is above 300 GT)
- Near misses
- Accidents that are unlikely to result in spill events:
  - Machine damage (however, if it leads to follow-up events, it is registered as grounding, collision etc.)
  - Passenger accidents
- Accidents outside the data period (01.01.2015-31.12.2024)

5.2 Data on oil spills at sea

General

HELCOM maintains a database on illegal and inadvertent oil spills at sea. It contains all oil observations that are obtained by aerial and satellite surveillance by the Helsinki Convention Contracting Parties. As opposed to some national databases, it does not contain oil observations accomplished by other means (e.g. non-systematic observations by passing vessels, persons on the coast etc.).

While it can be said that the majority of all accidents at sea are covered by the accident database, this cannot be said about the database on illegal and inadvertent oil spills. The reason is a combination of the following:

- Many oil types are volatile and disappear from the sea surface within a few hours. The majority of all illegal and inadvertent oil spills involves volatile oil, as observed during earlier Danish analyses.
- Aerial and satellite surveillance is not continuous, i.e. there are long time intervals between two surveillance operations. Oil can disappear from the surface in the meantime.

- It is in the nature of illegal and inadvertent spills that polluters do not notify the authorities themselves (as opposed to accidents at sea).

Since the number of observations by means of aerial and satellite surveillance and the number of surveillance flight hours per year is known, the actual number of spills can be estimated very roughly, i.e. in the sense of an upper and lower limit. Knowledge of oil observations by other means (e.g. by-passing ships) does not contribute significantly to this estimate.

In order to estimate the actual number of oil spills, a number of parameters on aerial and satellite coverage are required:

Data collection procedure

Data to be provided by HELCOM:

- Observed spills during the years 2019 (before the COVID-19 pandemic and before the war in Ukraine) as well as 2022, 2023 and 2024:

Data to be provided by each country (no specific format requirements):

- Number of aerial surveillance hours flown in 2019 (before the COVID-19 pandemic and before the war in Ukraine) as well as 2022, 2023 and 2024
- Typical speed of the surveillance aircraft *on surveillance missions* (i.e. the actual, not the maximum speed of the aircraft) to establish a reliable estimate of the relationship between observed and unobserved events
- Width of the covered sea area to both sides of the flight route (depends on the equipment and the typical altitude of the surveillance aircraft on surveillance missions)
- Number of satellite pictures of your national EEZ per year, weighted by the coverage percentage (i.e. a satellite picture that covers 70% of your country's EEZ counts as 0.7 pictures). Please provide this number for 2022, 2023 and 2024 as three separate numbers.

5.3 Pilotage

Pilotage, i.e. the usage of a maritime pilot, is one of the most important risk reducing measures in navigation. When estimating the number of grounding and collision accidents per year, it is therefore of central importance to have a realistic idea of the fraction of piloted ships.

5.3.1 Mandatory pilotage

General

In most places where pilots are used, this is based on a mandatory regime.

Data collection procedure

For each country, a description of the applicable pilotage rules is required, describing

- Geographical area

› Types of ships that the pilotage regime applies to

5.3.2 Recommended pilotage

General

In some areas, pilotage is just recommended but not mandatory. This applies e.g. to the Great Belt and the Sound.

The piloted fraction is estimated by comparing the number of piloted sea miles to the total number of sailed sea miles in an area. While the total number of sailed sea miles per area, ship size and ship type are known from the AIS traffic statistics described in Section 2.1, the number of piloted sea miles needs to be collected separately. The present section describes, which requirements should be met during this process.

Data collection procedure

A template file in MS Excel will be distributed together with this note (*pilotage template.xlsx – under preparation*). This template should be used, if you do not have a similar table containing the same type of information readily available in your country.

The required data details are specified below (see *Data period* and *Data format*). It should be stressed that it is very relevant to know

› where the pilotage job has taken place. Therefore, we need either the coordinates of the start and beginning of the pilot job or the name/code/ID of the pilotage route

› how many nautical miles the pilotage job included

› the size (DWT and/or GT) and type of the piloted vessel or – alternatively – the vessel name and IMO number

Note that the next section (5.4, *RRM parameters*) equally includes a number of questions regarding pilotage.

