FRESHWATER CENTRE

# Recent Development of Oil Pollution Prevention Preparedness - does it meet the current safety level?

## International scientific forum
## ”Gulf of Finland – natural dynamics and anthropogenic impact”
## 17.-18.10.2018, St Petersburg, Russia

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Nord Stream 2
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- Recovery Capacity
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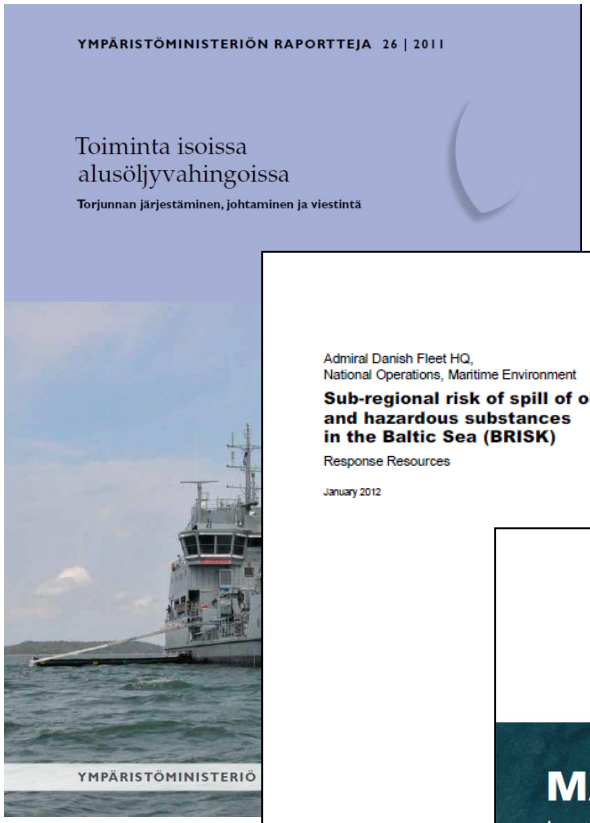




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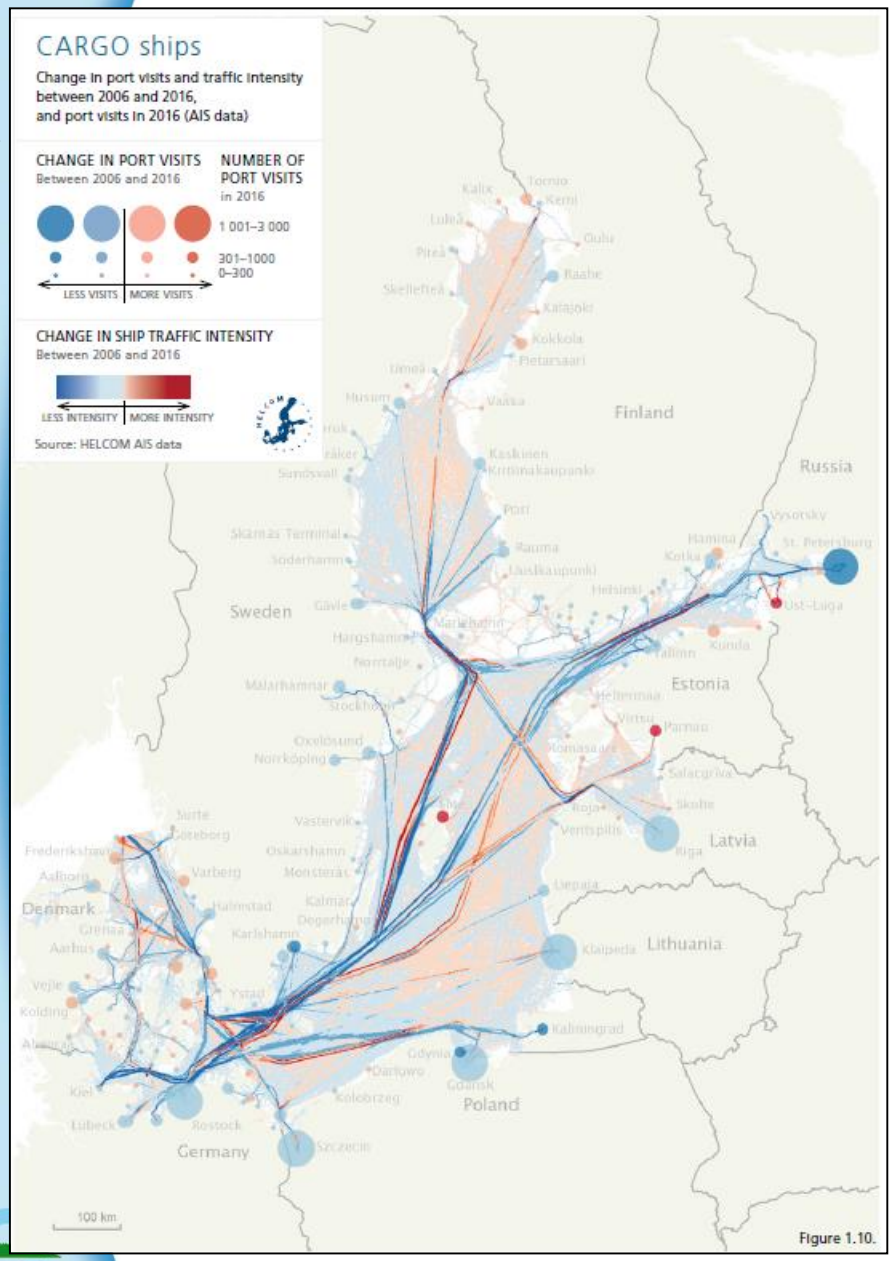


Figure 1.10.

