

BEAWARE

PROJECT WORKSHOP, Trondheim, NO

27-28 Januar 2015

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Risk Assessment



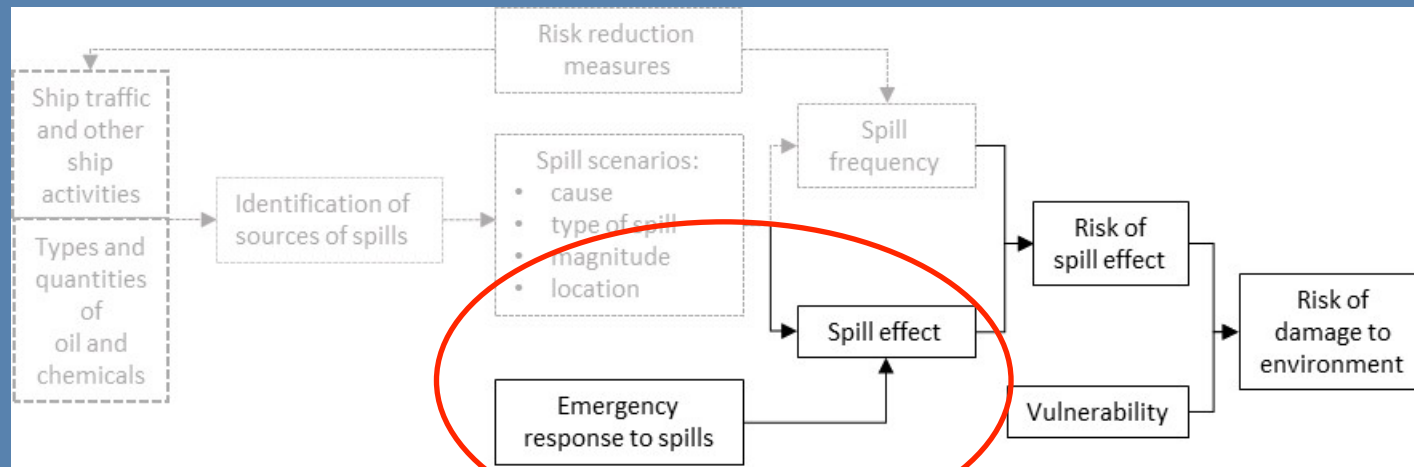
Oil Spill and Response Modelling

Overview

- Method overview
- Implementation overview
- Preliminary results
- Next step
- Upcoming tasks
- Outcome

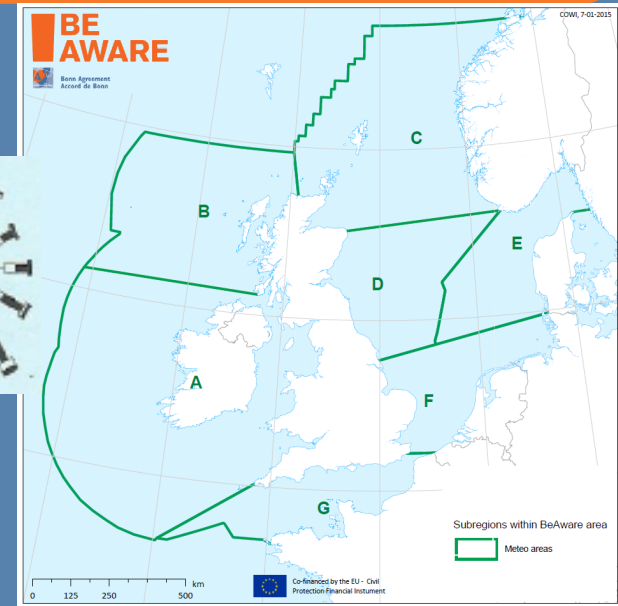
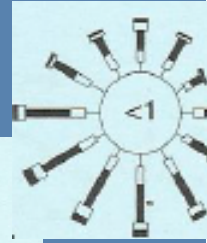
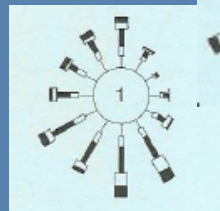
Method overview