Data period

The BRISK II project uses AIS data from the period between 1 January and 31 December 2024. The same period should be used for pilotage data.

If pilotage data are not available for the mentioned period, the latest available data can be used instead. If possible, they should cover a period of one entire year.

Data format

A template file in MS Excel format is distributed together with this note (*Pilotage template.xls – under preparation*). It contains the following fields:

Table 5.2 Requirements to pilotage data

Field	Type	Description
Date	Date	Date of pilot job (DD-MM-YYYY)

Beginning of pilot job: Place	Text	Name of the location, where the pilot job began
Beginning of the pilot job: Lon/Lat	Real number	Expressed in degrees and decimals (e.g. 14.56°, not 14°34'). A rough indication is sufficient. *Can be omitted, if a pilotage route ID is indicated in stead.*
End of pilot job: Place	Text	Name of the location, where the pilot job ended
End of the pilot job: Lon/Lat	Real number	Expressed in degrees and decimals (e.g. 14.56°, not 14°34'). A rough indication is sufficient. *Can be omitted, if a pilotage route ID is indicated in stead.*
Pilotage route ID	Text/Number	If you use codes/abbreviations for designating the most common pilotage routes in your country, please indicate here
Piloted distance	Real number	The distance sailed with a pilot on board, expressed in nautical miles
Ship name	Text	Ship name *(can be omitted, if DWT/GT and ship type are known)*
IMO number	Integer	IMO number of the ship *(can be omitted, if DWT/GT and ship type are known)*
Deadweight tonnage	Real number	Deadweight tonnage (metric tons)
Gross tonnage	Real number	Gross tonnage
Ship type	Text	Please indicate the ship type in English (you can also provide a separate list, which translates all ship type designations into English)
Loaded?	Yes/No	Indicate *Yes* if the ship is loaded and *No* if the ship is in ballast

5.4 RRM parameters

General

The accident and spill model takes more than a dozen different risk-reducing measures (RRMs) into account, as specified in the Method Note. They include e.g. ECDIS usage, VTS centres and many more. Each RRM is characterised by two basic numbers:

- The probability that a RRM is in force (P = 1, if it is certain that the RRM applies to all ships; 0 < P < 1 if the RRM does not apply to all ships or if it is uncertain, whether the RRM will be implemented at a given point in time in the future)

- The risk-reduction factor associated with a RRM (k = 0.7 means that the risk is reduced to 70 % of its original value, i.e. a reduction by 30 %)

For a number of RRMs, both parameters have already been estimated in connection with the earlier Danish oil spill analysis. However, some of the RRMs have been added specifically for the BRISK II project and some RRMs have regionally varying parameters. Therefore, input from the participating countries is required.

The countries are asked to help quantifying the *first* parameter of the two, i.e. the probability that the respective RRMs are in force. As far as the *second* parameter, i.e. the risk-reduction factor, is concerned, we will address specific countries directly, if it should become necessary.

Data collection procedure

The relevant questions regarding the different RRMs are collected in a questionnaire which will be distributed together with this note (*questionnaire risk reducing measures – under preparation*). Please fill out the questionnaire and return it to the BRISK II project.

5.5 STS operations, loading buoys and bunkering at sea

General

Several scenarios can ensue in spill of oil of hazardous substances during ship-to-ship transfer (STS) and oil loading buoy operations. Likewise, bunkering at sea can lead to oil spills.

Data collection procedure

Please indicate the following information:

- All locations, where STS transfers, oil loading buoy operations and bunkering at sea are performed in your country's EEZ (name of the area, latitude, longitude). If available, please also provide data regarding the so-called shadow fleet (commercial ships sailing without AIS).

- The number of STS/bunkering/loading buoy operations per year performed at each location

- *For STS and loading buoy locations only:* The average size of the mother ships (i.e. the larger ships of the two ships involved)

5.6 Offshore wind farms (OWFs)

General

Offshore wind farms (OWFs) are potential obstacles to ships and can be subject to ship collision. Both currently existing wind farms and wind farms expected to be in place by 2036 are relevant in terms of data collection.