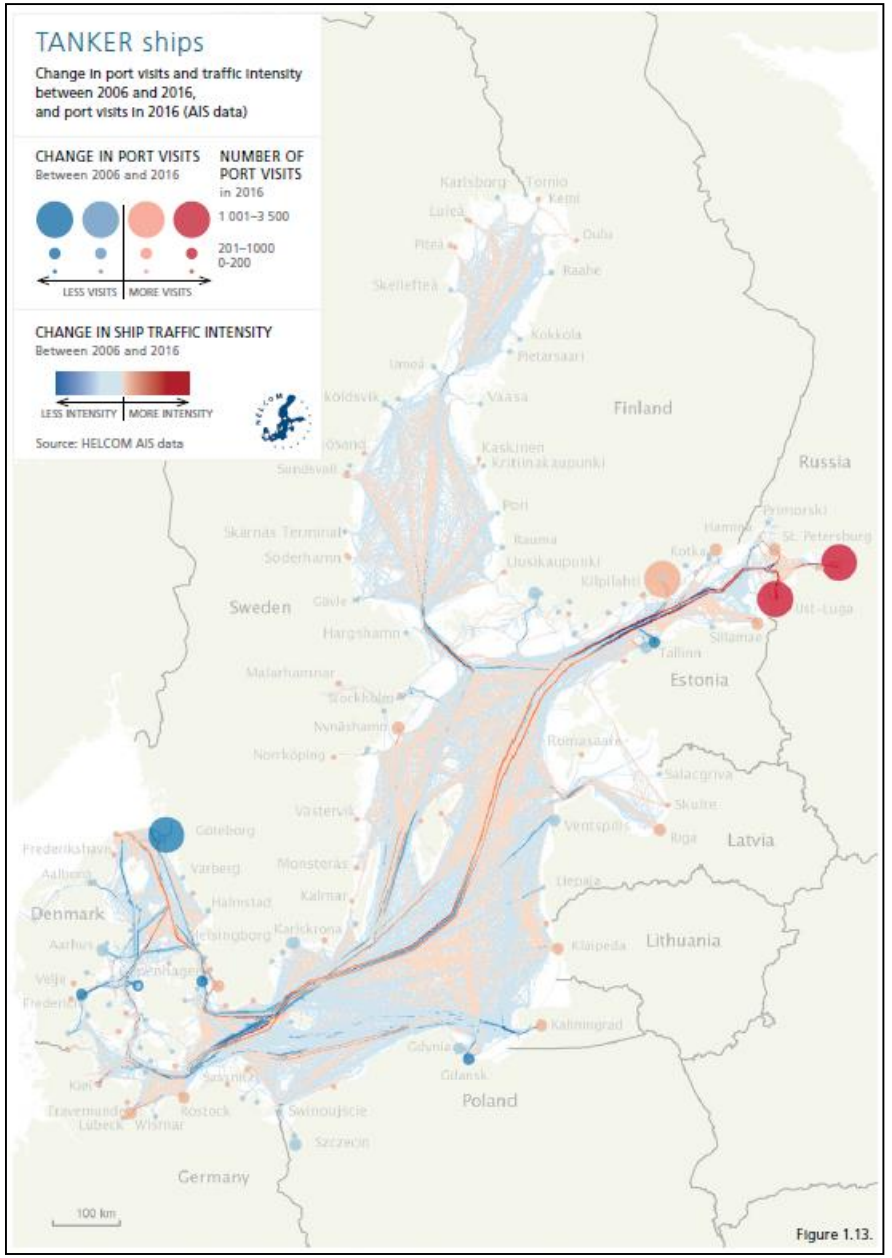
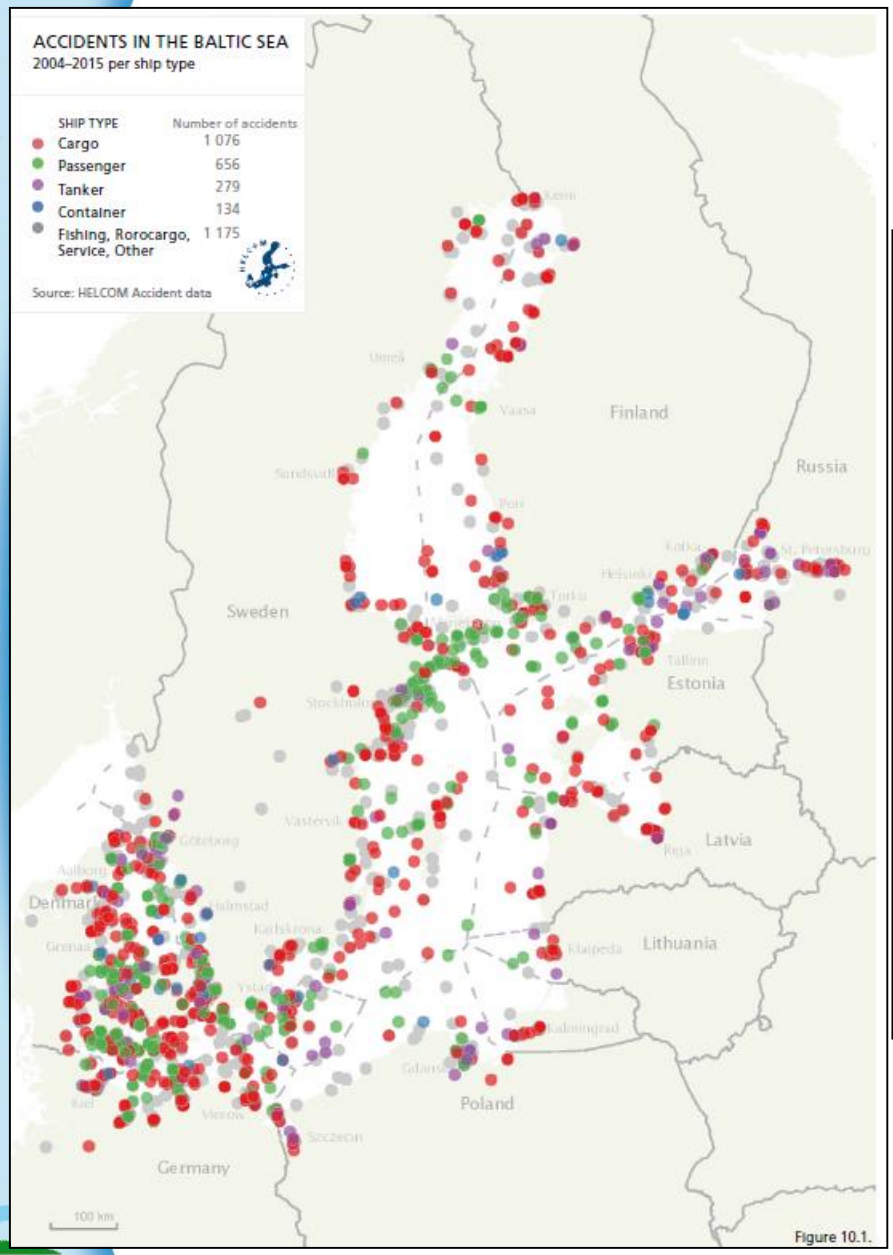
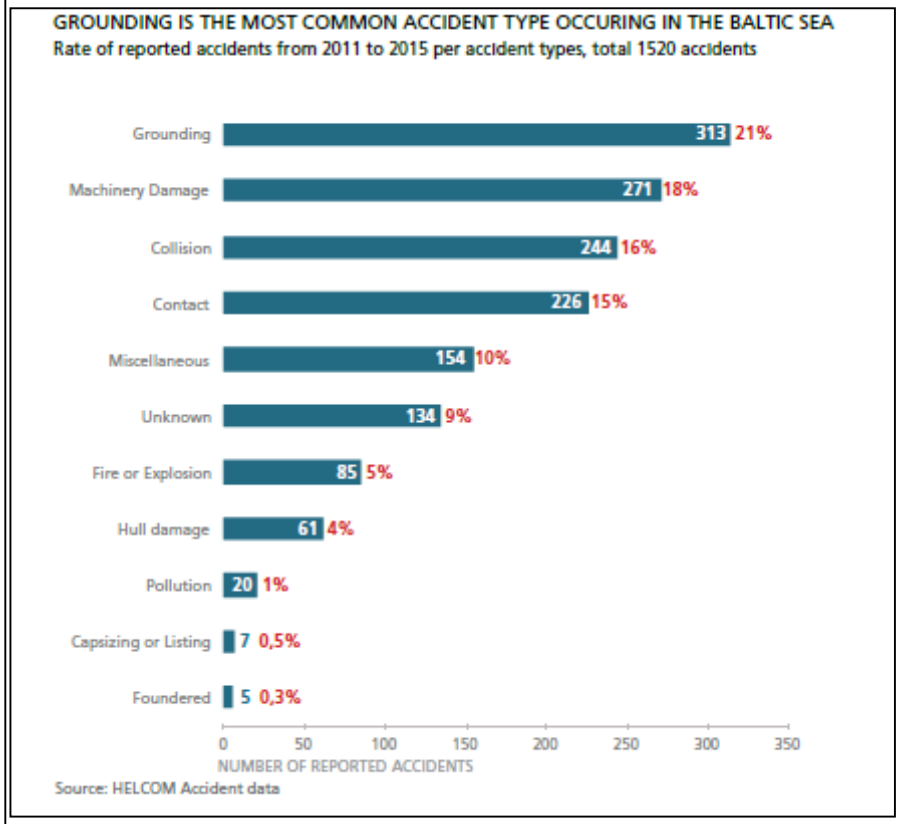


Figure 1.13.


ACCIDENTS IN THE BALTIC SEA
2004–2015 per ship type
SHIP TYPE
Number of accidents
Cargo 1 076
Passenger 656
Tanker 279
Container 134
Fishing, Rorocargo, Service, Other 1 175
Source: HELCOM Accident data
Finland
Russia
Sweden
Estonia
Latvia
Lithuania
Poland
Germany
Denmark
100 km
Figure 10.1.