Spill -> Spreading, Response -> Spill effect

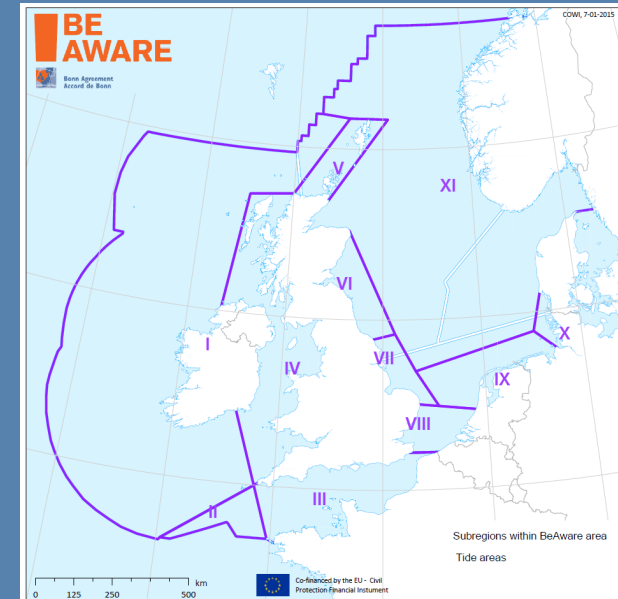


Area specific data

- Meteorological areas
 - Wind
 - Surface current



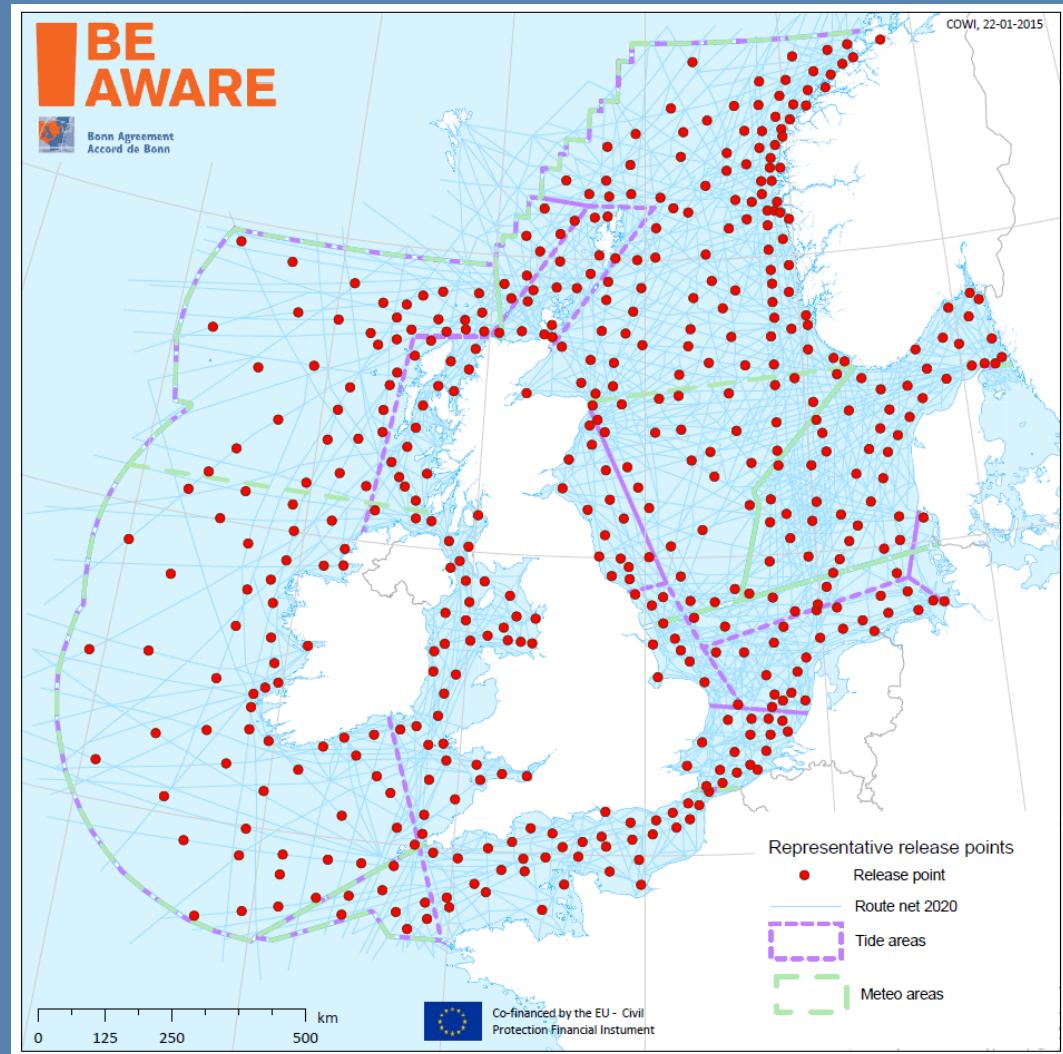
- Hydrographical areas
 - Tide
 - Deep water currents



Representative model points

Representative points based on:

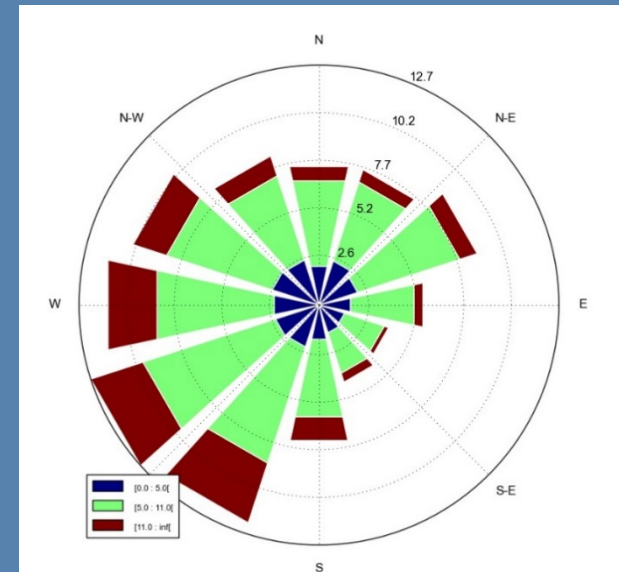
- Spills
- Area changes
- All spills are fairly represented