Data collection procedure

Please provide the following

- Currently existing OWFs (as per 2024): Please check and confirm the HOLAS 3 database. If any OWFs are missing, please provide GIS maps.
- Future situation: Please provide GIS maps with the OWFs expected to be constructed by 2036.

5.7 Fixed objects (other than OWF)

General

In the present context, fixed objects include all potential obstacles in the sea other than OWF that are

- permanently linked to the seabed (by a foundation or permanent anchorage)
- large enough to cause severe damage (potentially ensuing in leakage) to ships larger than 300 GT in case of a collision
- man-made (i.e. grounds are excluded)
- not part of the coastline (i.e. jetties are excluded)

This definition applies essentially to bridge piers, offshore platforms and very large navigational buoys. Any other object meeting the above definition is equally included.

Both existing objects and objects expected to be established by 2036 should be indicated.

Data collection procedure

A template file in MS Excel format is distributed together with this report (*Fixed objects template.xls – under preparation*). It contains the following fields:

Table 5.3 Requirements to data on fixed objects (other than OWF)

Field	Type	Description
Object type	Text	Oil platform, buoy, bridge pier etc.
Object name	Text	The name or ID of the object (e.g. buoy no. 314)
Latitude	Real number	Expressed in degrees and decimals (e.g. 64.23°, not 64°14’)
Longitude	Real number	Expressed in degrees and decimals (e.g. 14.56°, not 14°34’)
Max. dimension	Real number	The maximum dimension of the object when seen from above (i.e. length or diameter), expressed in metres

90° to max. dimension	Real number	The dimension that can be measured perpendicular to the max. dimension, when seen from above (for a rectangular object, this is simply the width of the object!!), expressed in metres
Attendant vessel visits per year	Integer	How many times per year is the object approached by vessels for supply, inspection etc.?
Attendant vessel size	Real number	Attendant vessel size in DWT
Construction details	Text	Construction material, construction principle etc.
Existing/planned	Text	Please indicate whether the object already exists ("existing") or when it is expected to be established (e.g. "expected 2029")

Please note, that each bridge pier and each platform is an object of its own, unless the distance between two piers or two platforms is very small (smaller than 50 m).

6 Response data

6.1 Equipment and capacity for each country

Please provide a list and technical specifications of ships and oil spill response equipment (table 6.1). Please see the equipment list in the HELCOM Response Equipment database and check for updating.

Please provide a brief description including illustrations of response systems alternative to systems of booms - skimmers - pumps (examples: split-ships, sweeping arms, brushing systems in ice):

Table 6.1 Table for providing equipment and capacity data

Country	Name of system	Effective sweeping width (m)	Tow speed (knots)	Average recovery capacity (ton oil/h)

6.2 Response modelling parameters

Please provide response parameters that you assess are of primary importance to the response modelling (one example is tank capacity on board the recovery vessel). The existing parameters are listed in table below.

Table 6.2 Table for providing response modelling data

Parameter (For time-depended parameters, please choose value for time T1, T2 and T3)	Dimension	Model response (example values – please replace by correct values)
Accumulated capacity of pump-skimmer system at time T1, T2, T3	m^3/h	Cap1: 0 Cap2: 50 Cap3: 100
Accumulated length of booms at time T1, T2, T3	m	L1: 300 L2: 600 L3: 1200
Alarm-combat time T1, T2, T3	Hour	T1: 2 T2: 4 T3: 6
Ice cover coefficient (Relative increase in alarm-combat time dependent on ice coverage)	Non-dimensional	Ice covered; 1,50 Broken ice: 1,25 No ice: 1,00
Tow speed at time T1, T2, T3	Knot	V1: 1 V2: 1 V3: 1
Visibility coefficient (ratio of time where combat is not possible due to too much fog and haze)	Non-dimensional	Spring: 0,02 Summer: 0,01 Fall: 0,02 Winter: 0,04
Darkness coefficient (ratio of time where combat is not possible due to too little daylight)	Non-dimensional	Spring: 0,4 Summer: 0,2 Fall: 0,4 Winter: 0,6
Max. significant wave height Hs	m	1,3
Recovery efficiency for floating (non-dissolving) chemicals compared to oil	Non-dimensional	0,5
Reduction factor for fire hazard class "red"	Non-dimensional	0,7
Reduction factor for health hazard class "red"	Non-dimensional	0,7
Reduction factor for hybrid fuels	Non-dimensional	0,3
Reduction factor for low-sulphur fuels	Non-dimensional	0,3