GROUNDING IS THE MOST COMMON ACCIDENT TYPE OCCURING IN THE BALTIC SEA
Rate of reported accidents from 2011 to 2015 per accident types, total 1520 accidents
Grounding 313 21%
Machinery Damage 271 18%
Collision 244 16%
Contact 226 15%
Miscellaneous 154 10%
Unknown 134 9%
Fire or Explosion 85 5%
Hull damage 61 4%
Pollution 20 1%
Capsizing or Listing 7 0,5%
Foundered 5 0,3%
0 50 100 150 200 250 300 350
NUMBER OF REPORTED ACCIDENTS
Source: HELCOM Accident data

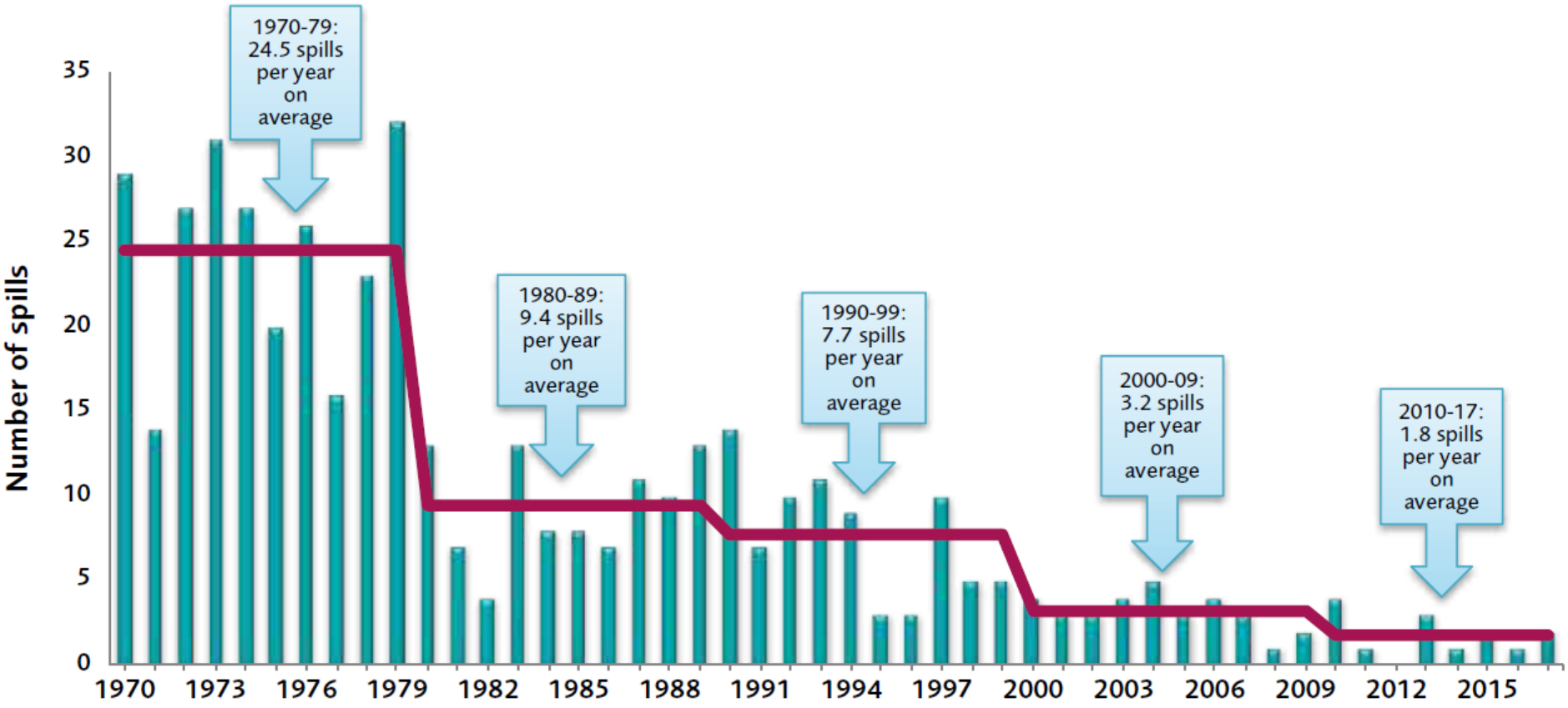
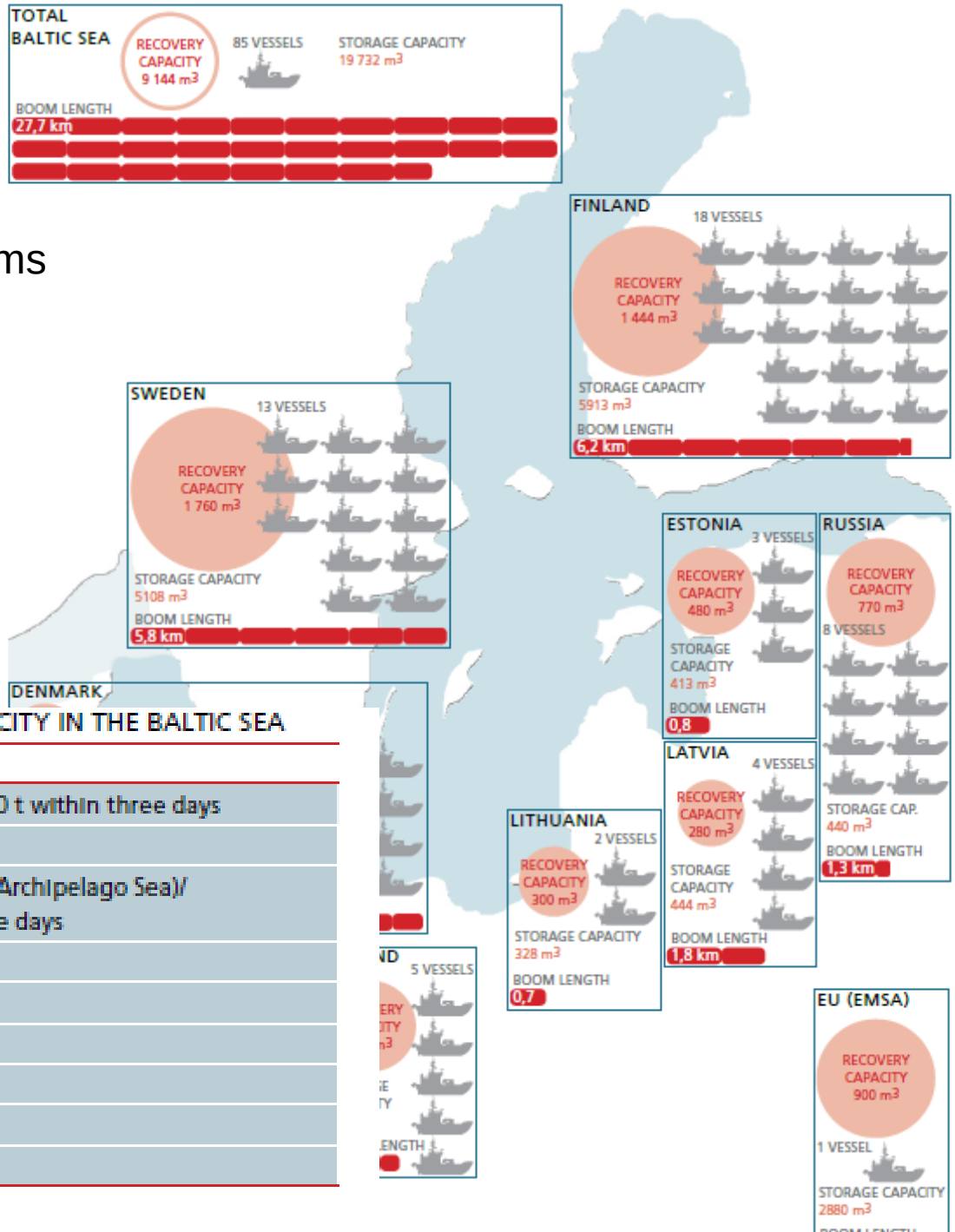



