MARITIME

Shipping accidents

in the Baltic Sea from 2014 to 2017

HELCOM

Baltic Marine Environment Protection Commission

Shipping

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1. Introduction

Annual reports on shipping accidents in the Baltic Sea area have been compiled by HELCOM since 2000. According to an agreed procedure all accidents are reported irrespectively if there was pollution or not. This includes accidents which involved tanker ships over 150 gross tonnage (GT) and/or other ships over 400 GT, both in territorial seas or Exclusive Economic Zone (EEZ) of the HELCOM Contracting Parties. Accident types cover i.a. groundings, collisions (striking or being struck by another ship), contacts with fixed or floating objects, pollution accidents (e.g. during fuel transfer) and other types of accidents like fires and explosions, machinery damage and capsizing.

A new reporting format was taken into use in 2004.[1] Data collected before 2004 is thus not fully comparable with the data collected in 2004 and subsequent years. In 2012 the HELCOM reporting format was modified in order to harmonize with reporting formats for incidents of the International Maritime Organization (IMO) and the European Maritime Safety Agency (EMSA). Some further fine-tuning was also made to the reporting in 2013.

The report focuses on the shipping accidents data collected for the year 2014, 2015, 2016 and 2017 as well as for the longer period since 2004. All Baltic Sea coastal states (Denmark, Estonia, Finland, Latvia, Lithuania, Poland, Russian Federation and Sweden) were requested to provide information on ship accidents. For the period 2014-2017, the HELCOM Secretariat received national reports from all these countries. Attached to this report are the guidelines for the 2013 HELCOM reporting format containing additional information on the categorization used in this report (Annex 1).

The content of the report remains the same as in previous years with an additional chapter on accidents with pollution and response activities in 2015 reported by Denmark and Poland, in 2016: Denmark, and in 2017: Denmark and Estonia. This report was compiled by the HELCOM Secretariat and approved for publication by the HELCOM Maritime Working Group.

1 A major revision of the shipping accidents database of Denmark, maintained by the Danish Maritime Agency, took place in 2013. Denmark has informed that the accidents data of the old database and of the new database can both be considered valid. However, due to the differences in the content and structure of the two databases, care should be taken when presenting regional information on accidents which include Danish data both from the old (before 2009) and new (after 2010) databases. For example, this is the case in the southwestern Baltic Sea, where the relative influence of data from Denmark to overall trends is higher. However, based on HELCOM Secretariat comparisons between regional datasets including either old or new Danish data for the years 2010–2012, the effect of the revision on regional trends can be considered minor Baltic wide, but also within all sub-regions.

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2. Ship traffic in the Baltic Sea

To get a full picture of the shipping safety in the Baltic Sea, basic information on the intensity of shipping is of importance. IMO regulations (i.e. SOLAS) require Automatic Identification System (AIS) transponders to be fitted on board all ships of 300 GT and above engaged in international voyages, cargo ships of 500 GT and above not engaged in international voyages, as well as all IMO registered passenger ships irrespective of size. The AIS enables the identification of the name, position, course, speed, draught and main ship types.

In the Baltic Sea area movements of ships are gathered in the regional HELCOM AIS network and database launched in 2005. The intensity of traffic based on the HELCOM AIS data is illustrated in Figure 1.

The ship movements can also be illustrated by the number of ships crossing the pre-defined statistical lines as presented in Figure 2 (according to the ship types).

In the previous HELCOM reports on shipping accidents in the Baltic Sea area, the figures regarding the number of ships crossing the lines were generated by a tool made available by the Danish Maritime Authority. The HELCOM Secretariat is now producing these figures, more information and the scripts can be found on the HELCOM GitHub page (https://github.com/helcomsecretariat). The data is available on the HELCOM Map and Data Service.

Figure 3 on the two next pages is illustrating the number of ships crossing each line.

The overall ship traffic in 2014-2017 was stable in terms of intensity compared to the previous years with roughly 295 000 visits to the ports of the Baltic Sea region in 2015, defined as entering and exiting a port with at least 10 minutes spent inside the port. While passenger ships make up almost half of the port visits (mainly due to frequent connections between cities in the region), about 68 % of the IMO-registered ships navigating in the Baltic Sea are classified in the ship type cargo (3778 cargo ships in 2015). Tankers are representing 22 % of the fleet operating in the Baltic Sea region, passenger ships - 5.4 %, service ships – 5.2 %, container ships – 4.3 %, fishing ships – 4.1 %, RoRo cargo – 3.1 % and other ships – 7.4 %. The dominance of the cargo ships can also be represented with the distance sailed in the Baltic Sea area (cf. Figure 4).

Shipping in the Baltic Sea based on AIS data, data on shipping accidents and other relevant data collected under the HELCOM framework has been visualized in a movie to be found on the HELCOM web page.

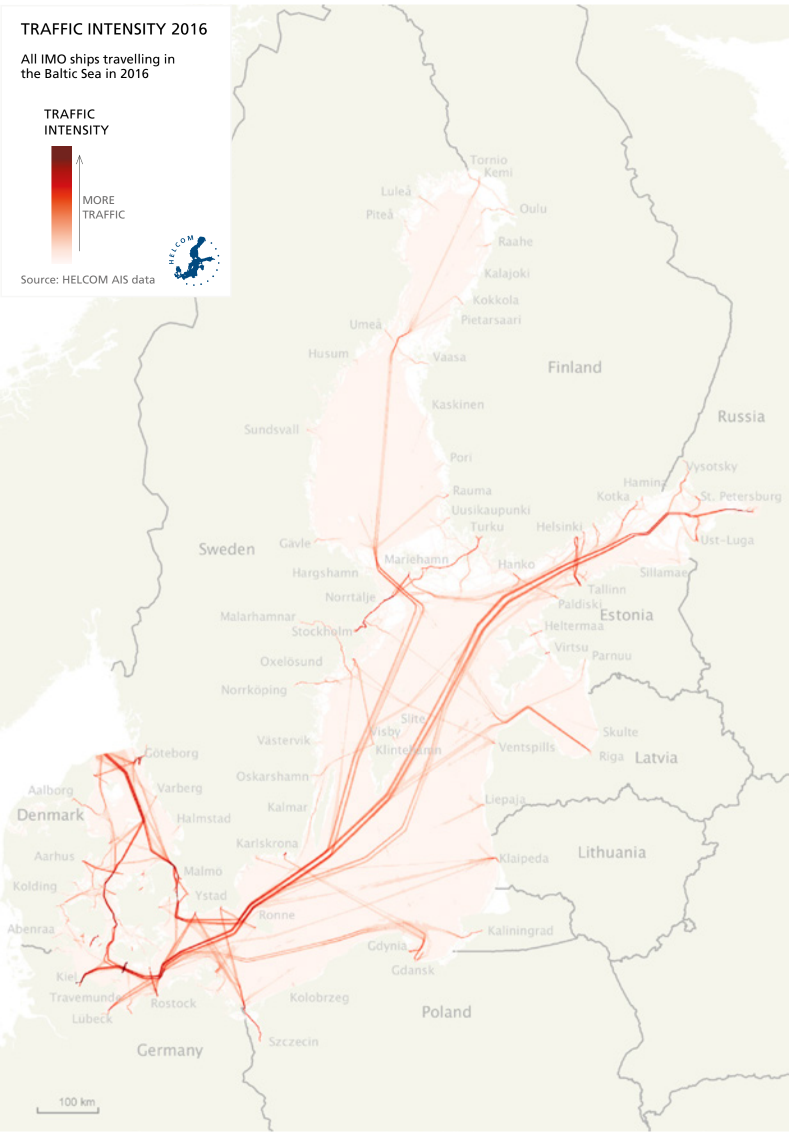

Figure 1: Traffic intensity in the Baltic Sea Region in 2016

Line	Name of the location
1	Skaw
2	The Great Belt East Bridge
3	Sundet Syd
4	Langeland East
5	Kadet Fairway
6	North of Bornholm
7	South of Bornholm
8	West of Gotland
9	East of Gotland
10	Irbe Strait
11	Gulf of Finland
12	Åland West
13	Åland East
14	Bothnian Sea

Figure 2: Location of the predefined crossing lines.

Figure 3: Number of ships crossing predefined passage lines based HELCOM AIS data.