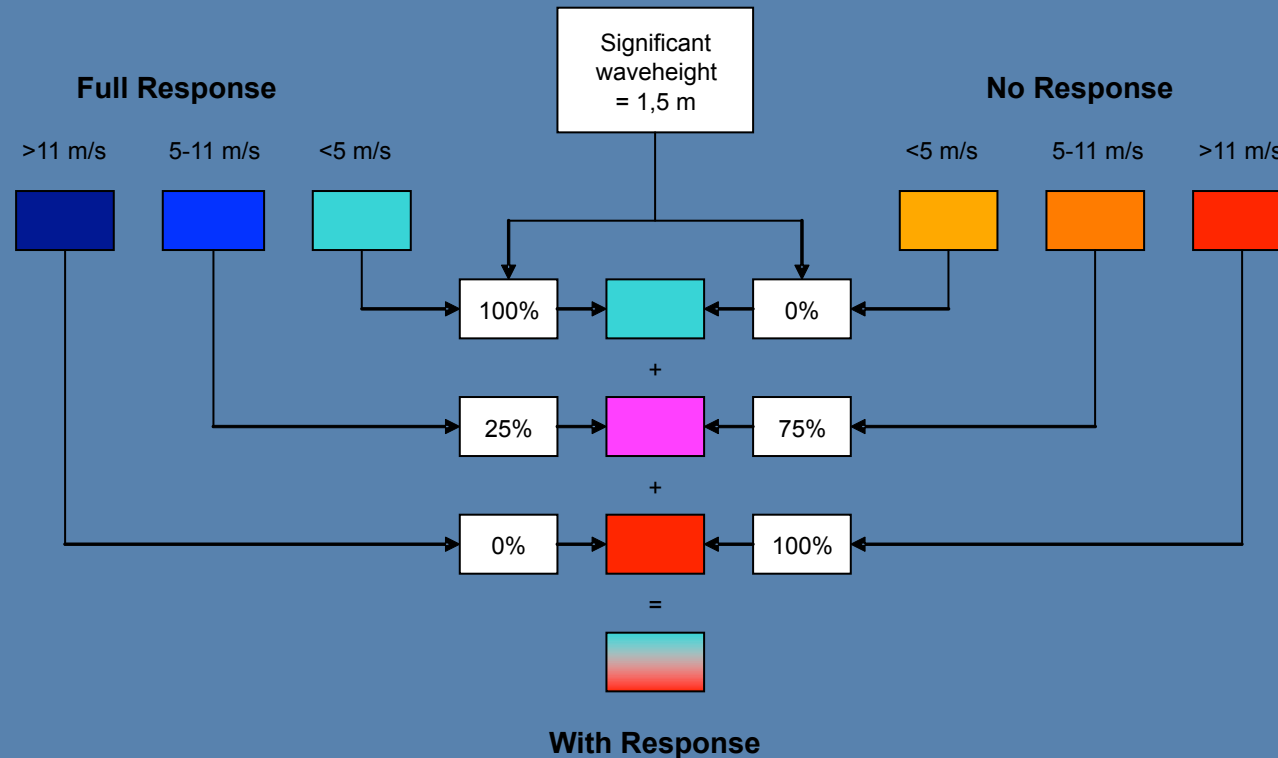
Discretisation

- Input from MUMM
- 12 directions, 3 wind speeds

Example on distribution			Wind speed interval		
			$W < 5 \text{ m/s}$	$5\text{m/s} < W < 11 \text{ m/s}$	$11\text{m/s} < W$
wind sector	345°-15°	North	2,09	4,64	0,78
	15°-45°		2,45	4,40	0,70
	45°-75°		2,15	5,70	0,97
	75°-105°	East	1,70	3,45	0,48
	105°-135°		1,42	2,22	0,24
	135°-165°		1,55	2,26	0,50
	165°-195°	South	1,85	4,21	1,28
	195°-225°		2,33	6,48	3,33
	225°-255°		2,43	7,38	2,92
	255°-285°	West	2,42	6,35	2,67
	285°-315°		2,60	5,89	1,88
	315°-345°		2,50	4,69	1,11



Method aggregation overview



Model run without response

476 representative points

4 oil type categorisations

4 seasons

8 release sizes

432994 cells (2x2km)

10 day model run → Huge output DB (1.15x10⁹ rows – 35 GB)

The aggregation

Wind aggregation (3 wind classes, 12 directions)

Superposition of the representative points to the calculated spills.

Combine the probability of the spills

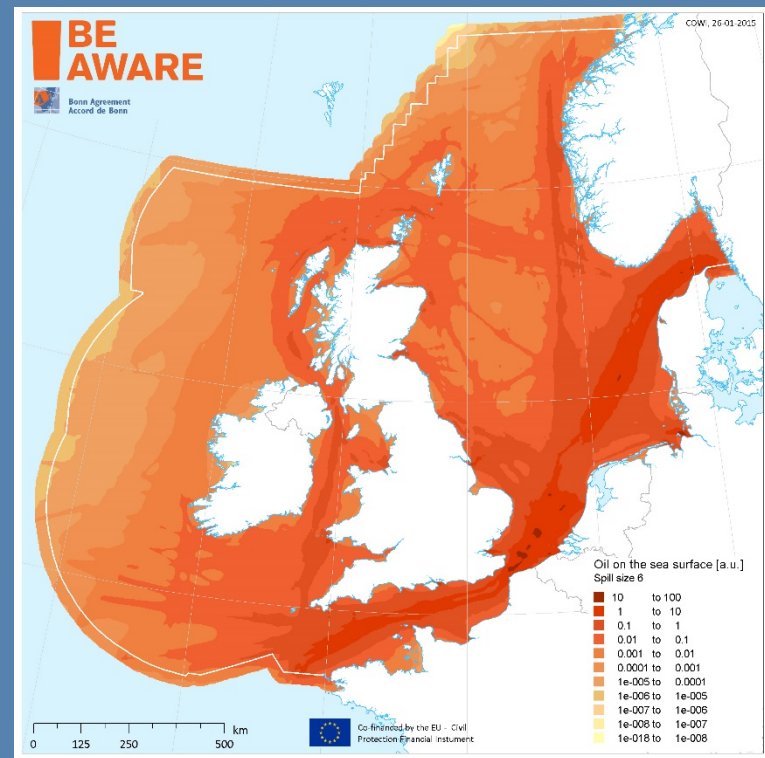
Model run without response

Impact on coast and environmental load based on no response

View of surface impact

Superposition gives better representation of the actual impact area.

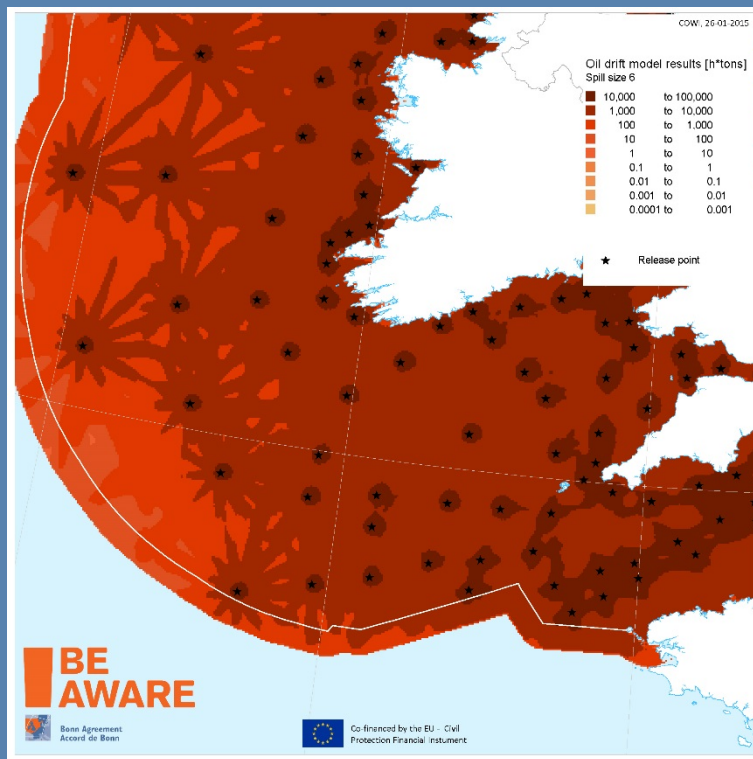
Clear correlation with the spills, e.g. main traffic routes.