*Figure 3: Number of large spills (>700 tonnes) from 1970–2017*

Source: ITOPF, January 2018

# Recovery Capacity/Booms
Source: HELCOM




## NATIONAL TARGETS FOR SPILL RESPONSE CAPACITY IN THE BALTIC SEA

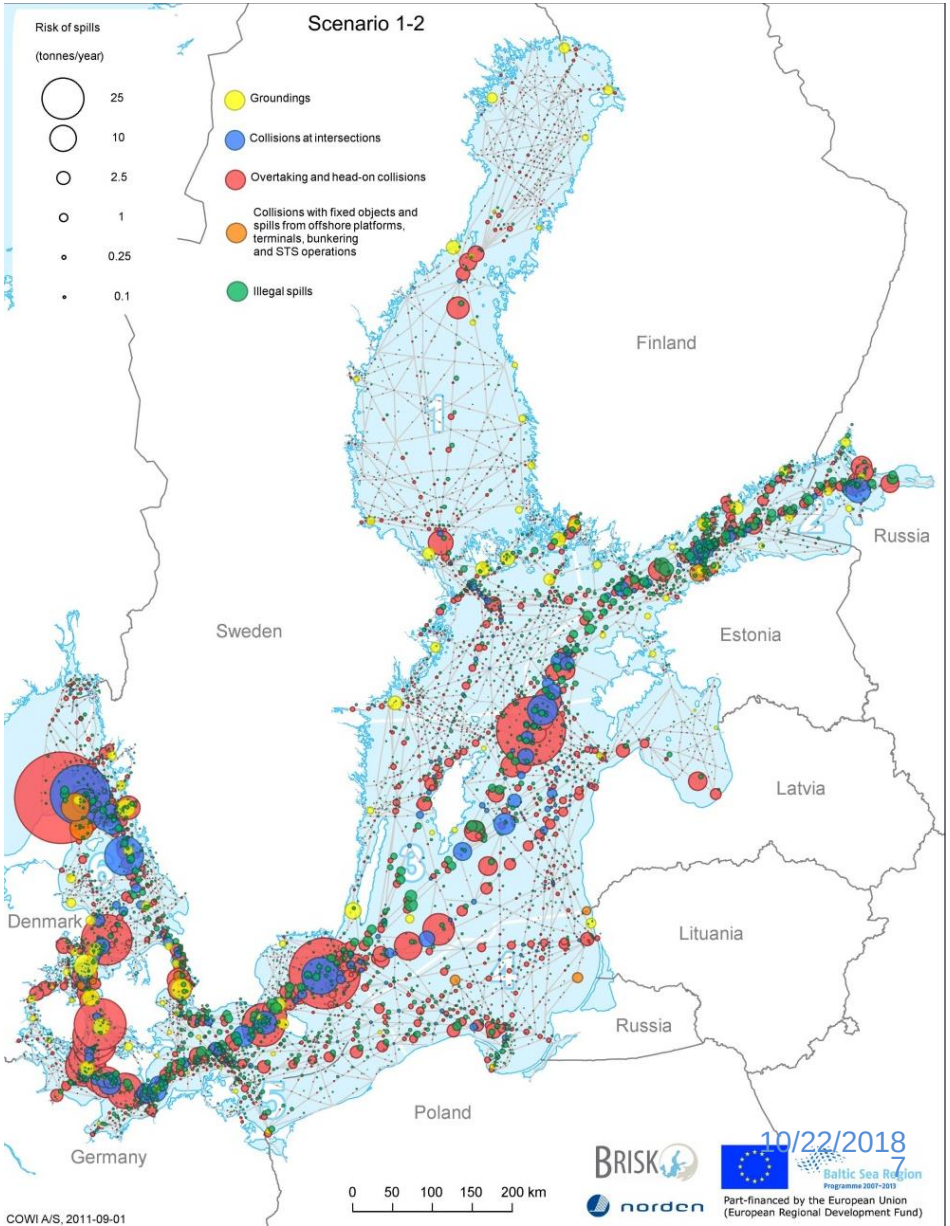
| Country | Response target/objective |
|---|---|
| DENMARK | capacity to respond to a spill of 5000 t within three days |
| ESTONIA | 10 000 t |
| FINLAND | 30 000 t (Gulf of Finland) /20 000 t (Archipelago Sea)/ 5000 t (Gulf of Bothnia) within three days |
| GERMANY | 15 000 t |
| LATVIA | No fixed value |
| LITHUANIA | NA |
| POLAND | No fixed value |
| RUSSIA | NA |
| SWEDEN | 10 000 t (National resources only) |

Source: HELCOM 2016b

# Regional Spill Risk Assessments

- HELCOM BRISK/BRISK-RU (2009-12)
- BONN BE-AWARE I&II (2012-2015)
- Spill risks-> sensitivity mapping -> recommended risk reducting measures
- Big projects –> long intervals

**-> Could we have jointly agreed & transparent tools enabling more frequent RAs?**



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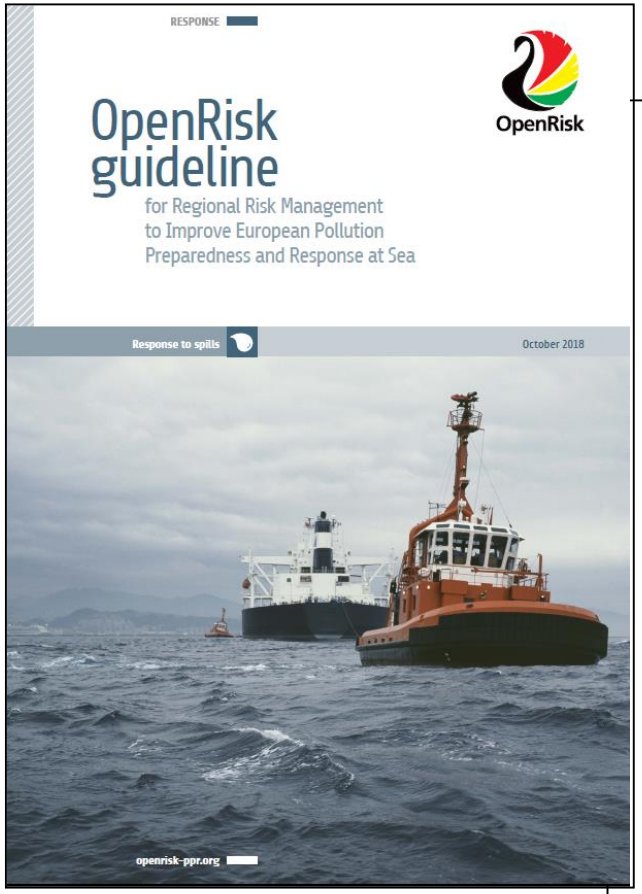
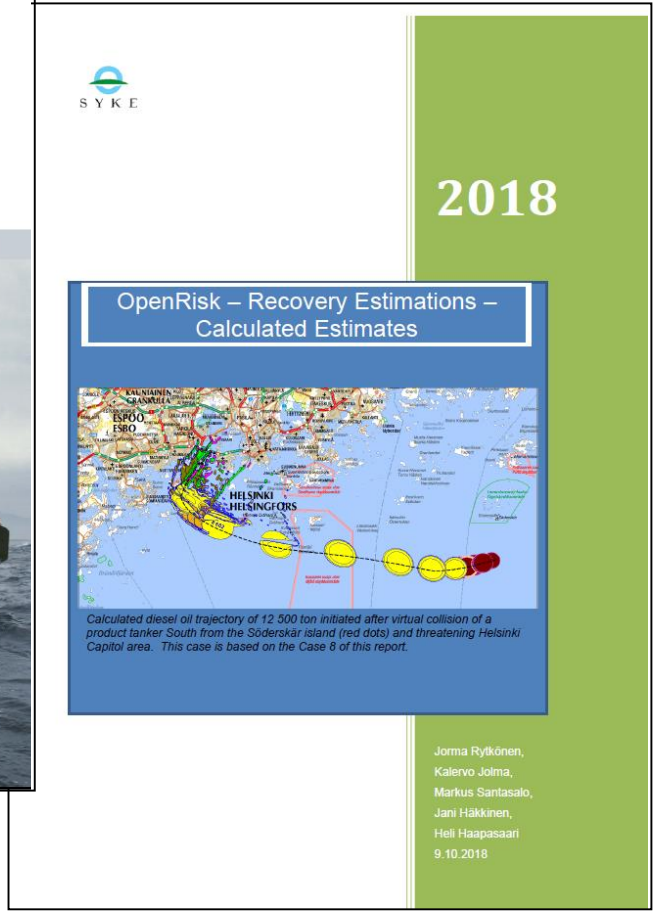
# OPEN RISK