In case you propose additional parameters please insert them in the table below:

Table 6.3 Table for providing additional response data

Parameter	Dimension	Model response

7 Sea ice

General

The duration of the ice period and the geographic extent of the ice cover are important parameters for the traffic and accident model as well as for the oil fate and response model.

Data collection procedure

Maps, which describes the *geographical extent and thickness* of the ice cover in each country's EEZ will be collected. There should be a separate map for each time step (e.g. for each week) so that the development of the ice cover during the winter becomes evident. Maps will be provided for the following two periods:

› Winter 2023/2024: This is the winter that is reflected by the AIS data for year 2024, which are used for the BRISK II traffic model. The aim is to collect ice maps with approximately one-week intervals for the entire ice season.

Average winter: To assess the ice situation during an average winter some general data will be collected. From BRISK I, yearly data from 1979 to 2009 is available. For each year after that, i.e. 2010 to 2025, the following data are needed:

- › Date of maximum ice cover (i.e. during the entire ice season)
- › Extent of maximum ice cover in km²
- › Qualitative indication of navigation conditions (e.g. very mild / mild / normal / difficult / very difficult)

Data will be collected centrally by the Core Project Team (especially Sweden and Finland), thus no action for the countries is needed.

8 Checklist

The below checklist summarises the data collection requests from the previous chapters. Please note the symbols used in the checklist:

- o … required
- (o) … to be decided (*under preparation by Core Project team*)
- \- … not required
- x … obtained

Table 8-1 Data collection checklist

Data type	Beneficiary country									Detailed description
	DE	DK	EE	FI	LT	LV	PL	SE	HELCOM	
Traffic										
- HELCOM AIS data	-	-	-	-	-	-	-	-	o	2.1
Goods transport										
- Port statistics	(o)	(o)	(o)	(o)	(o)	(o)	(o)	(o)	-	3.1
- Passage statistics	o	o	o	o	o	o	o	o	-	
- Goods transport development data and prognoses	o	o	o	o	o	o	o	o	-	3.3
- Passenger transport development data and prognoses	o	o	o	o	o	o	o	o	-	3.4
Vulnerability										
- Indicator maps for each environmental indicator	o	o	o	o	o	o	o	o	-	4.2 / 4.3
- Indicator weights for each environmental indicator	o	o	o	o	o	o	o	o	-	4.4

Accidents										
- Additional accidents at sea	o	o	o	o	o	o	o	o	-	5.1
- Oil spill surveillance details	o	o	o	o	o	o	o	o	-	5.2
- Pilotage data	o	o	o	o	o	o	o	o	-	5.3
- Risk reducing measures (RRMs)	o	o	o	o	o	o	o	o	-	5.4
- STS operations & bunkering at sea	o	o	o	o	o	o	o	o	-	5.5
- Offshore wind farms	o	o	o	o	o	o	o	o		5.6
- Fixed objects	o	x	o	o	o	o	o	o	-	5.7
Spreading, fate and containment										
- Equipment and capacity	o	o	o	o	o	o	o	o	-	6.1
- Response modelling parameters	o	o	o	o	o	o	o	o	-	6.2
Ice										
- Winter 2023/2024	-	-	-	o	-	-	-	o	-	7
- Average winter	-	-	-	o	-	-	-	o	-	7

Appendix A Representative ports

This appendix represents the ports selected for data collection and outlines the criteria used for selecting ports to understand the types of goods, particularly liquid cargo, transported in the Baltic Sea. The port selection directly informs the goods transport model, which is essential for assessing the potential consequences of shipping accidents involving oil and hazardous and noxious substances (HNS).