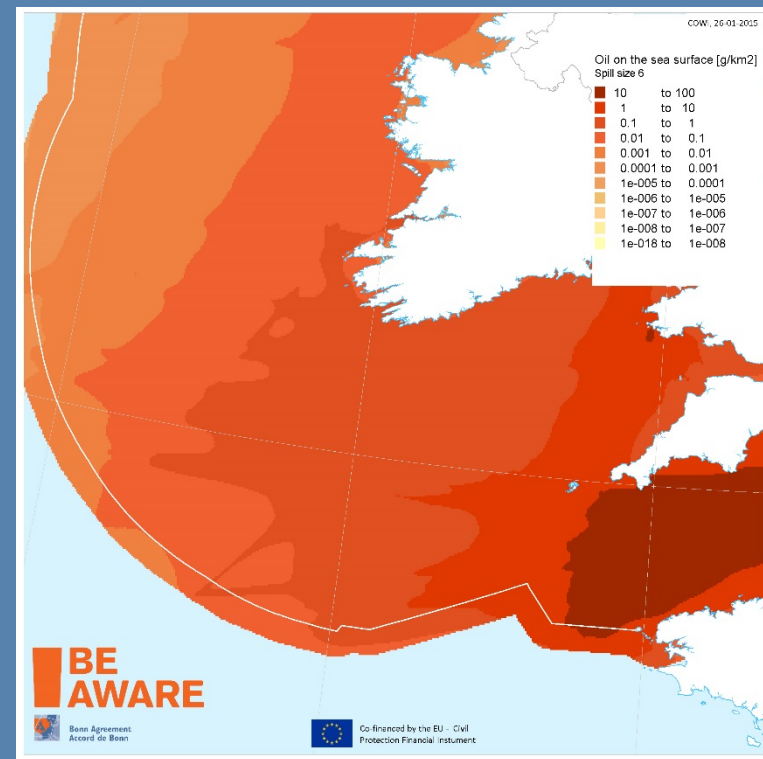
For illustrative purpose only – not representative current and wind