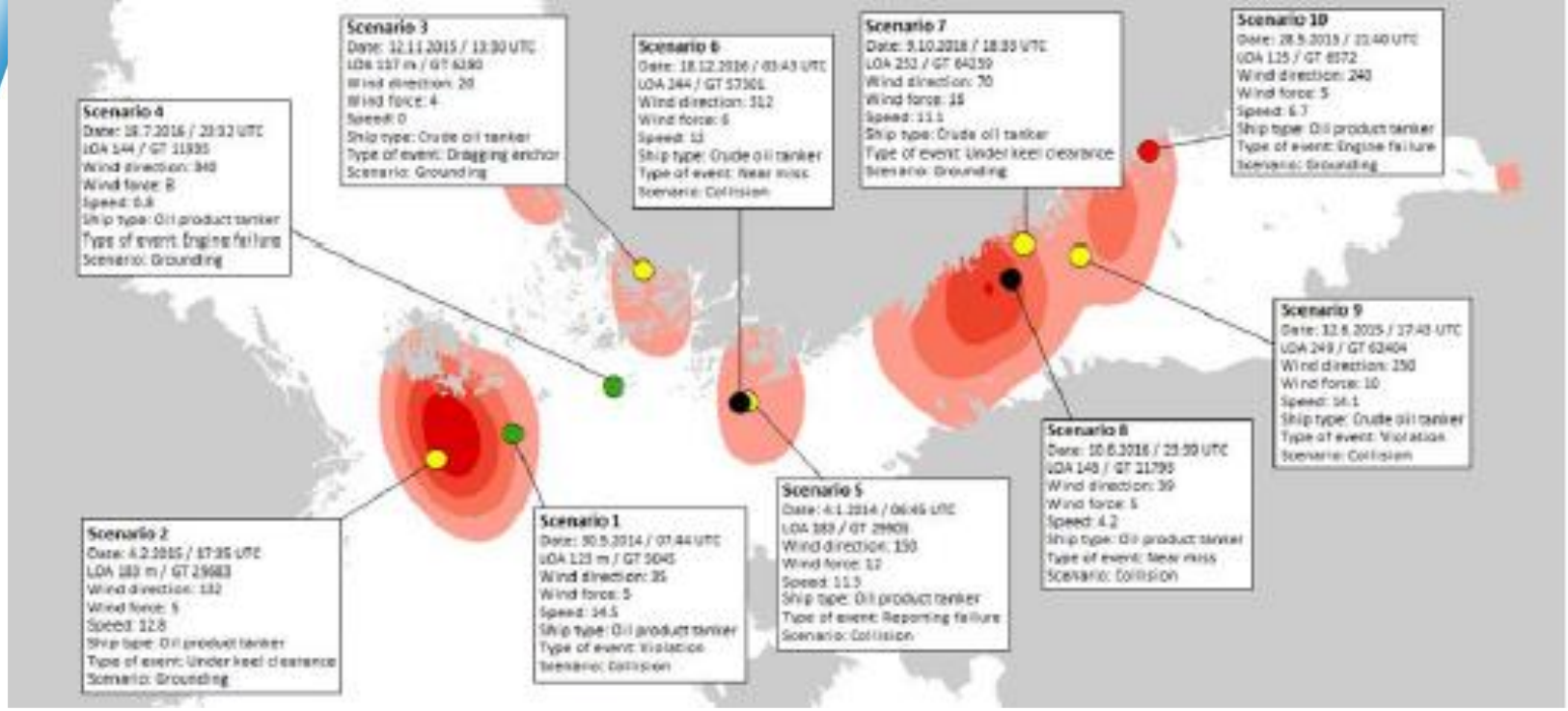
**https://openrisk-ppr.org/**
**https://openrisk-ppr.org/risk-assessment/**




Jorma Rytkönen

OPENRISK 2016/PREV/26 is Co-financed by the EU – Civil Protection Financial Instrument.




| ID | Latitude | Longitude | Date | Type of event | ERC-M Env. | ERC-M Hum. | ERC-M Econ. | GT [tonnes] | LOA [m] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 59.78111 | 20.61028 | 30.05.2014 | Traffic zone violation | | | | 5045 | 125 |
| 2 | 59.71972 | 19.87833 | 04.02.2015 | Under keel clearance | | | | 29683 | 183 |
| 3 | 60.43528 | 22.06556 | 12.11.2015 | Drifting | | | | 6280 | 117 |
| 4 | 59.92833 | 21.59972 | 18.07.2016 | Engine failure | | | | 11935 | 144 |
| 5 | 59.74861 | 22.79278 | 04.01.2014 | Reporting | | | | 29905 | 183 |
| 6 | 59.74861 | 22.71806 | 18.12.2016 | Near collision | | | | 57301 | 244 |
| 7 | 60.20306 | 25.59694 | 09.10.2016 | Under keel clearance | | | | 64259 | 252 |
| 8 | 60.06694 | 25.41194 | 10.06.2016 | Near collision | | | | 11793 | 145 |
| 9 | 60.09806 | 26.08639 | 12.06.2015 | Traffic zone violation | | | | 62404 | 249 |
| 10 | 60.48444 | 26.95000 | 28.05.2015 | Engine failure | | | | 6572 | 125 |

**Notes:** Env.: Environmental consequences as per ERC-M, Hum.: Human losses as per ERC-M, Econ.: Economic damages as per ERC-M