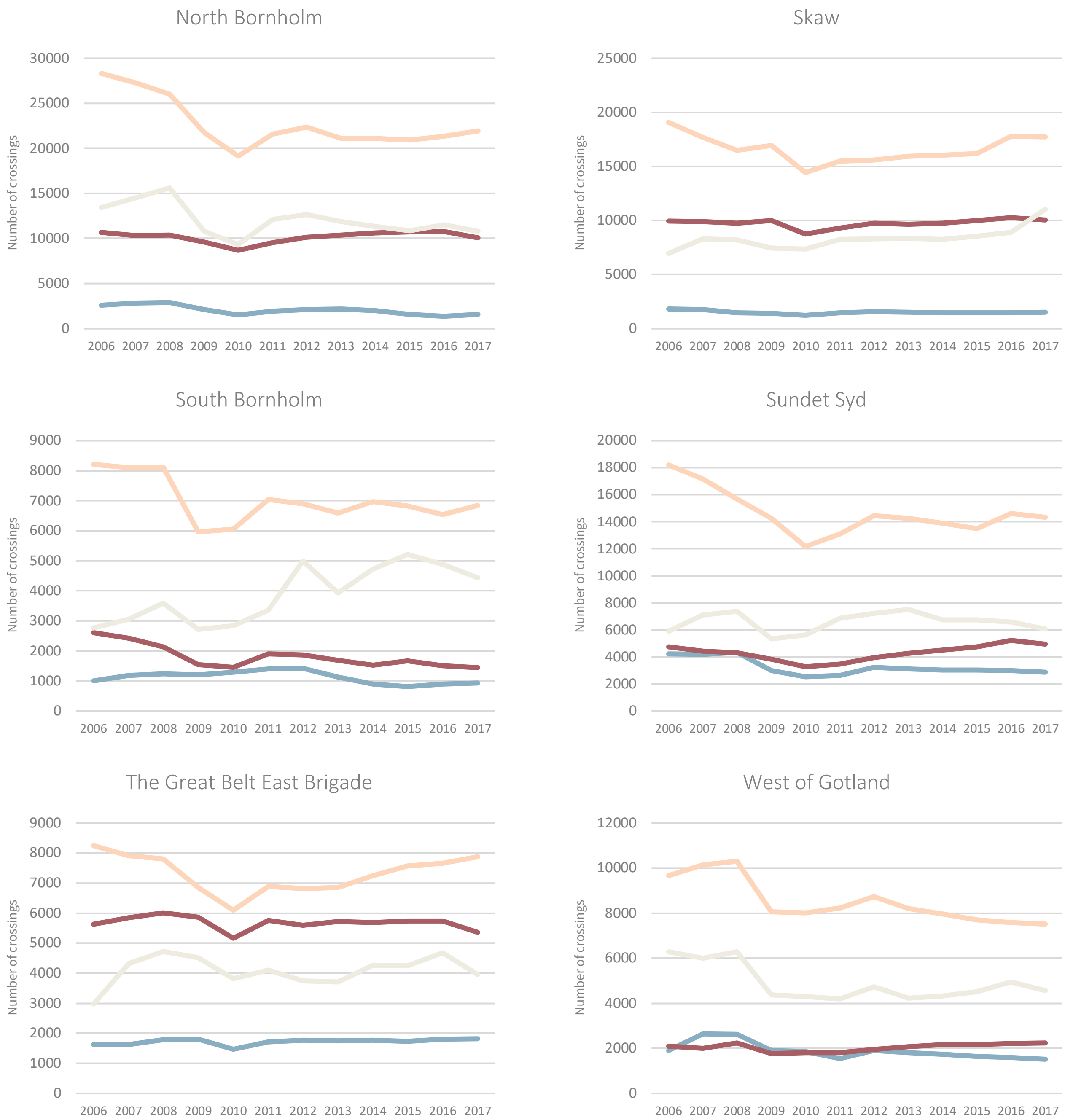

Figure 3 (continued): Number of ships crossing predefined passage lines based HELCOM AIS data.

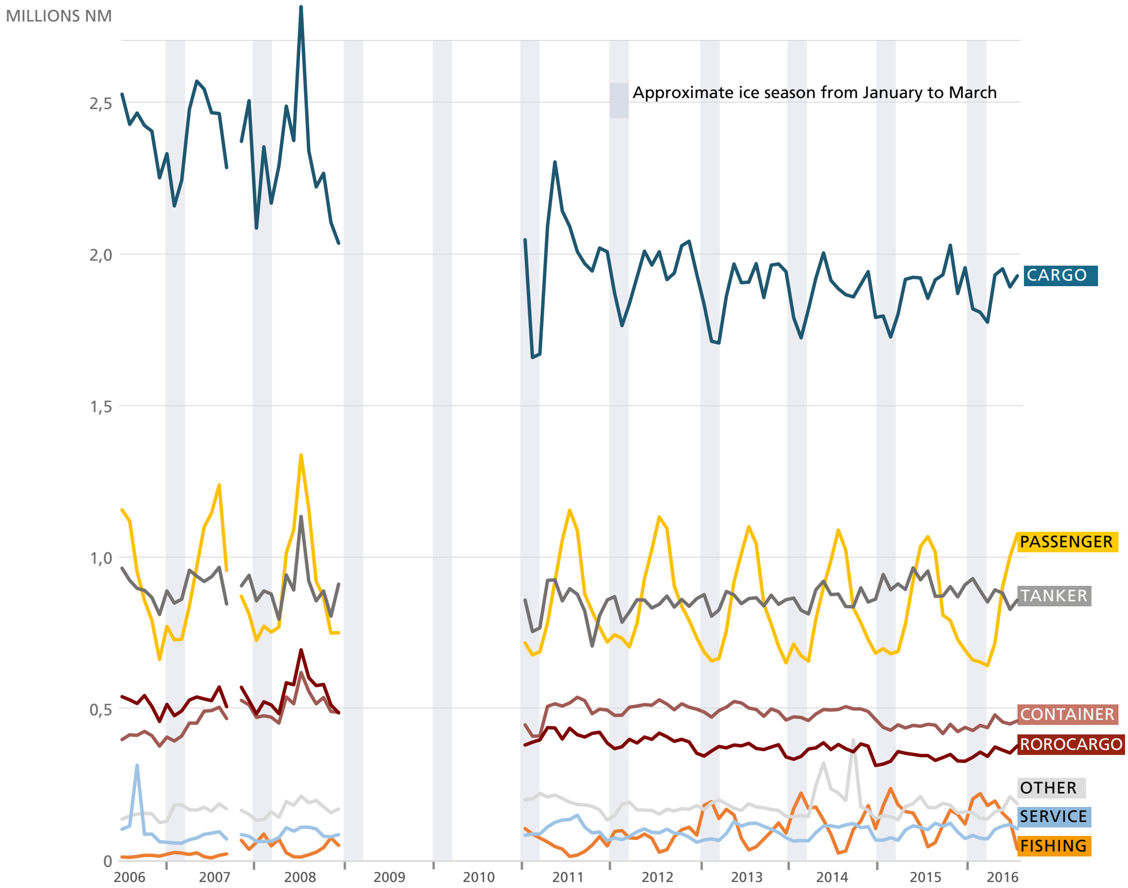

Figure 4: Distance sailed in the Baltic Sea per ship type.
Monthly figures from July 2006 to July 2016. (Source: HELCOM 2018)

3. Overview of accidents in the Baltic Sea

According to the reports from the HELCOM Contracting Parties more than 600 ship accidents occurred in the Baltic Sea area between 2014 and 2017: 163 reported in 2014, 184 in 2015, 131 in 2016, 139 in 2017 (cf. Figure 5).

A detailed categorization of the location of the accidents – open sea, port approach and port - was introduced for the reporting in 2012 (cf. Figure 6). Around one third of the accidents between 2014 and 2017 occurred in the ports (226 accidents, 36.7 %). The open sea is the second location where the accidents happened the most with 175 events (28.4 %). However the location was not specified for 18.6 % of the accidents (115 events). The spatial distribution of the reported accidents in 2014-2017 is presented in Figure 7 on the next page.