The selection process was guided by the following criteria:

Major liquid bulk ports: The primary criterion was the selection of the largest liquid bulk ports in the Baltic Sea. (Note: Russian ports were excluded due to data availability constraints for previous years).

National representation: At least one port was selected from each Baltic Sea country, even if it was not among the largest liquid bulk ports.

Sub-regional representation: At least one port was selected from each Baltic Sea sub-area, including areas where the largest liquid bulk ports are not located (e.g., the Gulf of Bothnia).

A non-oil liquid bulk port: A major non-oil liquid bulk port (Aarhus) was included to provide data on the transport of liquid chemicals other than oil in the Baltic Sea.

Rationale: The port selection is focused on the liquid bulk because the BRISK II project concentrates on risk analysis of oil and HNS pollution resulting from shipping accidents.

Selected ports: By applicating these criteria the Core Project Team selected 16 ports in the EU Baltic Sea countries which are presented below. The locations of the ports are shown in the map (Figure A.1).

1 Kokkola FI

2 Porvoo (Sköldvik) FI

3 Tallinn EE

4 Riga LV

5 Ventspils LV

6 Būtingė LT

7 Klaipėda LT

8 Gdańsk PL

9 Gdynia PL

10 Świnoujście PL

11 Rostock DE

12 Fredricia DK

13 Statoil-Havnen DK

14 Aarhus DK

15 Gothenburg SE

16 Gävle SE

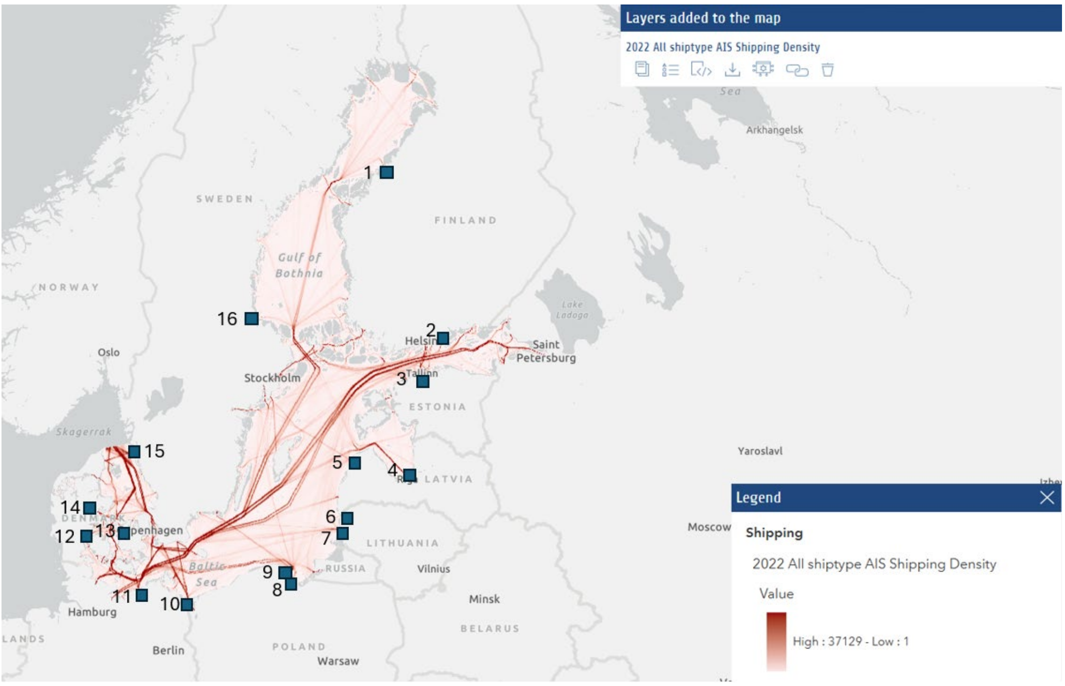

Figure A.1 The locations of the 16 representative ports. (Source: HELCOM map and data service).