# Characteristics of oil types and spills

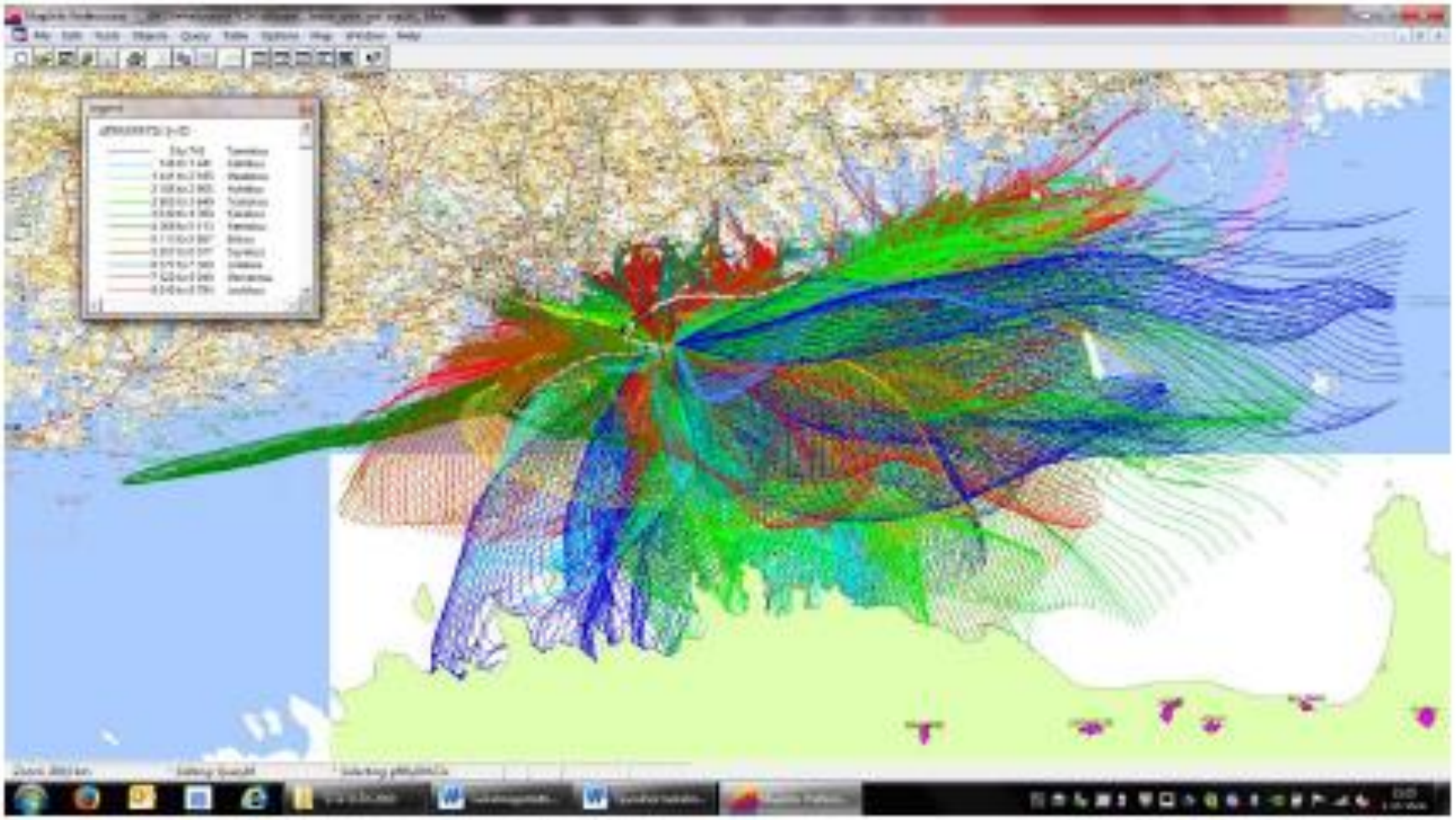
| ID | Sea area [-] | Accident type [-] | Oil type [-] | Spill size [tonnes] | Spill duration [-] |
|---|---|---|---|---|---|
| 1 | 1 | Collision | Diesel | 1000 | Immediate |
| 2 | 1 | Grounding | Light-medium crude | 491 | Immediate |
| 3 | 2 | Grounding | Gasoline | 210 | Immediate |
| 4 | 2 | Grounding | Light-medium crude | 829 | Immediate |
| 5 | 3 | Collision | Gasoline | 5000 | Immediate |
| 6 | 3 | Collision | Diesel | 12500 | Immediate |
| 7 | 4 | Grounding | Light-medium crude | 5451 | Immediate |
| 8 | 4 | Collision | Diesel | 12500 | Immediate |
| 9 | 5 | Collision | Light-medium crude | 20000 | Immediate |
| 10 | 5 | Grounding | Gasoline | 150 | Immediate |

# Theoretical oil recovery capacities

*Table 4. Theoretical capacities of Finnish Oil Recovery Vessells (SYKE/Haapasaari, H. 2016).*

| VESSEL'S NAME | LENGTH [m] | SWEEPING WIDTH [m] | BRUSHES [number/cm] | WIDTH OF BRUSHES [cm] | TANK CAPACITY [m³] | SWEEPING AREA [km²/12h] | RECOVERY RATE [m³/h] | MAX LIFTING CAPACITY OF BRUSHES [m³/h] |
|---|---|---|---|---|---|---|---|---|
| Halli | 60,5 | 40 | 18/338 | 338 | 1400 | 1,8 | 74 | 108 |
| Hylje | 64,3 | 35 | 16/300 | 300 | 900 | 1,6 | 65 | 96 |
| Kummeli | 28,2 | 25 | 10/188 | 188 | 70 | 1,1 | 46 | 60 |
| Letto | 42,7 | 30 | 2x110 | 220 | 42,7 | 1,3 | 56 | 73 |
| Linja | 34,9 | 23 | 2x100 | 200 | 77,4 | 1,0 | 43 | 67 |
| Louhi | 71,4 | 42 | 30 | n/a | 1200 | 1,9 | 78 | 180 |
| Merikarhu | 58 | 32 | 2x136 | 272 | 40 | 1,4 | 59 | 91 |
| Oili I | 24,5 | 21 | 10/188 | 188 | 80 | 0,9 | 39 | 60 |
| Oili II | 24,5 | 21 | 10/188 | 188 | 80 | 0,9 | 39 | 60 |
| Oili III | 24,5 | 21 | 10/188 | 188 | 80 | 0,9 | 39 | 60 |
| Oili IV | 19 | 19 | 10/188 | 188 | 30 | 0,8 | 35 | 60 |
| Otava | 34,9 | 25 | 8/71 | 71 | 100 | 1,1 | 46 | 48 |
| Polaris | 100 | 52 | 40 | 0 | 1200 | 2,3 | 97 | 180 |
| Seili | 50,5 | 30 | 12/225 | 225 | 196 | 1,3 | 56 | 72 |
| Sektori | 33 | 25 | 10/188 | 188 | 108 | 1,1 | 46 | 60 |
| *Stella* | *33* | *25* | *8/71* | *71* | *100* | *1,1* | *47* | *48* |
| Svärtan | 24 | 21 | n/a | n/a | 52 | 0,9 | 39 | 50 |
| Tursas | 61,45 | 30 | 12/225 | 225 | 100 | 1,3 | 56 | 72 |
| Turva | 95,9 | 45 | 0 | 0 | 1200 | 2,0 | 84 | 180 |
| **Total** | | | | | **7056** | **25,0** | **1043** | **1625** |

# Scenario 8; diesel oil 12 500 m3



# Scenario 8, one possible trajectory

# Scenario 8

*Table 11. Recovery ships, their sailing times to the area and estimated recovery capacities during the first three days.*

| Recovery ship / estimated recovery rate [$m^3$/h] and storage tank [$m^3$] | Sailing time to the area | Recovered amount of oil recovery rate [$m^3$/h] /recovered amount per day[m3] 1 day | 2 day | 3 day | Total [theoretical without breaks], in three days |
|---|---|---|---|---|---|
| TURVA/ 1000 | 1 h | 5/115 | 5/ 120 | 5/120 | 355 |
| LOUHI/1200 | 6 h | 5/ 90 | 5/120 | 5/120 | 330 |
| HYLJE/ 900 | 8 h | 20/320 | 20/480 empt. | 20/120 | 920 |
| Kindral Kurvits | 10 h | 5/60 | 5/120 | 5/120 | 300 |
| Raju PVL 203 | 10 h | 5/60 | 5/120 | | 180 |
| KBV/ 200 | 24 h | -..... | 5/120..... | 5/120 | 168 |
| KBV /1000 | 24 h | - | 5/120..... | 5/120 | 168 |
| | | | | | 2 421 $m^3$ |