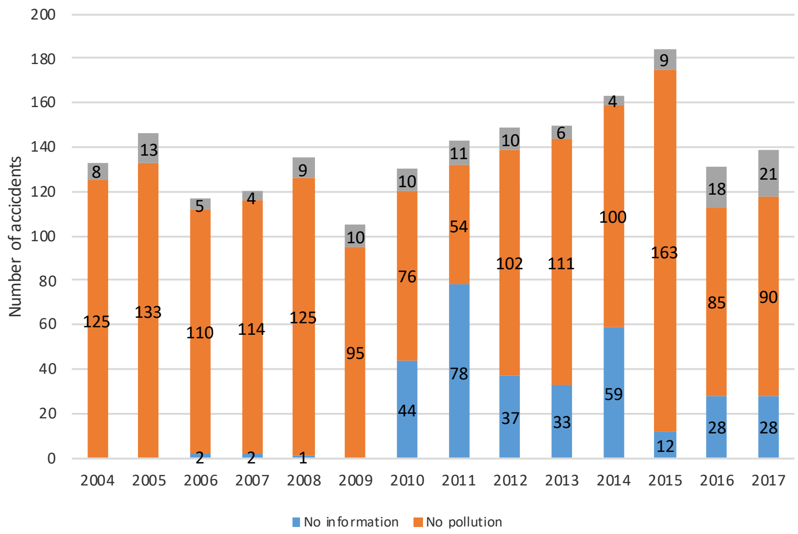

Figure 5: Number of reported accidents in the Baltic Sea

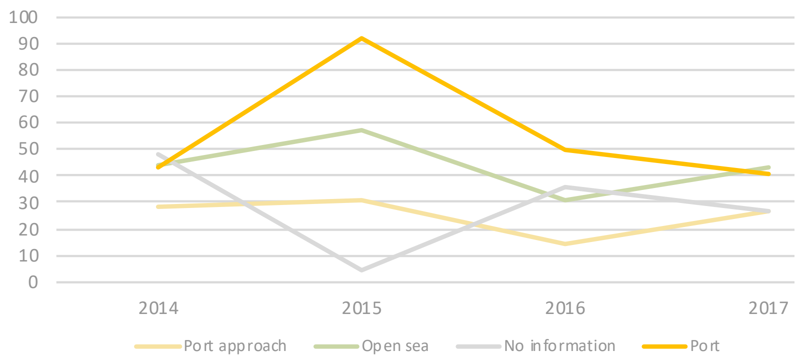

Figure 6: Location of the accidents or the period 2014 to 2017

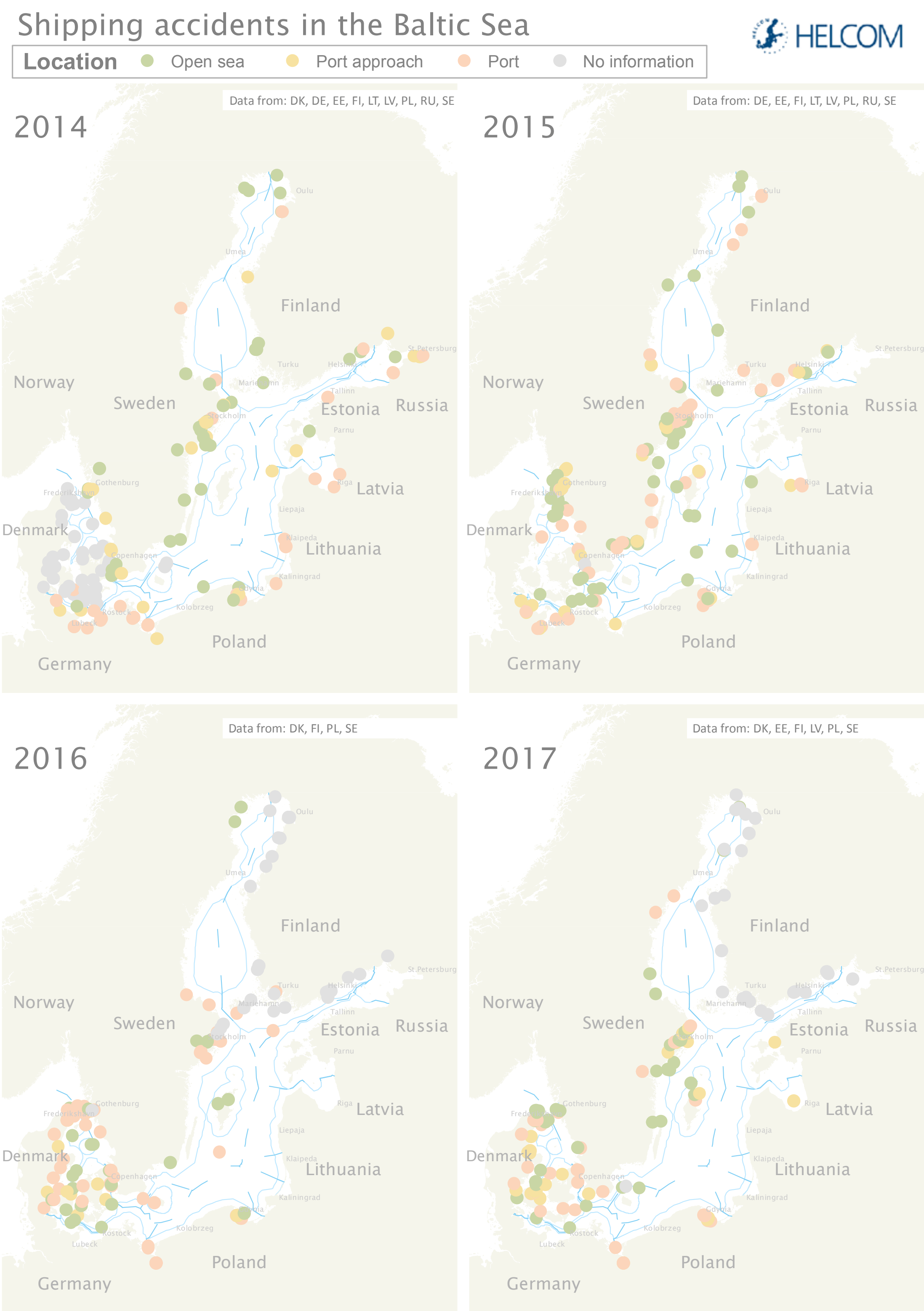

Figure 7: Location of shipping accidents in the Baltic Sea (if no accidents are displayed in certain national waters, the reason can be either no accident occurrence during the period 2014 to 2017, or lack of data).

4. Types of accidents

Table 1: Definition of the accident type "other"

Other reason
Accidents with life-saving appliances
Capsizing/listing
Damage to ship or equipment
Door fault / fault in doorways
Flooding/Foundering
Physical damage
Related to the use of rescue equipment
Sunk
Technical failure
Tilt / crash
Hull failure/failure of watertight doors/ports etc.
Loss of control
Other reason

Due to modification of the reporting format in 2012, the category "contact", as a type of accident, was included in the reporting, defined as striking any fixed or floating object other than ships or underwater objects (wrecks etc.). In previous reports "collisions" accounted for both collisions with ships and objects. In order to retain comparability both "collision" and "contact" accidents will be referred to as "collisions" in following text.

Collisions were the main type of accidents in 2014-2017 accounting for almost 32 % of the accidents in total (cf. Figure 8). Groundings or strandings (hereafter referred to only as groundings) accounted for 153 events or 24.8 % of the accidents. Machinery damage caused accidents in 92 cases or 14.9 %. Also other types of accidents such as damage to ship or to the equipment, fires or explosions and other in total made up about one third of all accidents during the period 2014-2017.

The type of accidents qualified as "other" can be defined following the information in Table 1 below.

The spatial distribution of different types of reported accidents in the Baltic Sea area is presented in Figure 9 on the next page.