Model run without response

- Spill size 6 – representative wind, deep current and tide



Pre-aggregation

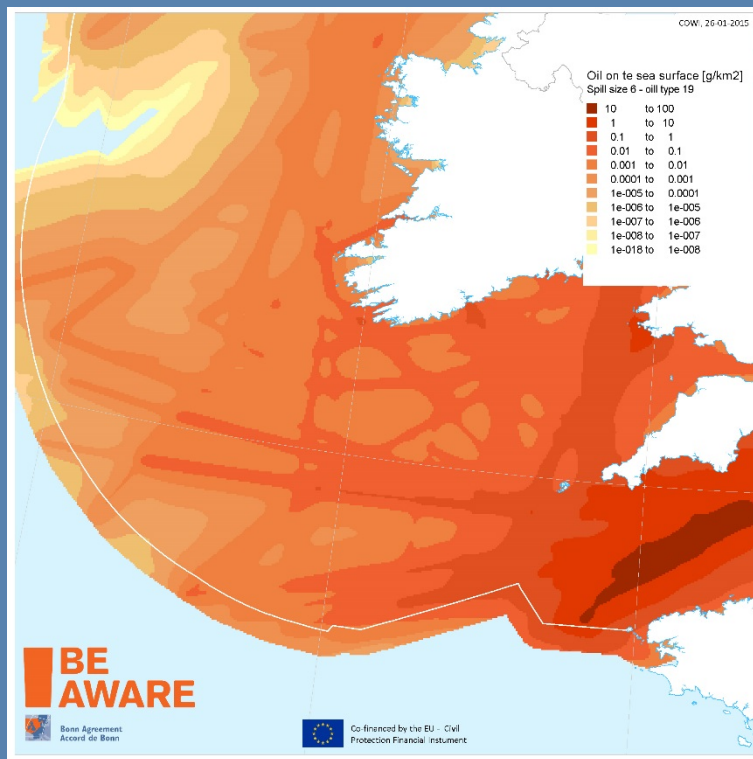


Post-aggregation

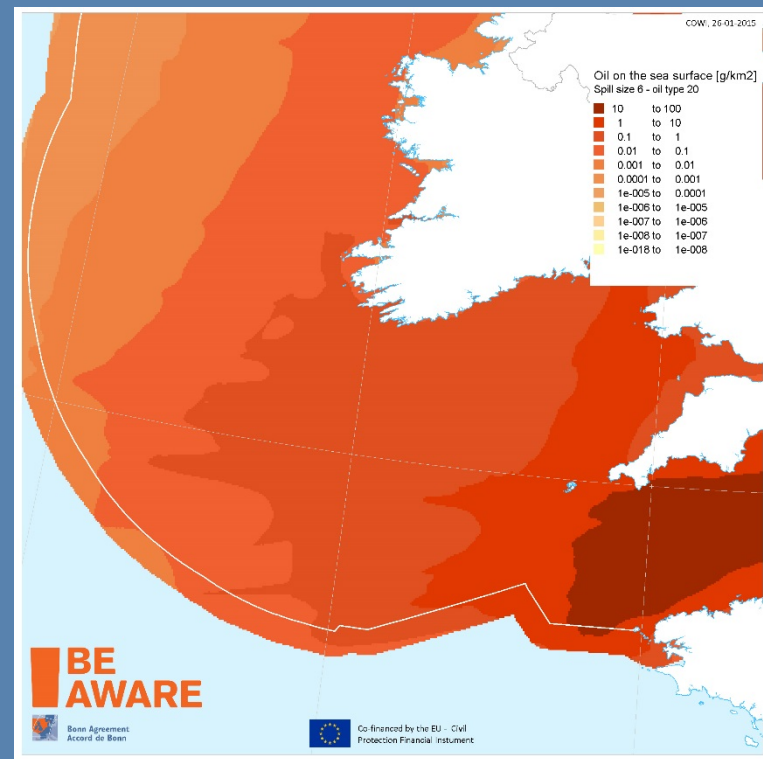
BeAware II Task E

Model run without response

- Spill size 6



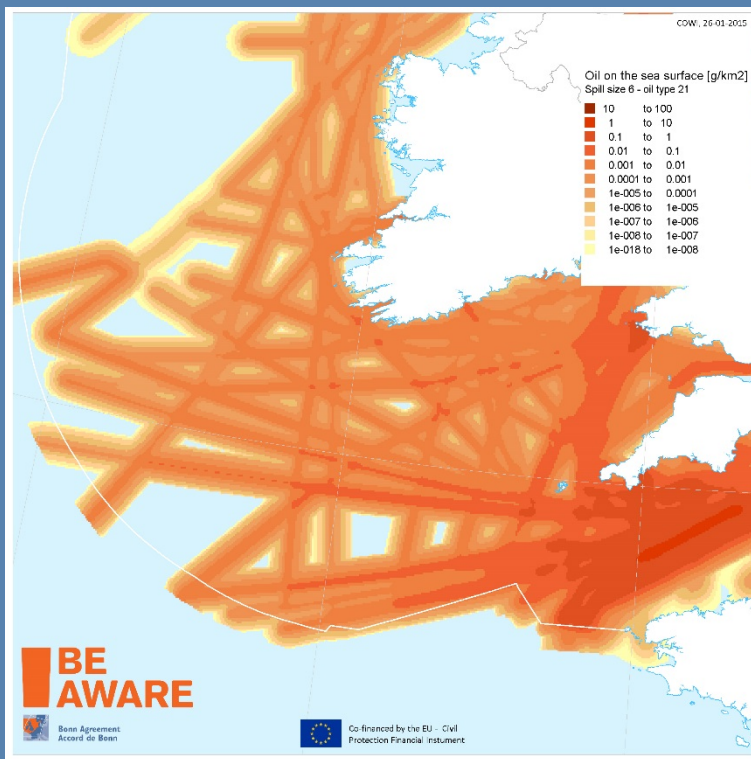
Oil 19



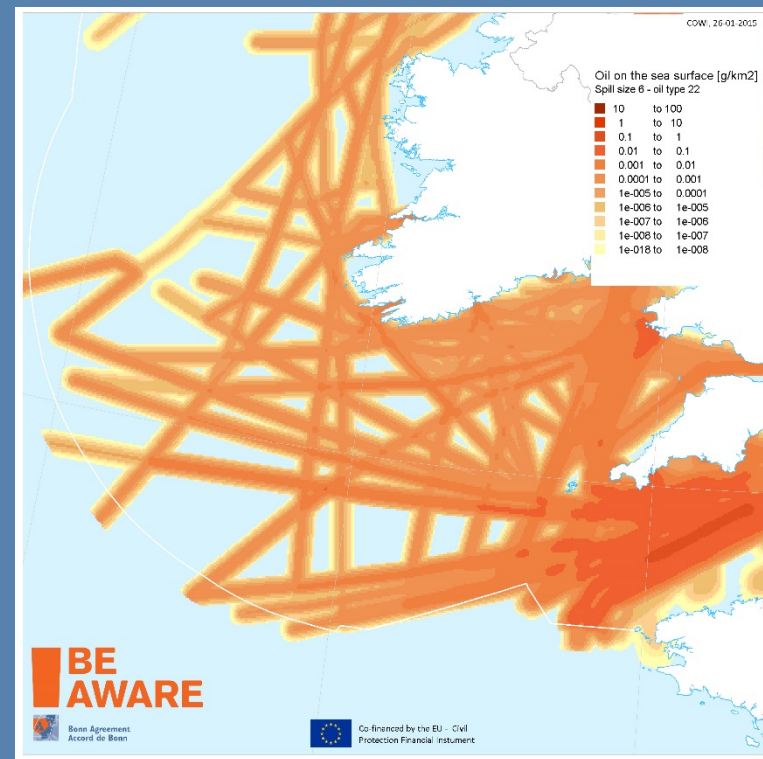
Oil 20

Model run without response

- Spill size 6



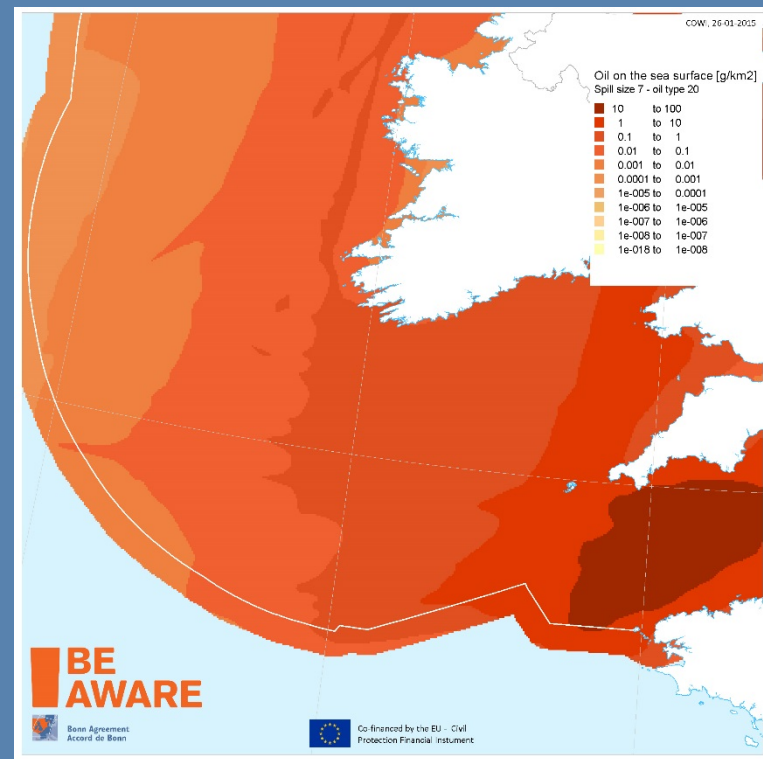
Oil 21



Oil 22