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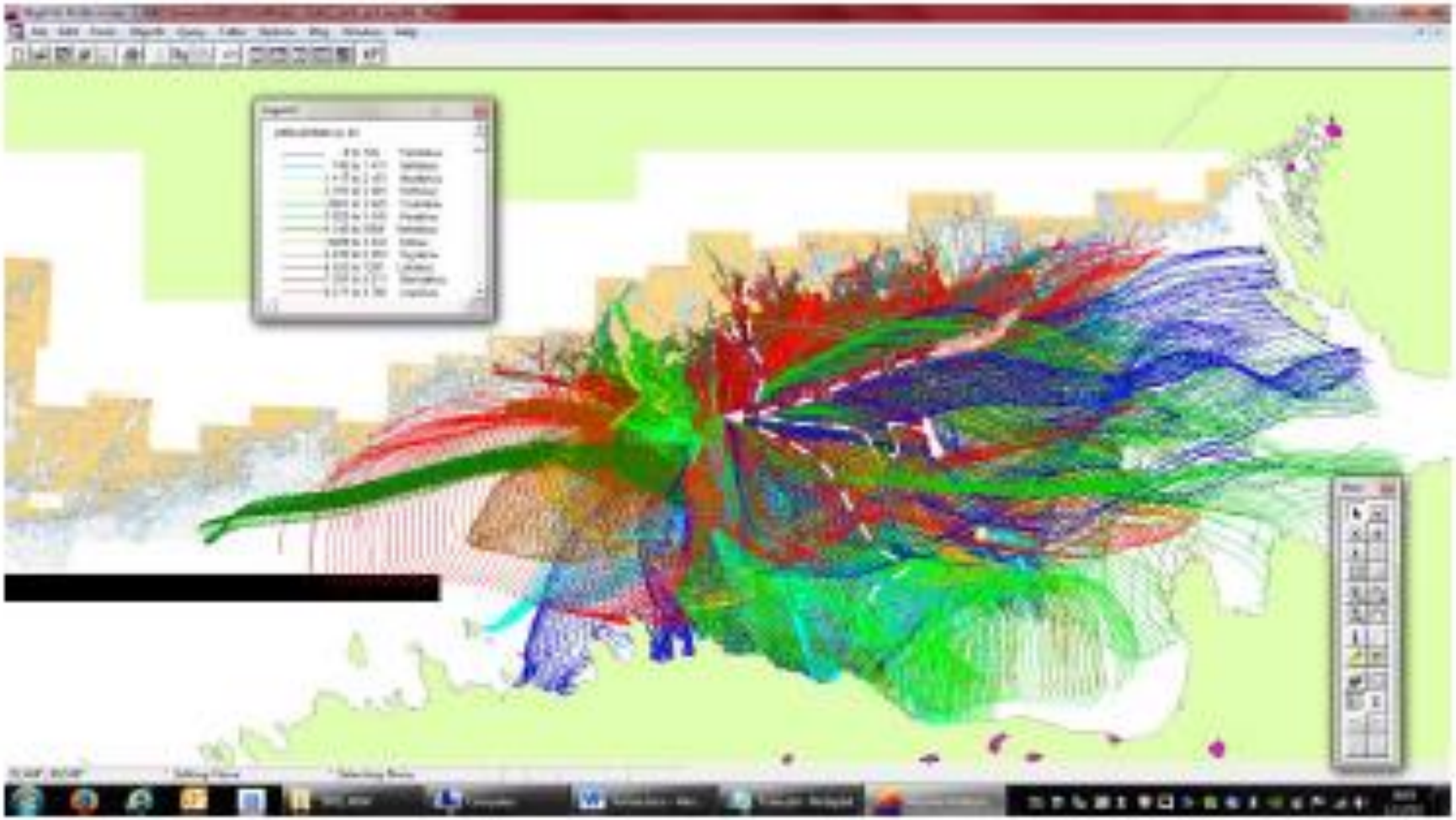
# Scenario 9, 20 000 m3 crude oil release



# Scenario 9 – recovery fleet

*Table 12. Recovery ships, their sailing times to the area and estimated recovery capacities during the first three days.*

| Recovery ship / estimated recovery rate [$m^3$/h] and storage tank [m3] | Sailing time to the area | Recovered amount of oil recovery rate [$m^3$/h] /recovered amount per day[$m^3$] 1 day | 2 day | 3 day | Total [theoretical without breaks}] l in 3 days |
|---|---|---|---|---|---|
| TURVA/ 1200 | 3 h | 84/1200 | 1200 | 600 | 3000 |
| HALLI/ 900 | 12 h | 74/888 | 900 | 450 | 2238 |
| LOUHI/ 1200 | 6 h | 78/ 1200 | 1200 | 600 | 3000 |
| OILI /80 | 5 h | 40/80 40 | 40 | 40 | 160 |
| HYLJE/900 | 9 h | 65/900 | 900 | 450 | 2250 |
| SEILI/196 | 6 h | 50/196 | 196 | 196 80 | 668 |
| Otava/48 | 6 h | 35 /48 | 48 | 48 | 144 |
| Kindral Kurvitz/100 | 9 h | 56/100 | 100 | 100 | 300 |
| Raju/50 | 9 h | 50 | 50 | 50 | 150 |
| KBV1/200 | 20 h | 70/200 | 200 | 200 | 600 |
| KBV 2/1000 | 20 h | 70/280 | 1000 | 400 | 1680 |
| Baltica/1500 | 12 h | 80/960 | | 1500 | 2460 |
| Karev class/668 | 12 h | 80/660 | | 668 | 1328 |
| | | | | | 17 978 |

# DRAFT Conclusions – cases 1...10

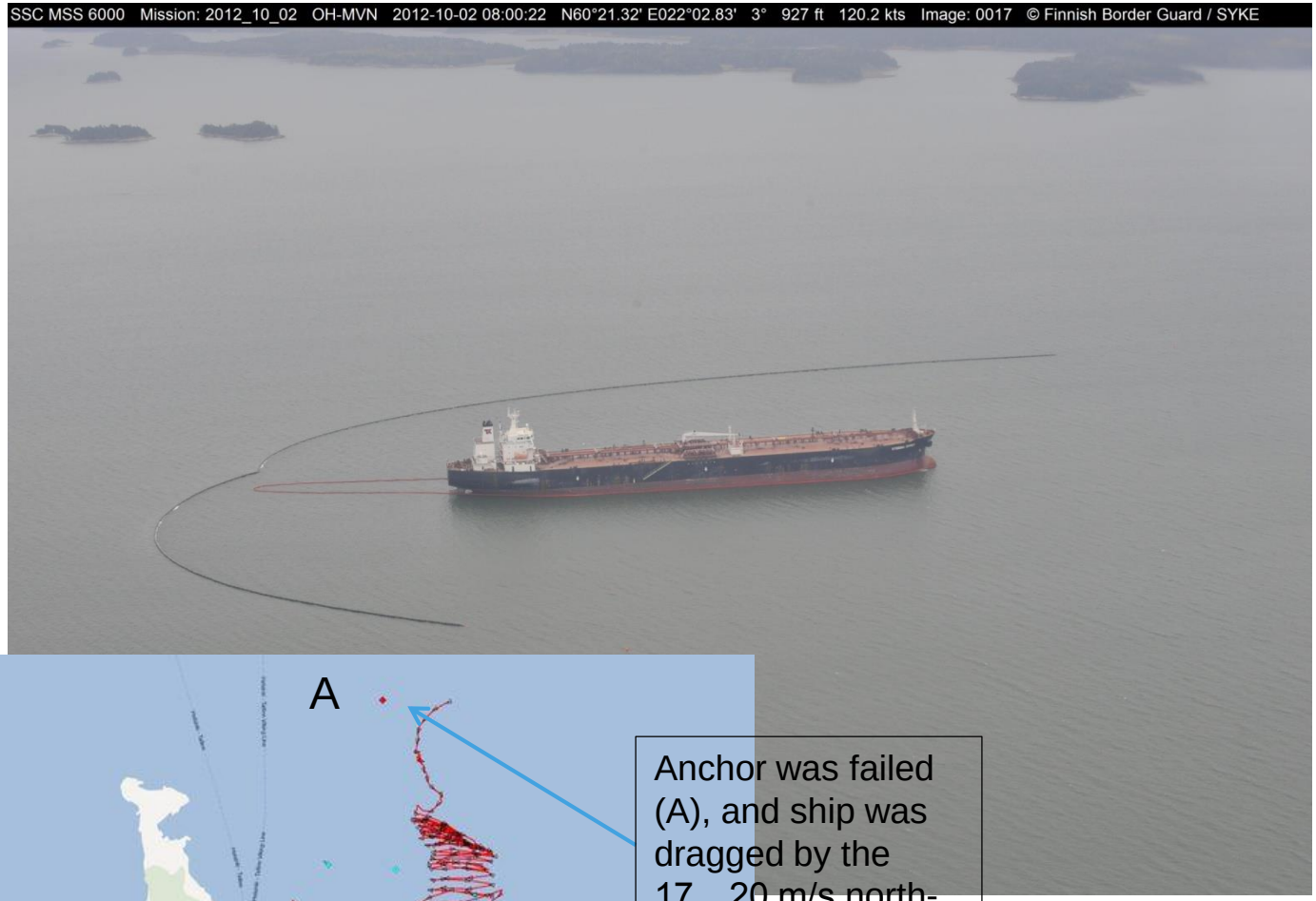
*Table 13. Estimation of the rate of consequences for the case 1.) No response or 2.) Selected countermeasures done. Severity refers to the oil on shore and dimension refers to the regional width of the impact.*