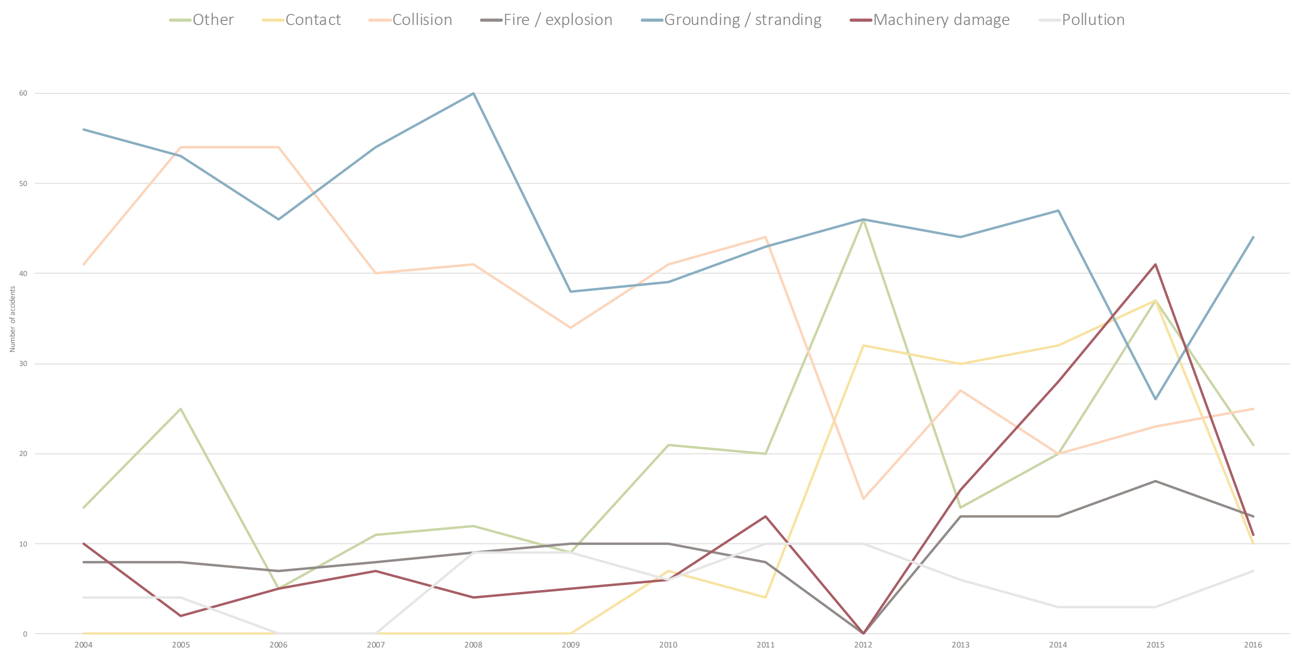

Figure 8: Types of accidents in the Baltic Sea

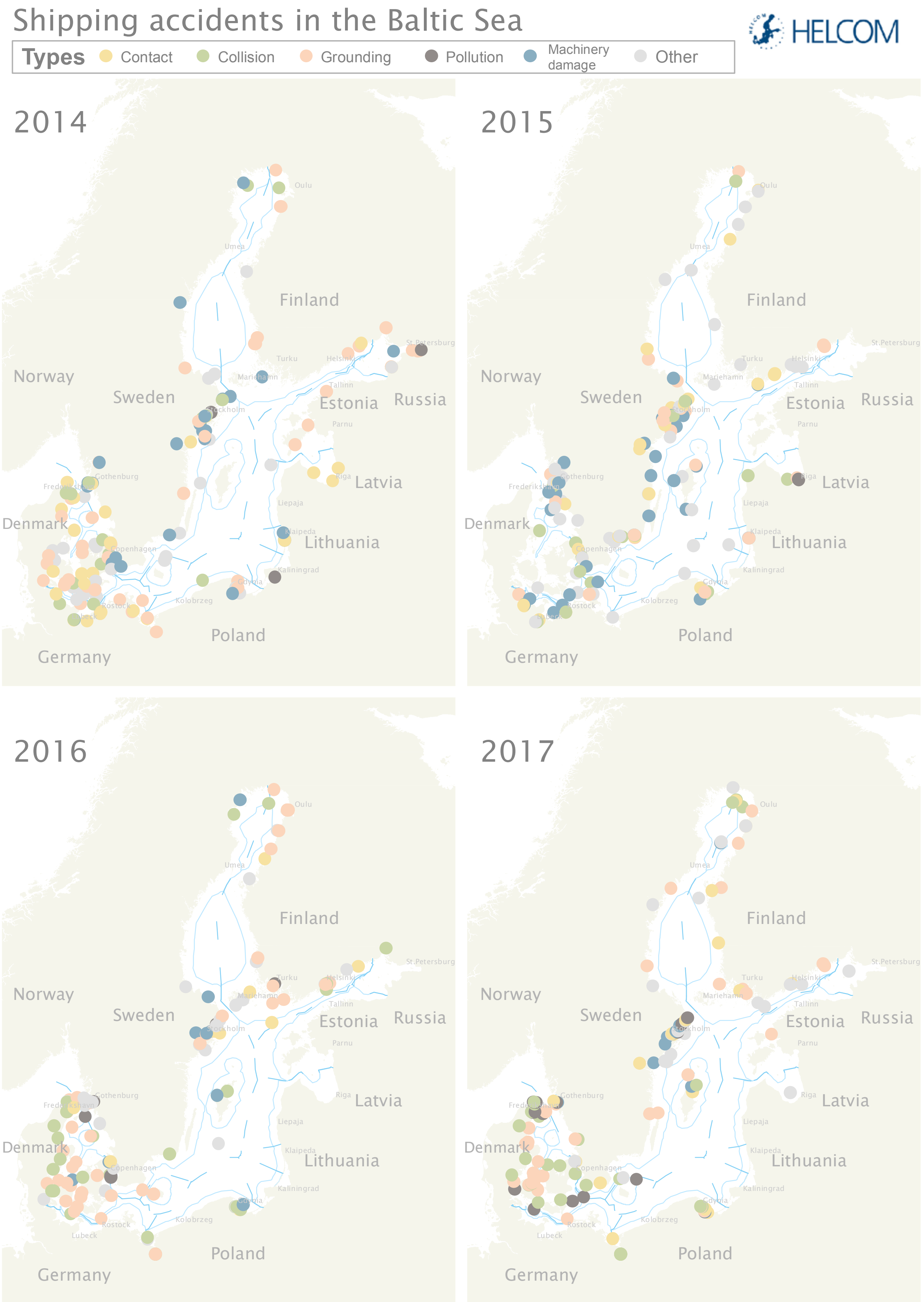

Figure 9: Types of shipping accidents in the Baltic Sea (if no accidents are displayed in certain national waters, the reason can be either no accident occurrence during the period 2014 to 2017, or lack of data).

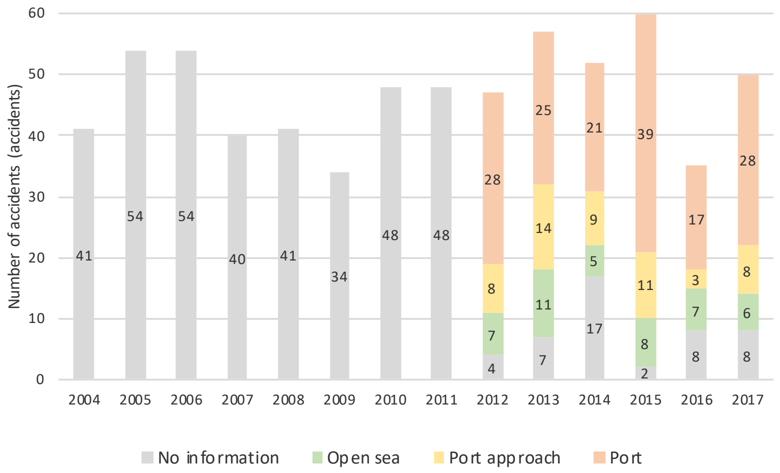

Figure 10: Location of ship collisions in the Baltic Sea

Figure 11: Types of collisions

Table 2: Definition of the types of collisions

With vessel	With object	Other reasons
With another vessel	Buoy	Loss of containment
With multiple vessels	Dry dock	Loss of directional control
	Fixed object	On the fairway slope
	Object	other (unsealing the vessel's hull)
	Bridge	Ship not underway
	Pier, quay	Drift
	Sluice	Explosion
	Breakwater	Fire
	Berth	Flooding
		Loss of electrical power
		Loss of propulsion power
		Power

4.1. Collisions

Collisions have been the most common type of shipping accidents in 2014-2017. There were 197 collisions in total in this period (cf. Figure 9) or 32 % of all accidents (48 % contact, 52 % collision): 2014 – 52, 2015 – 60, 2016 – 35, 2017 - 50. In 2013 collisions accounted for 38 % of all accidents (57 cases in total: 30 - collision, 27 - contact). There was a slight decrease in the number of collisions in the period 2014-2017 (on average) compared to 2013.

Collisions with vessels and contact with objects accounted for an almost equal share of all collision accidents in the period 2014-2017, 51 % and 49 % respectively. The collisions with objects corresponds to the number of accidents categorized as contact accidents (cf. Figure 10). The main types of collisions are: with vessel, with object, with vessel and object, contact and other. Of the total number of collision following were the principal: collisions with pier/quay, contacts, collisions with fixed objects, fires and other types. Of the contact accidents about one two thirds were contacts with an object and one third – contacts with other ship.

Following the shipping accidents information received from the HELCOM Contracting Parties, the merging of some types of collisions was necessary in order to produce Figure 11: The detail of the collisions with vessel, with object and other reasons are available in Table 2.

The spatial distribution of the reported collisions and contact accidents in the Baltic Sea area is presented in Figure 12 (next page).

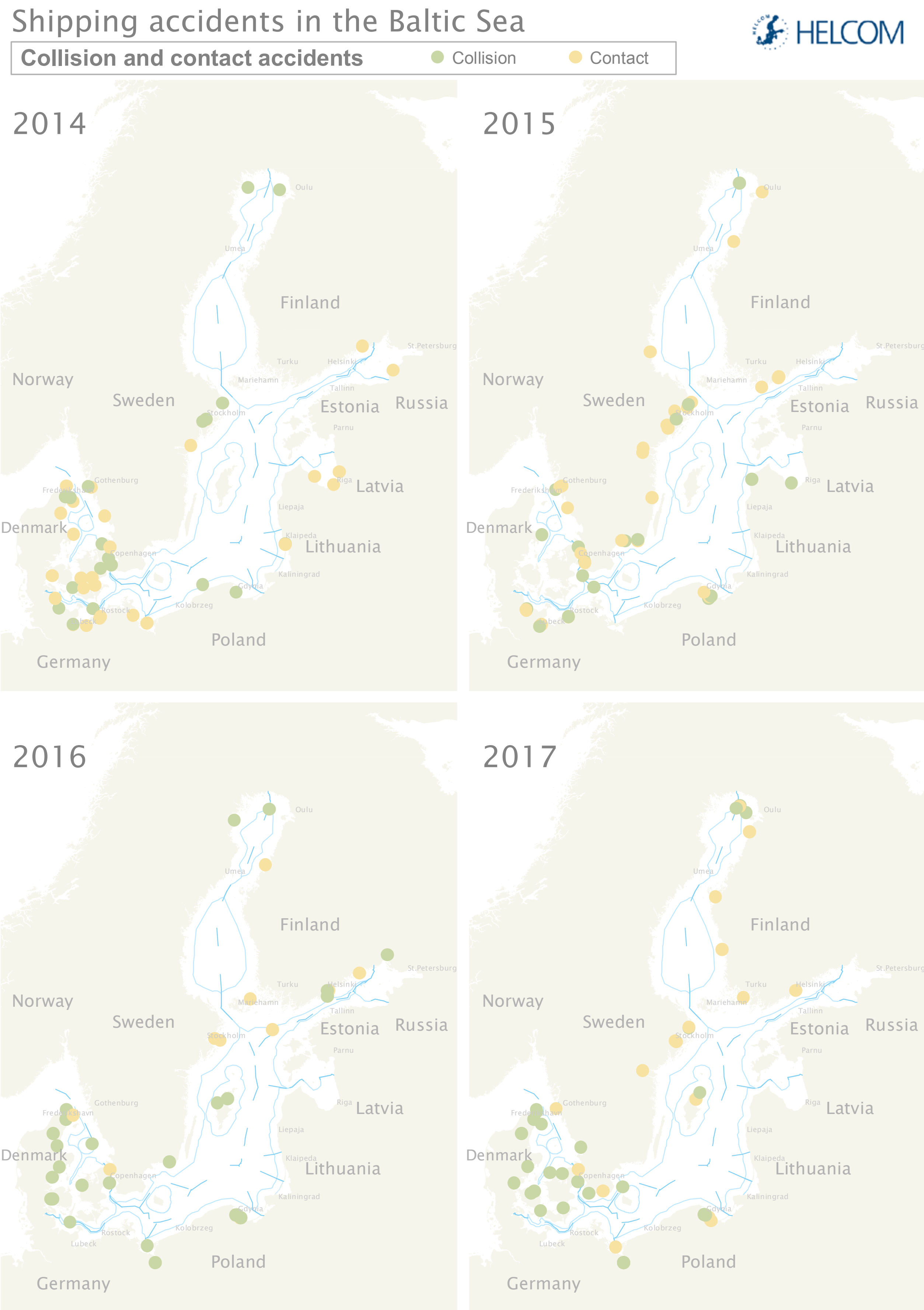

Figure 12: Collision and contact accidents in the Baltic Sea (if no accidents are displayed in certain national waters, the reason can be either no accident occurrence during the period 2014 to 2017, or lack of data).

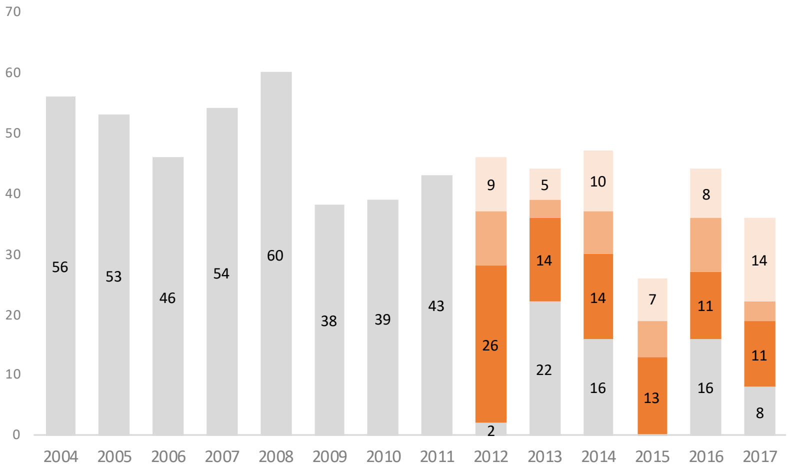

Figure 13: Location of the grounding accidents

4.2. Groundings

In the period 2014-2017, there were 153 reported groundings or strandings (hereafter referred to as groundings) in the Baltic Sea area accounting for 24.8 % of the total number of reported accidents in 2014-2017. The groundings are generally occurring during when ships are approaching the ports or in open sea (cf. Figure 10).