Model run without response

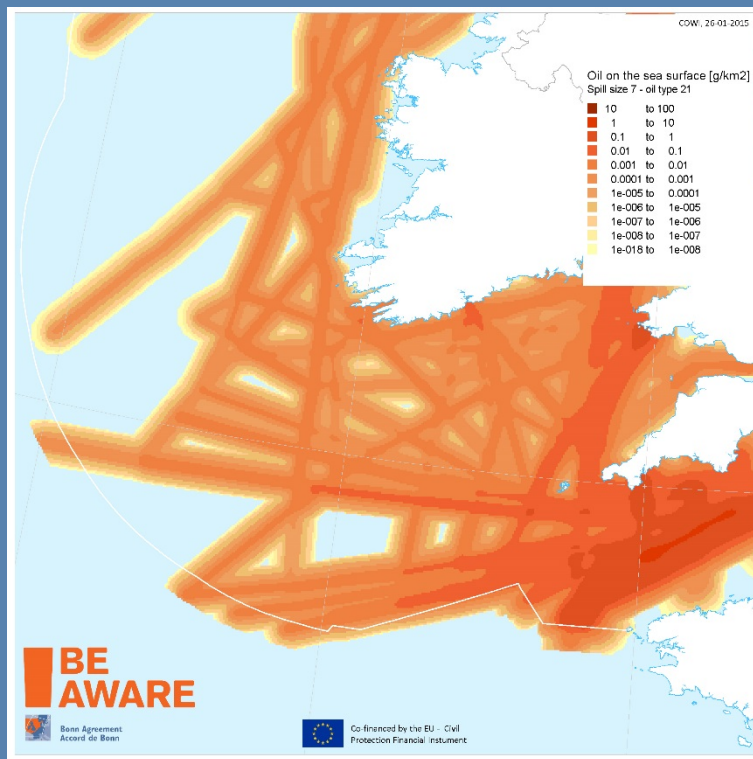
- Spill size 7



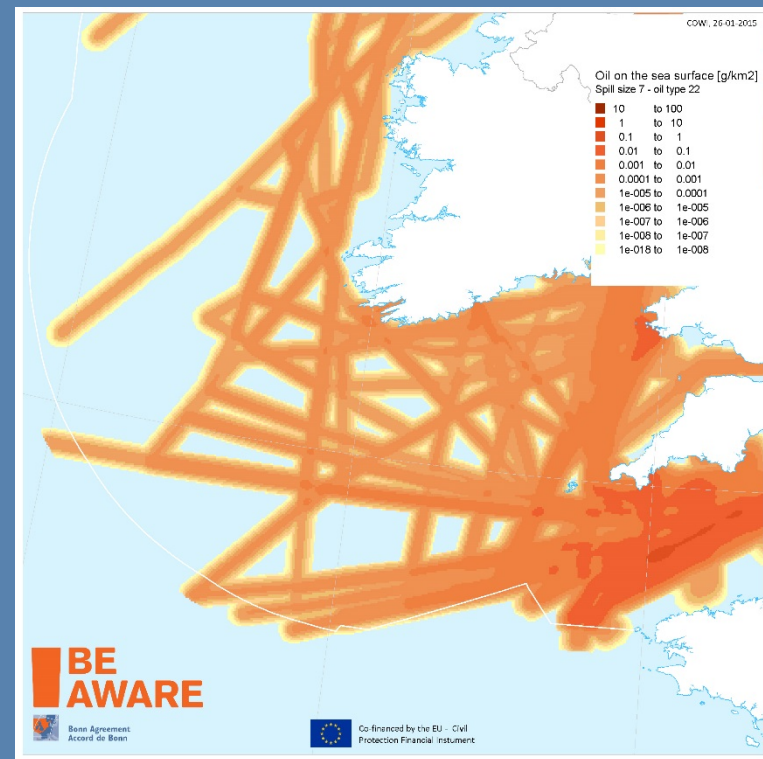
Oil 20

Model run without response

- Spill size 7



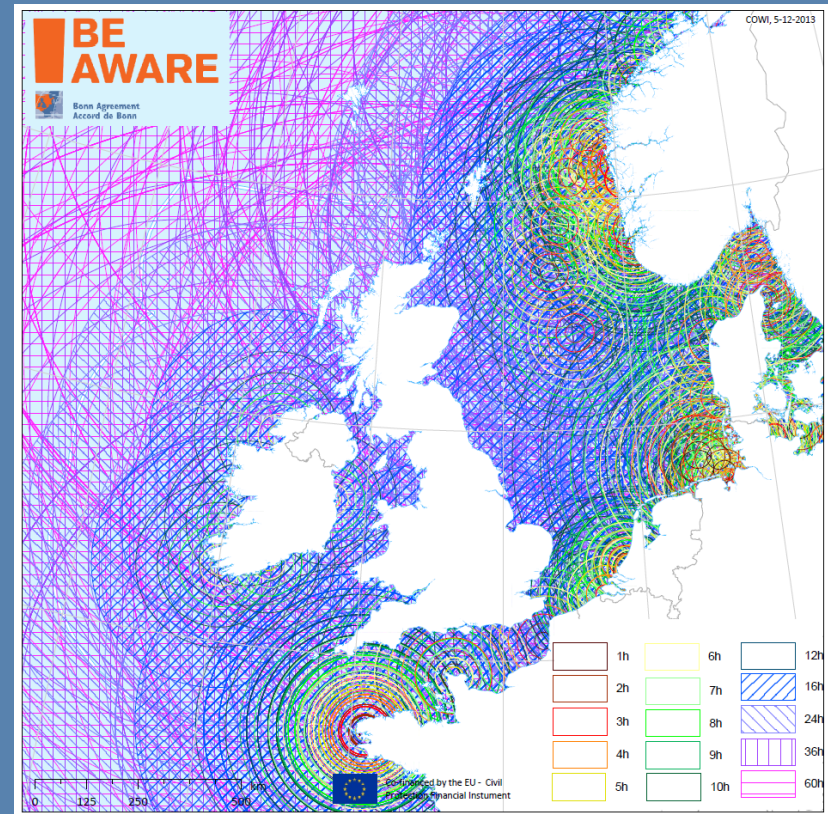
Oil 21



Oil 22

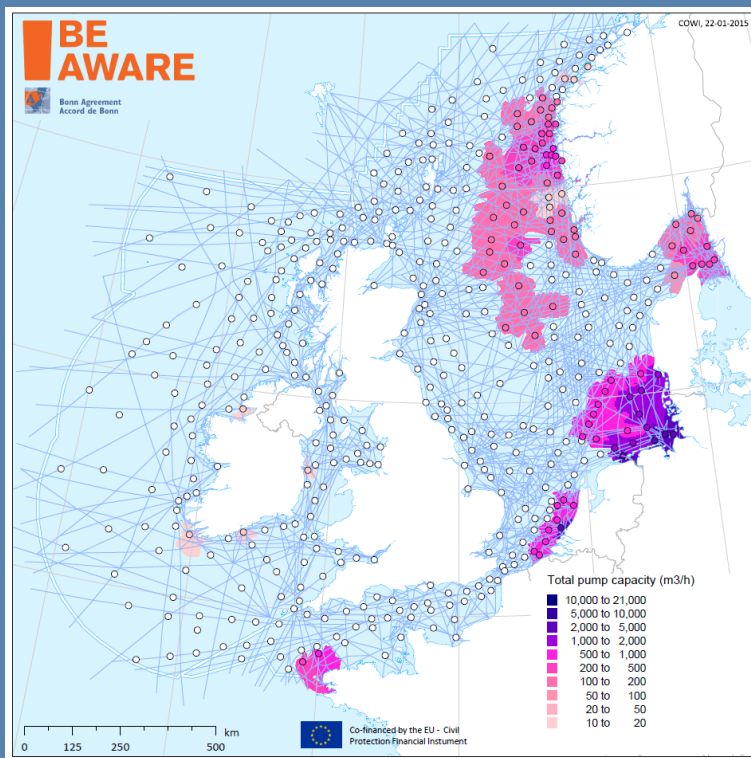
Model run with full response

- Not discrete model anymore, but evaluation of actual response at the time step evaluated.
- Mobilisation time
- Speed of vessel
- Vessel configuration
 - Pump capacity
 - Boom length