| ID. | Release [m3] | NO RESPONSE SEVERITY | NO RESPONSE DIMENSION | RESPONSE SEVERITY | RESPONSE DIMENSION |
|---|---|---|---|---|---|
| 1 | 1000 | SERIOUS | INTERNATIONAL | MODERATE | LOCAL |
| 2 | 491 | SERIOUS | REGIONAL | MINOR | LOCAL |
| 3 | 210 | MINOR | REGIONAL | MINOR | LOCAL |
| 4 | 829 | SERIOUS | INTERNATIONAL | MODERATE | LOCAL |
| 5 | 5000 | MODERATE | REGIONAL | MOERATE | LOCAL |
| 6 | 12500 | CATASTROPHE | INTERNATIONAL | MODERATE | INTERNATIONAL |
| 7 | 5451 | SERIOUS | INTERNATIONAL | MODERATE | INTERNATIONAL |
| 8 | 12500 | CATASTROPHE | INTERNATIONAL | SERIOUS | iNTERNATIONAL |
| 9 | 20000 | CATASTROPHE | INTERNATIONAL | SERIOUS | INTERNATIONAL |
| 10 | 150 | MODERATE | LOCAL | MINOR | LOCAL |

# MT Propontis accident 2/2007

Gulf of Finland Co-operation


# Largest Oil Combating Exercise BALEX DELTA in August 2012 – MT Kyeema Spirit grounding, Monday 8 October at 6.55am close to Muuga Port, Estonia







Anchor was failed (A), and ship was dragged by the 17…20 m/s north-east wind and grounded (B)

# November 7, 2012 – Maersk Hakone arrived to Muuga Port – 330 x 60 m VLCC carrier – was idling a couple of days due to the hard wind – 12th November in port - loading (??)

# Case MT LOVINA 20.10.2012

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Note: MT Propontis' accident 2/2007 !!

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# More Information:

## Finnish Environment Institute/

## www.environment.fi/oil

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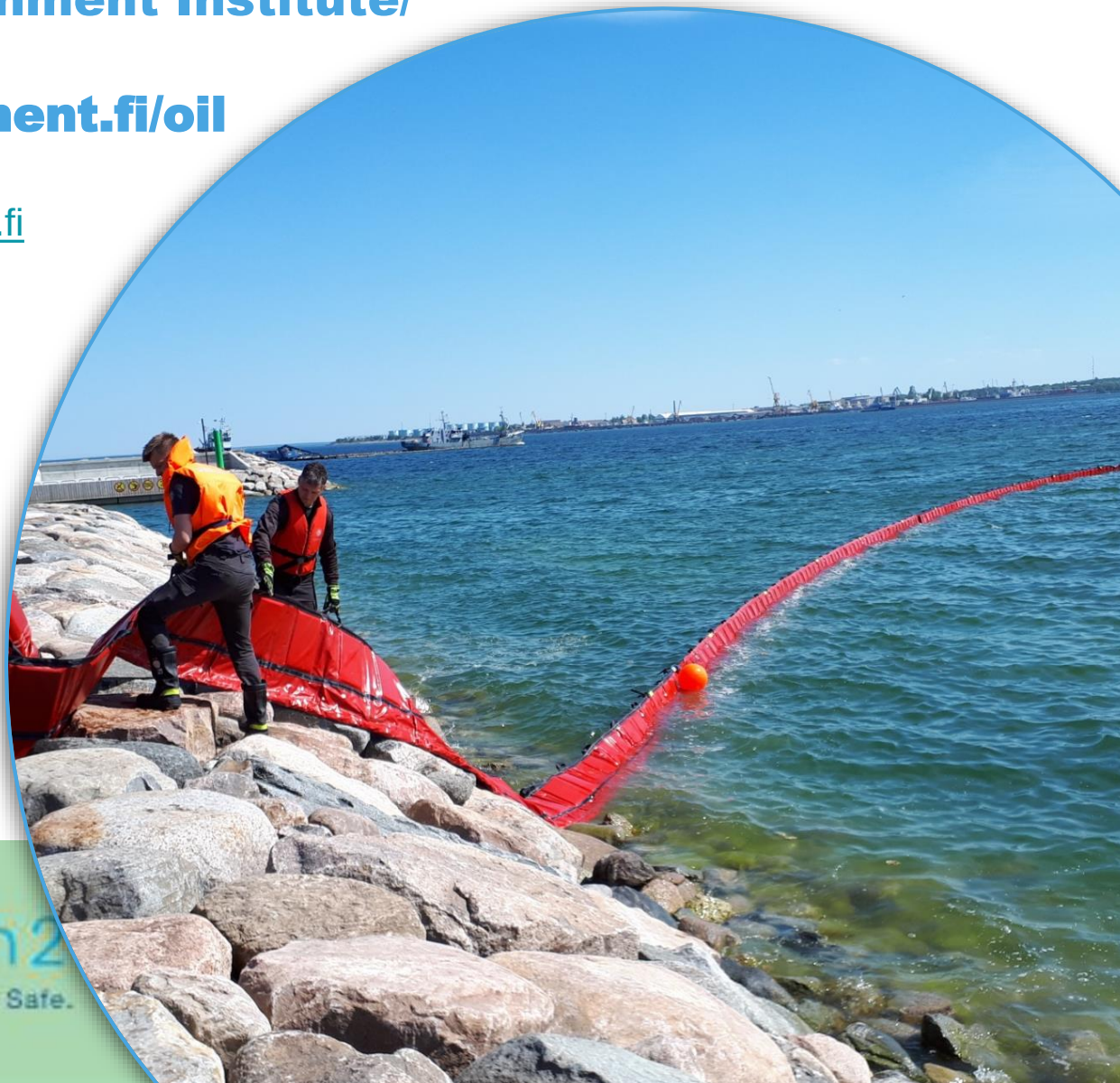

**Oil booms are deployed in Puhas Meri Exercise, Estonia May 2018**

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