Figure 14 below illustrates the presence or absence of pilot on board vessels in cases of grounding accidents from 2014 to 2017. It is clear that accidents usually happen when there is no pilot on board the ship to assist the crew when approaching a port or manoeuvring in the port.

For the period 2014 – 2017, most of the reported groundings occurred with vessels with a draught of less than 7 metres (cf. Figure 15). It is important to note that small vessels are not covered by the IMO's recommendations on the use of pilotage.

The spatial distribution of the reported collisions and contact accidents in the Baltic Sea area is presented in Figure 16 (next page).

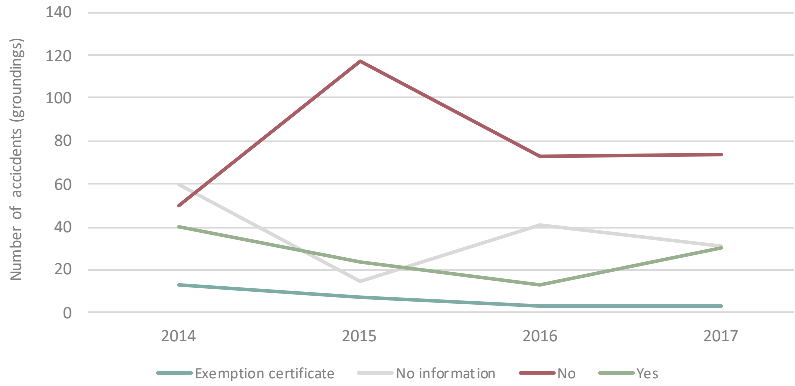

Figure 14: Presence of pilots during groundings

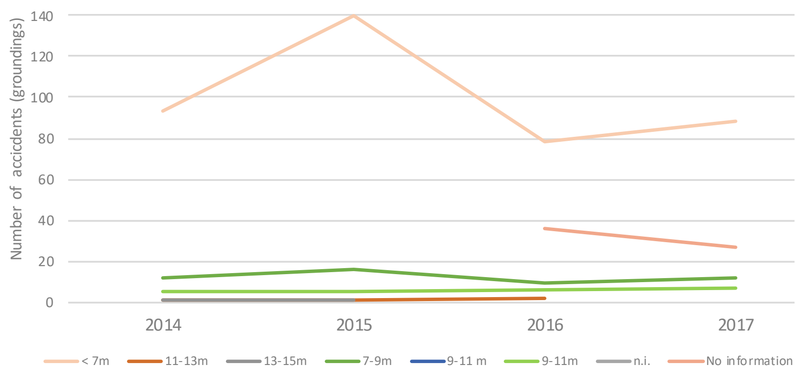

Figure 15: Draught of ships involved in groundings in the Baltic Sea (number of accidents per year)

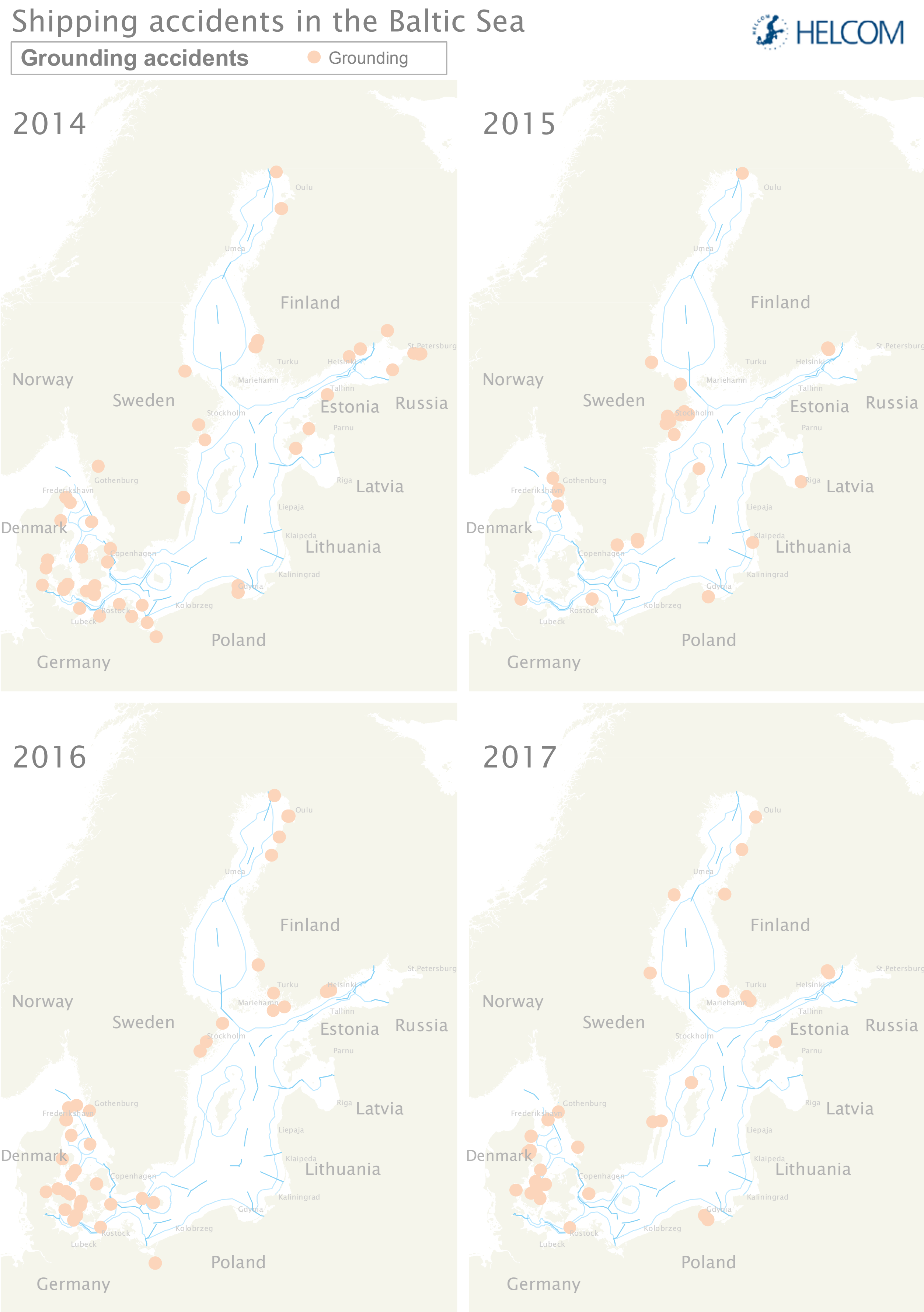

Figure 16: Grounding Accidents in the Baltic Sea (if no accidents are displayed in certain national waters, the reason can be either no accident occurrence during the period 2014 to 2017, or lack of data).

5. Types of vessels involved

Cargo and passenger vessels were the most common type of ships involved in accidents of all vessels in the period (7). In 2014 cargo vessels accounted for 46.5 % and passenger vessels were involved in 28 % of all reported accidents. In 2015, the number of cargo vessels involved in accidents considerably decrease to 20 % while the number of accidents with passenger vessels increased to 42 %. In 2016 cargo vessel accidents increased to 32 % while accidents involving passenger vessels were reduced to 33 %. Finally, in 2017 the number of accidents with cargo vessels fell slightly to 30 % and passenger vessels also presented a fall of 30 %. Other types of vessels such as ice breakers, barges, tugboats and research vessels were involved in less than 15 % of all accidents for the period 2014-2017.

Concerning the spatial distribution of the accidents by vessel types, Figure 18 on the next page presents the distribution for the years 2014, 2015, 2016 and 2017. From the figure it can be observed that the Danish Strait and the area near Stockholm present a high concentration of accidents in the different analysed years.