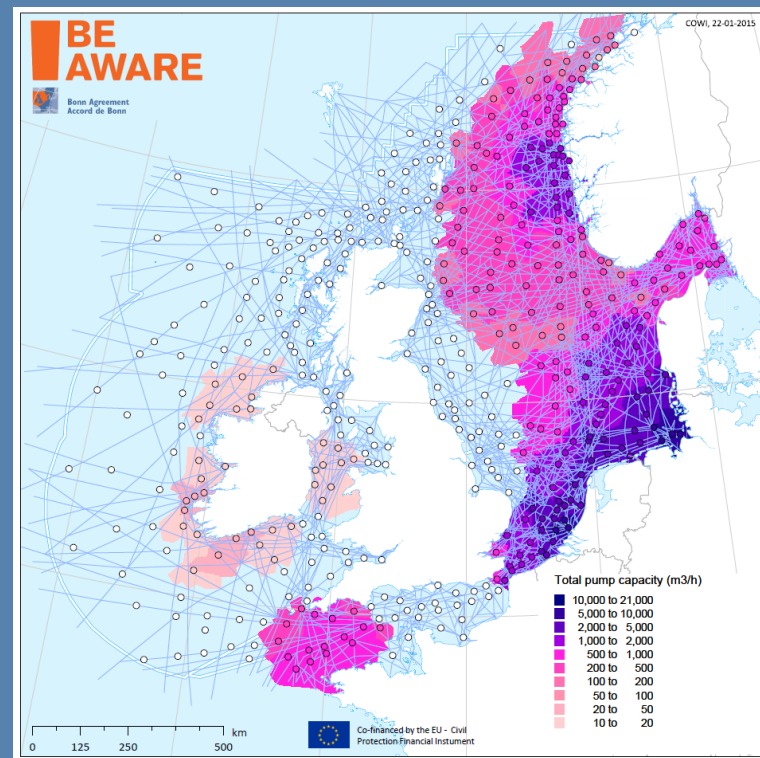


Model run with full response

- Total capacity at given time evaluated. Pump capacity



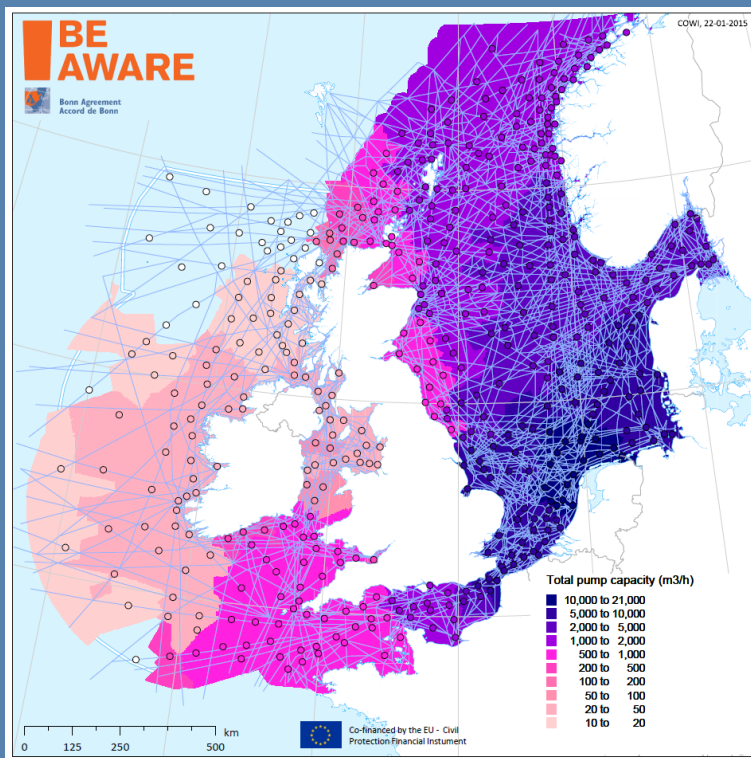
6 hours



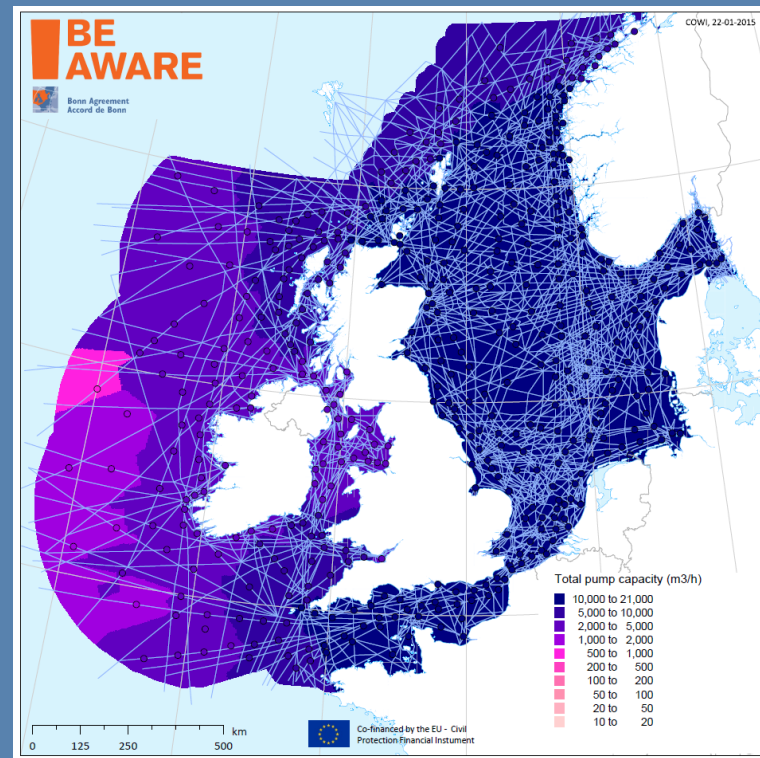
12 hours

Model run with full response

- Total capacity at given time evaluated. Pump capacity



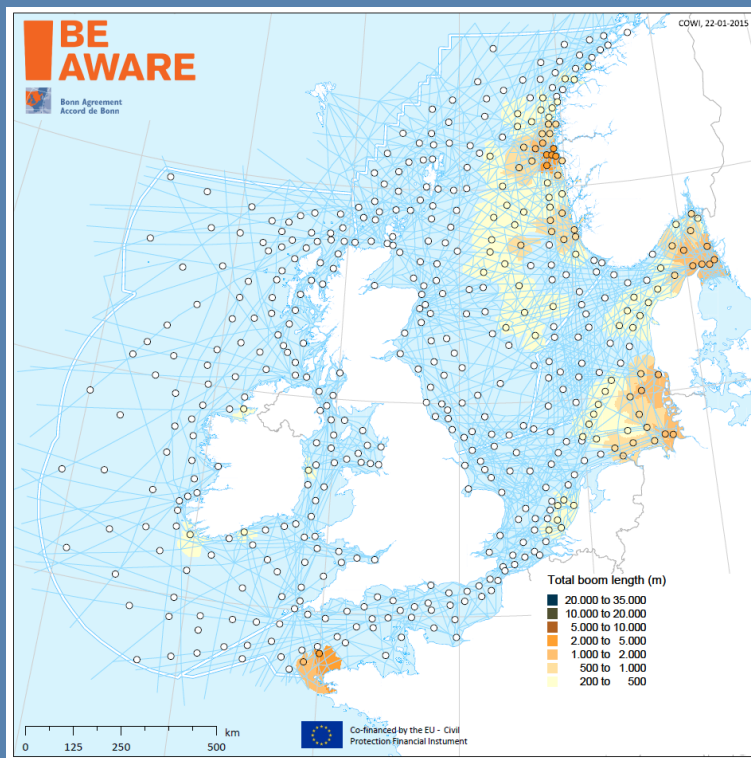