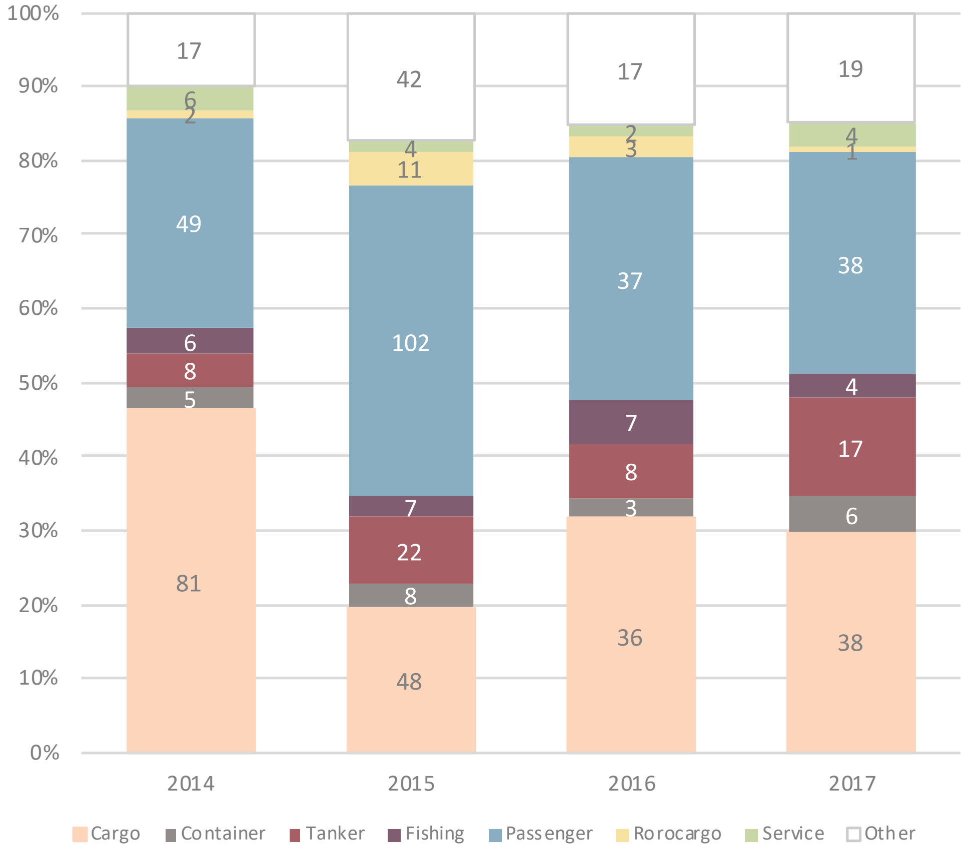

Figure 17: Type of ships involved in accidents

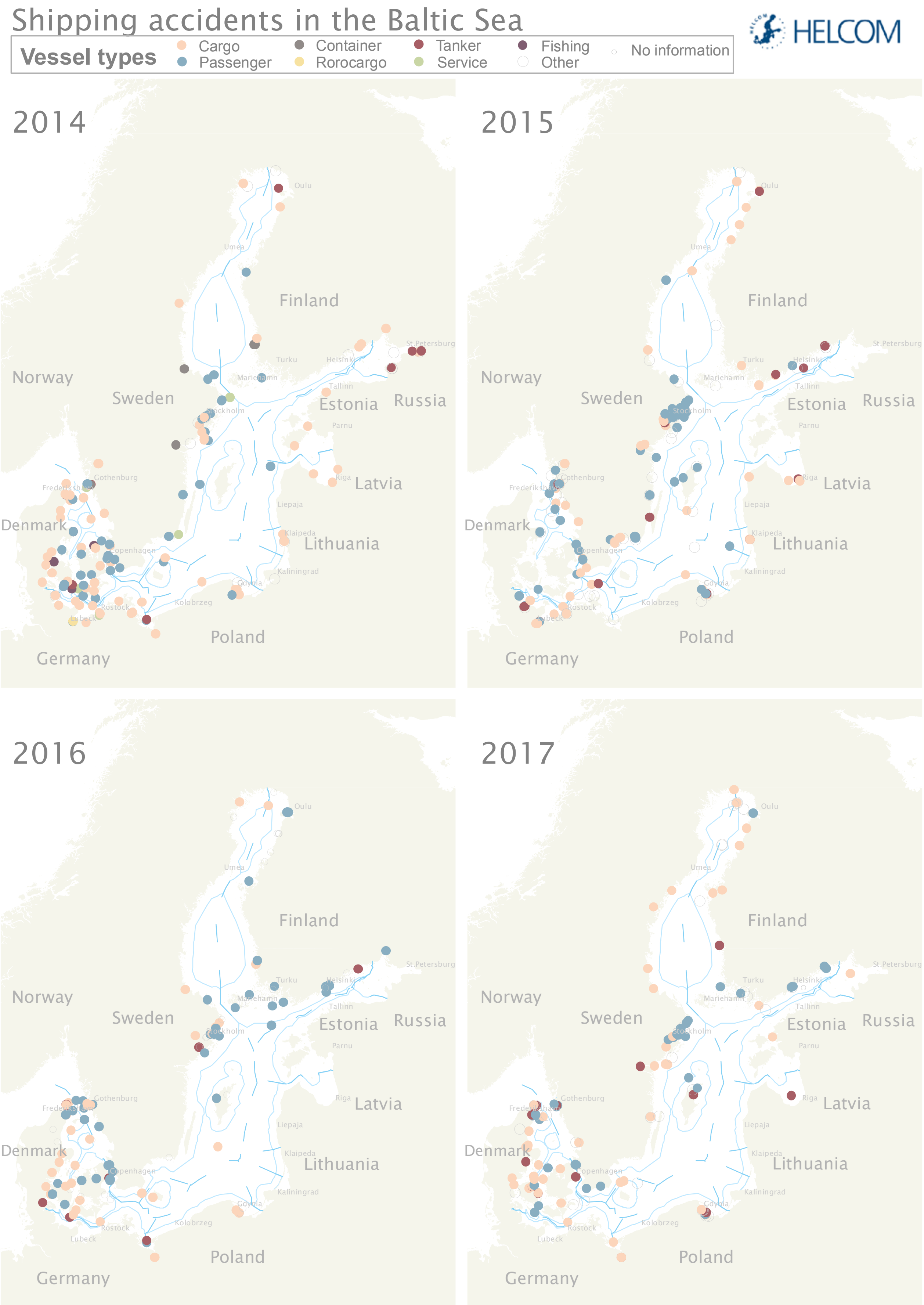

Figure 18: Types of vessels involved in accidents (if no accidents are displayed in certain national waters, the reason can be either no accident occurrence during the period 2014 to 2017, or lack of data).

6. Cause of accidents

For the period 2014 to 2017, the accidents were mainly caused by human element followed by technical failures, as can be observed in Figure 19. The year 2015 presented the highest recorded number of accidents, with a considerable raise in the following causes: human element, external causes, structural failure and other causes.

The causes of the accidents were reported by the HELCOM Contracting Parties. External causes are related to a factor that is not directly linked to the ship or the crew. For example, environmental conditions and surroundings can be counted as external causes.

The spatial distribution of accidents with indication of the cause of the accidents for the period is presented in 20 per year.

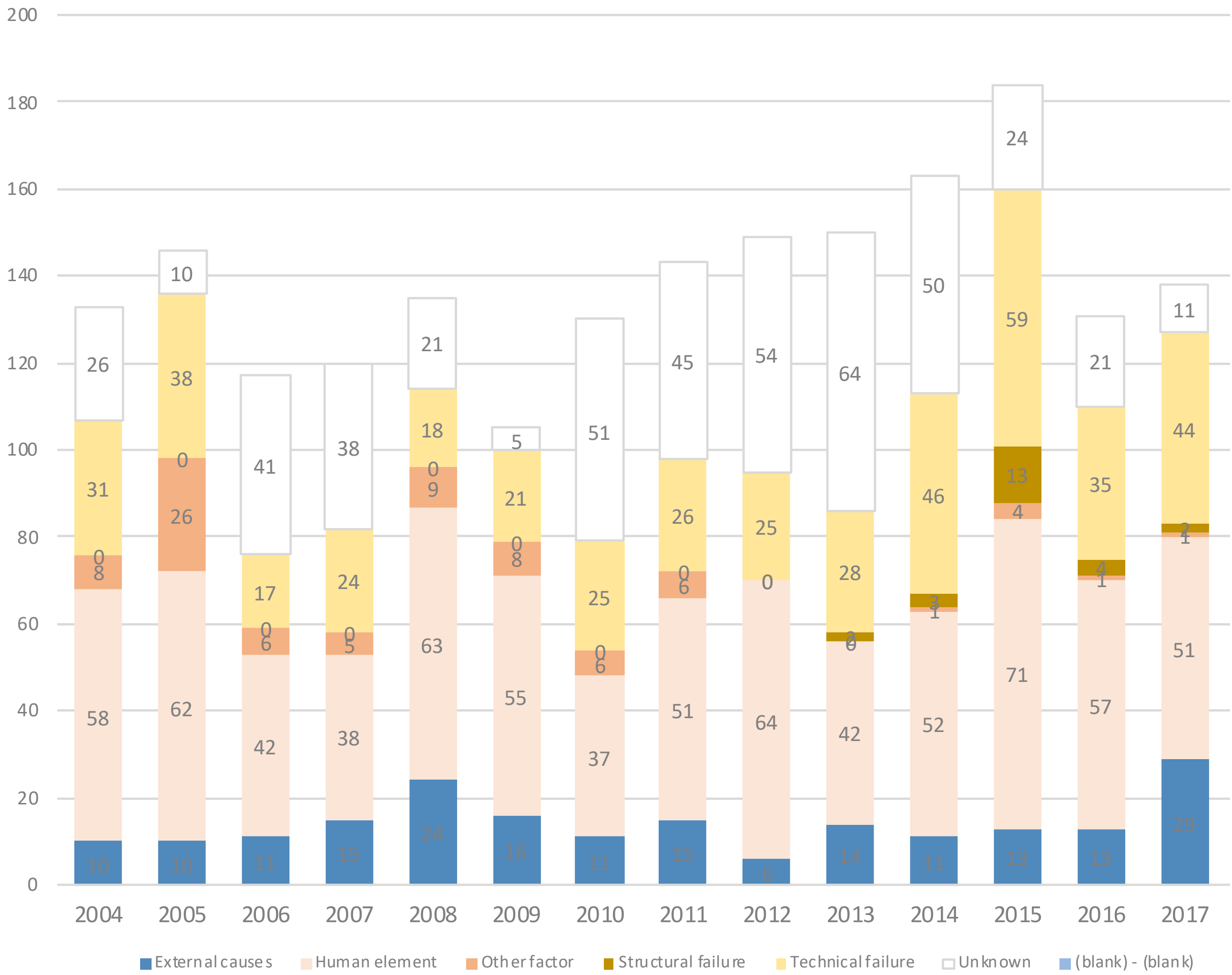

Figure 19: Cause of the shipping accidents

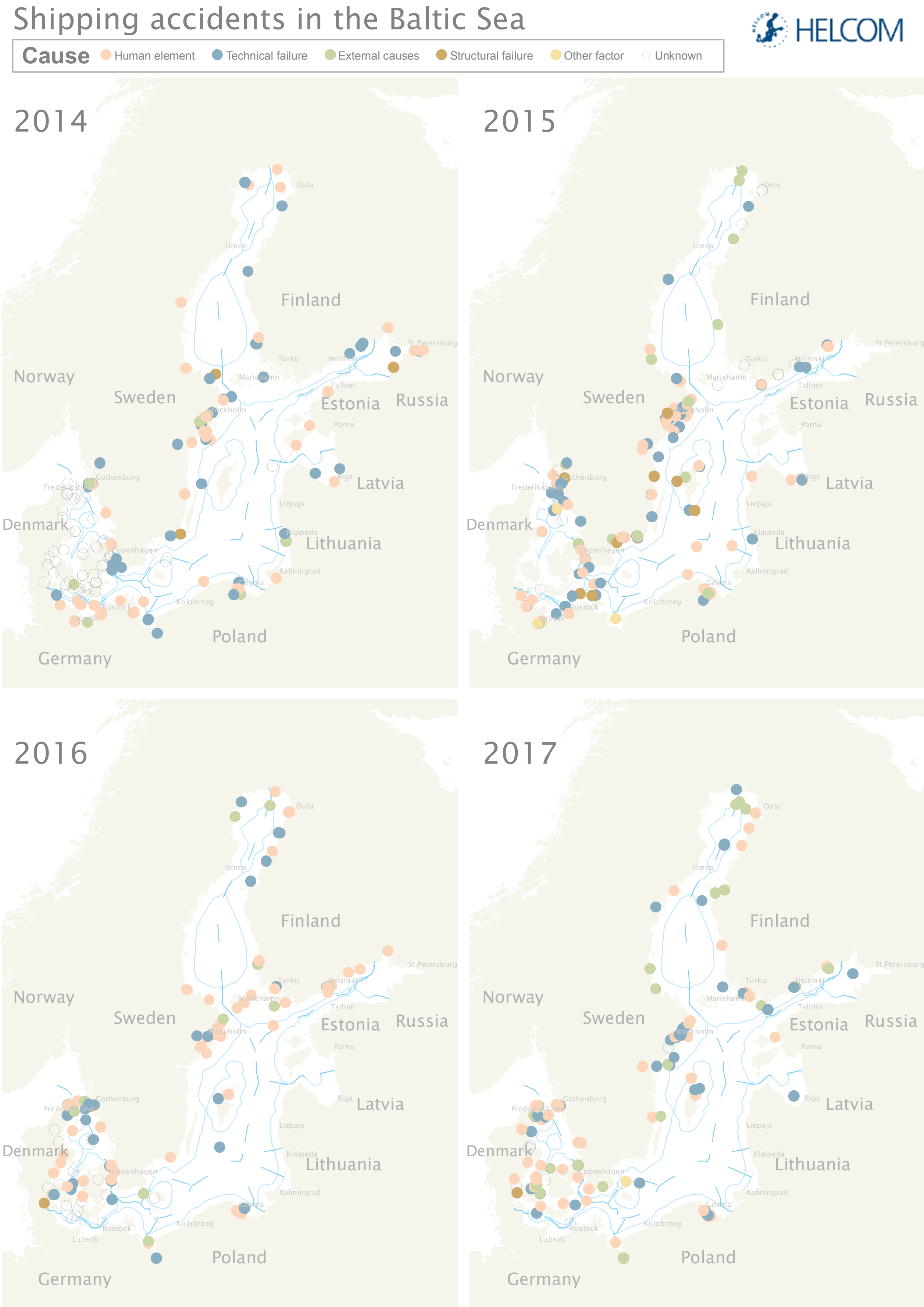

Figure 20: Cause of the accidents in the Baltic Sea (if no accidents are displayed in certain national waters, the reason can be either no accident occurrence during the period 2014 to 2017, or lack of data).

7. Accidents with pollution and response activities

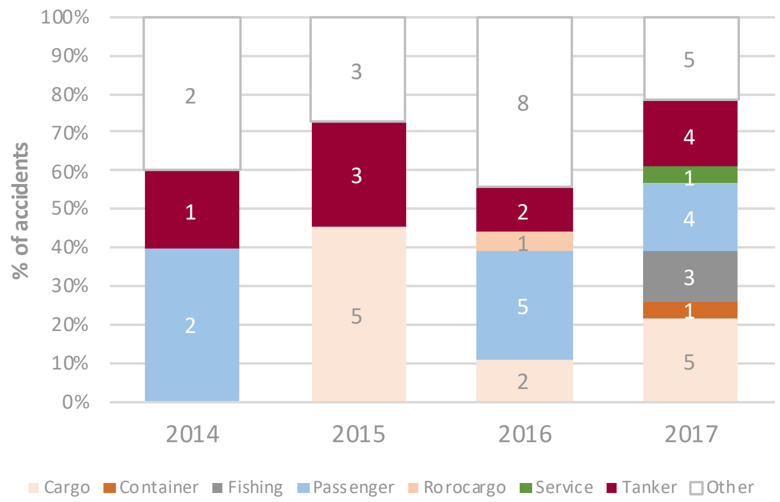

Figure 21: Types of ships involved in pollution accidents in the Baltic Sea

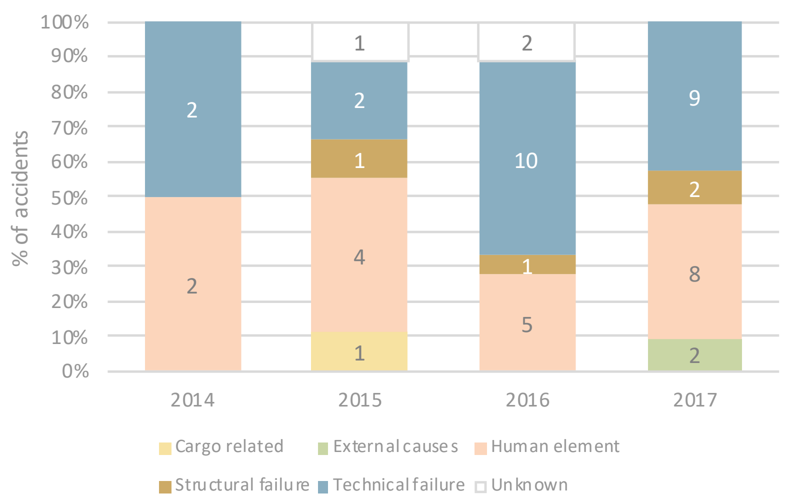

Figure 22: Cause of accidents resulting in pollution in the Baltic Sea

7.1. Accidents with pollution

According to the 2014-2017 data, 9,2 % of the reported accidents ended up with some kind of pollution. The type of vessels involved in pollution accidents in the period varied along the years, as observed in the figure 21. In 2014, the reported accidents were related to passenger ships, tankers and other ships, respectively. In 2015, cargo vessels, tankers and other ships were registered. In 2016, accidents involving passenger vessels, tankers, RoRo cargo, cargo and other vessels were observed. Finally, in 2017, accidents resulting in pollution with passenger vessels, tankers, fishing vessels, cargo vessels, containers vessels, service vessels and other classifications were registered.

The main cause of the pollution accidents was human element but also technical failure (cf. Figure 22).

The spatial distribution of the accidents resulting in pollution for the period is presented in Figure 23 on the next page.

Special characteristics such as low salinity, small water volume, restricted connection to the ocean, seasonality and the ice cover during winter make the Baltic Sea highly vulnerable to the effects of oil spills which makes swift response very important. Intensive regional cooperation in the field of response and preparedness to spills in the Baltic Sea has been carried out within HELCOM since the 1970s (HELCOM Response Working Group). Due to such cooperation efforts the oil recovery rate in the Baltic Sea is generally much higher than the global average and, as proved by previous pollution accidents of regional importance, it can reach as much as 50 %.

7.2. Response activities

Response activities in the Baltic Sea region have been reported by the Baltic Sea states following a request by the Secretariat. Only two countries submitted information for 2017, therefore Table 3 below may not include all response activities that took place in the Baltic Sea area in 2016 and 2017.

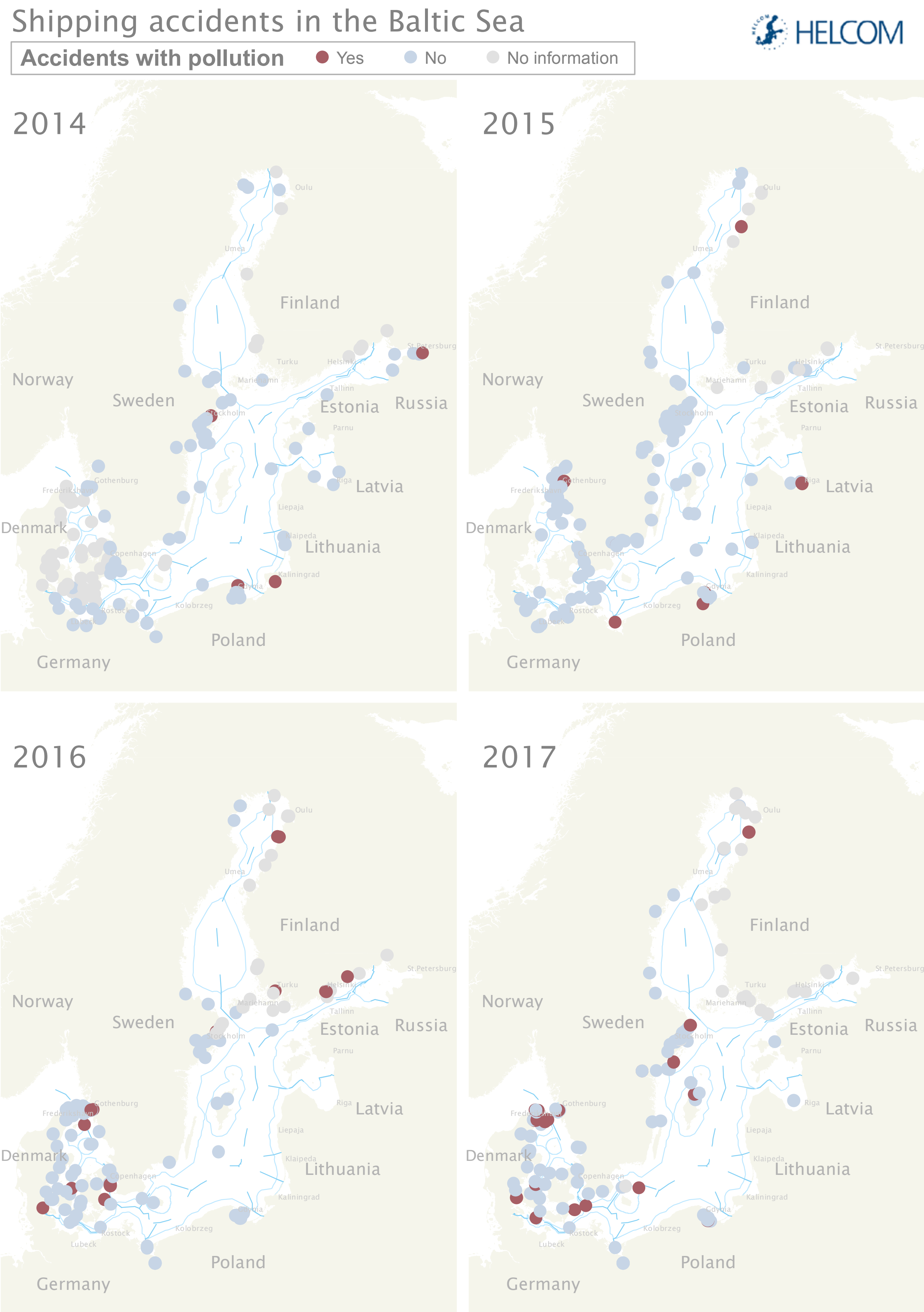

Figure 23: Shipping accidents with pollution in the Baltic Sea (if no accidents are displayed in certain national waters, the reason can be either no accident occurrence during the period 2014 to 2017, or lack of data).

8. Annexes

Table 1: Reported response activities in the Baltic Sea area

Country	Year	Date (dd.mm.yyyy)	Time (hh:mm)	Place	Latitude (DD)	Longitude (DD)	Source	Type of pollution	Amount of pollution (m3)	Amount recovered at sea (m3)	Responsible organization	Further details
Denmark	2017	03.02.2017	11:18	Odense Fjord	55,4715	10,534667	Shipyard	Gasoil	0,3		Odense Port	Oil evaporated
		25.08.2017	9:15	Kattegat	57,427	11,246167	Vessel aground	Gasoil	0,5		Maritime Assistance Services +45 72850370	Oil evaporated
		31.08.2017	18:19	Bandholm Port	54,838333	11,4905	Spil from shore	Rapssead oil	0,5	0,5	Bandholm Port	
		07.09.2017	10:48	Åbrnrå Port and Ford	55,0385	9,424833	Spil from shore instalation	Gasoil	200	0	Aabenraa Port, Maritime Assistance Services +45 72850370	Oil evaporated and collected
		23.11.2017	12:41	Kattegat	57,368333	11,105	Spil from vessel	Heavy fuel	0,5	0,2	Maritime Assistance Services +45 72850370	
Estonia		7.2.2017		at sea	58° 38\`	21°16\`	ship	oil	0,3	0	0	0
		19.3.2017		at sea	59° 30\`	23° 48\`	ship	oil	8,3	0	0	0
		20.9.2017		at sea	59° 30\`	24° 18\`	ship	oil	0,63	0	0	0
		27.9.2017		at sea	59° 4\`	21° 23\`	ship	oil	0,41	0	0	0
		7.11.2017		at sea	57° 54\`	21° 17\`	ship	oil	0,27	0	0	0

Annex 1

Guideline for filling-in the HELCOM Reporting Format on Shipping Accidents (as of September 2016).

All accidents including, but not limited to grounding, collision with other vessel or contact with fixed structures (offshore installations, wrecks, etc.), disabled vessel (e.g. machinery and/or structure failure), fire, explosions, etc., which took place in territorial seas or EEZ of the Contracting Party and involved any ships which are required to carry AIS should be reported to the HELCOM Secretariat using the agreed reporting format, irrespectively if there was pollution or not.

The reporting format is provided as an excel file and includes the following information entries. The predefined entries should be used!

Country	Country in whose water the accident took place	
Year	Year of accident	
Date (dd.mm.yyyy)		
Time (hh:mm)		
Latitude (DD)	Please provide latitude in decimal degrees, e.g. 57.123	
Longitude (DD)	Please provide longitude in decimal degrees, e.g. 18.456	
Location of accident	Fixed answers; please choose from: **"Port"**, **"Port approach"**, **"Open sea"** or **"n.i."** (no information available). The category "Open sea" covers all accidents at sea i.e. not defined as "Port" or "Port approach". Categories are used only for the purpose of statistics and are too be defined according to national practice of the reporting authority.	
Ship 1	Ship 1 name, ID, flag	
	Ship 1 AIS category	Fixed answers; please choose from: **"Tanker"**, **"Cargo"**, **"Passenger"** or **"Other".**
	Ship 1 type (detail)	Please, provide further details on type of ship, e.g. tanker (oil, chemical, gas tanker), cargo ship (general cargo, bulk carrier, etc) and other ships (icebreaker, tug boat, ro-ro, etc).
	Hull construction (tankers only)	Fixed answers; please choose from: **"Single, hull"**, **"Double hull"**, **"Double bottom"**, **"Double sides"**, **"Mid deck"** or **"Other"** .
	Size (gt)_ship1	
	Draught (m)_ship1	Fixed answers; please choose from**: "< 7m"**, **"7-9m"**, **"9-11m"**, **"11-13m"**, **"13-15m"**, **">15m"** or **"n.i."**.
Ship 2 (if relevant)	Ship 2 name, ID, flag	

Fill this in only if accident involved two ships, e.g. in case of a collision	Ship 2 AIS category	Fixed answers; please choose from: **“Tanker”**, **“Cargo”**, **“Passenger”** or **“Other”.**
	Ship 2 type (detail)	Please, provide further details on type of e.g. tanker (oil, chemical, gas tanker), cargo ship (general cargo, bulk carrier) and other ships (icebreaker, tug boat, ro-ro etc).
	Hull construction (tankers only)	Fixed answers; please choose from: **“Single, hull”**, **“Double hull”**, **“Double bottom”**, **“Double sides”**, **“Mid deck”** or **“Other”** .
	Size (gt)_ship2	
	Draught (m)_ship2	Fixed answers; please choose from**: “< 7m”**, **“7-9m”**, **“9-11m”**, **“11-13m”**, **“13-15m”**, **“>15m”** or **“n.i.”**.
Type of cargo	If relevant, please specify amount and type of cargo, e.g. people (passengers and crew), oil, dangerous goods, harmful substances, bunker, ballast and empty, other.	
Type of accident	Fixed answers; please choose from: **“Collision”** (striking or being struck by another ship) **“Stranding/grounding”** (being aground, or hitting/touching shore or sea bottom or underwater objects (wrecks, etc.)) **“Contact”** (striking any fixed or floating object other than those included previously) **“Pollution”** (e.g. during fuel transfer) **“Fire or explosion”** **“Hull failure/ failure of watertight doors/ports etc.”** **“Machinery damage”** **“Damages to ships or equipment”** **“Capsizing/listing”** **“Missing (assumed lost)”** **“Accidents with life-saving appliances”** **“Other”**	
Type of collision or contact*(collision and contact accidents only)*	Fixed answers; please choose from: **“With vessel”**, **“With vessel and object”, “With object”** or **“n.i.”**.	

Further details about accident	More detailed information, especially if “Other” was selected in the “Type of accident” column.
Cause of accident	Fixed answers; please choose from: **“Human element”** (violations or error) **“Structural failure”** **“Technical failure”** (machinery/equipment incl. design errors) **“Cargo related”** **“External causes”**(including environment, navigational infrastructure, criminal acts etc.) **“Unknown”**
Human element subcategories	Please provide further details if “Human element” was selected in the previous column. Fixed answers; please choose from: **“Violation”** (deliberate decision to act against a rule or plan) **“Slip”** (unintentional action where failure involves attention) **“Lapse”** (unintentional action where failure involves memory) **“Mistake”** (an intentional action where there is an error in the planning process; there is no deliberate decision to act against a rule or procedure):
Accident in ice conditions	Fixed answers, please choose from: **“Yes”, “No”** or **“n.i.”.**
Crew trained in ice navigation	Fixed answers, please choose from: **“Yes”, “No”** or **“n.i.”.**
Further details on cause of accident	Please, provide further details on cause e.g. hard winds, heavy waves, reduced visibility, etc.
Pilot on board	Fixed answers, please choose from: **“Yes”**, **“No”**, **“Exemption certificate”** or **“n.i.”**.
Offence against rules or regulations	Please, specify e.g. use of pilot, routeing, weather restriction, deficiency of the ship, operation of the ship, COLREG, speed limits, max draft, others.
Damage	Please specify, e.g. lives (crew and passengers), total loss, leakage, others.
Need of assistance	Please specify, e.g. SAR, towing, lightering, salvage, others.
Pollution	Fixed answers; please choose from: **“Yes”**, **“No”** or **“n.i.**.

Amount of pollution (m^3)	
Amount of pollution (tonnes)	
Type of pollution	Please, specify e.g. crude oil, diesel fuel, other.
Consequences/response action	Please, specify e.g. consequences of pollution, response to contamination taken, amount of pollution recovered, etc.
Additional info	Any other relevant information, e.g. needed to evaluate the limitation of data, etc.