24 hours



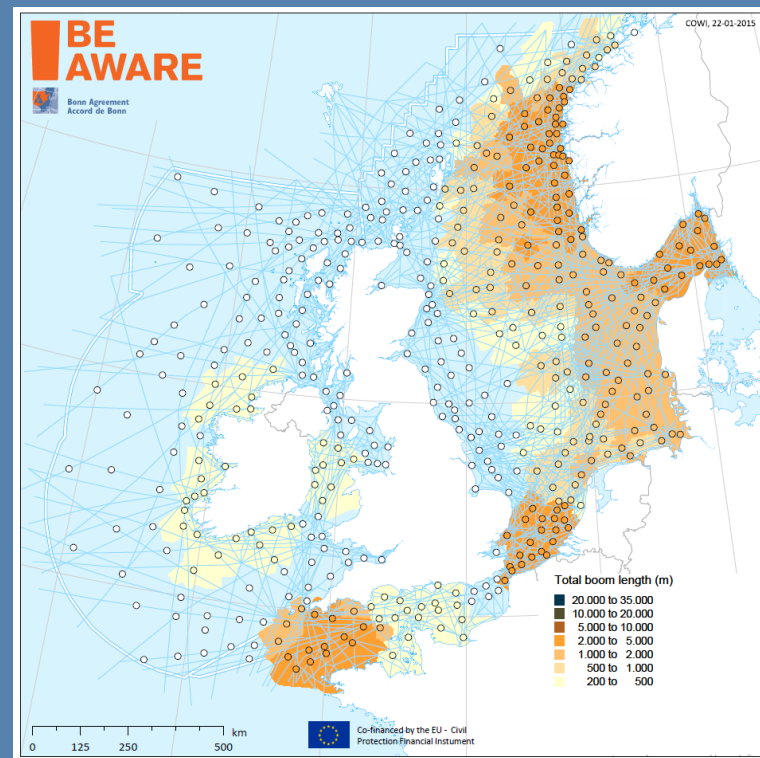
60 hours

Model run with full response

- Total capacity at given time evaluated. Boom length



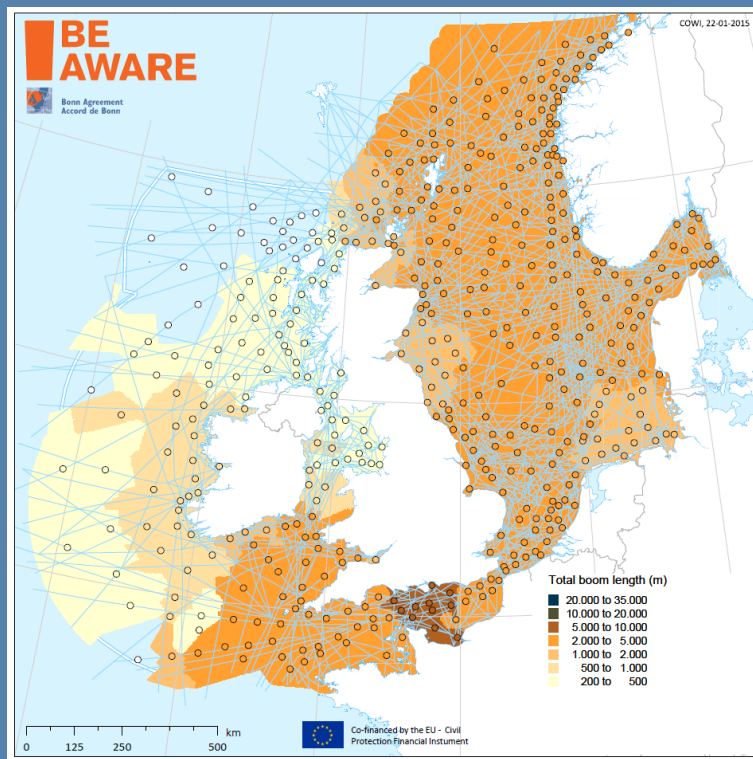
6 hours



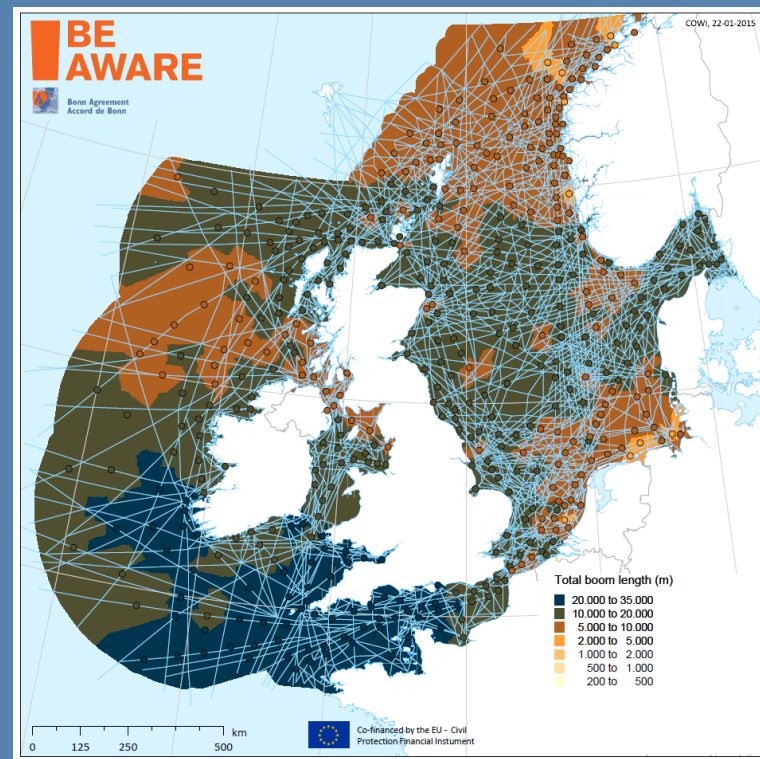
12 hours

Model run with full response

- Total capacity at given time evaluated. Boom length

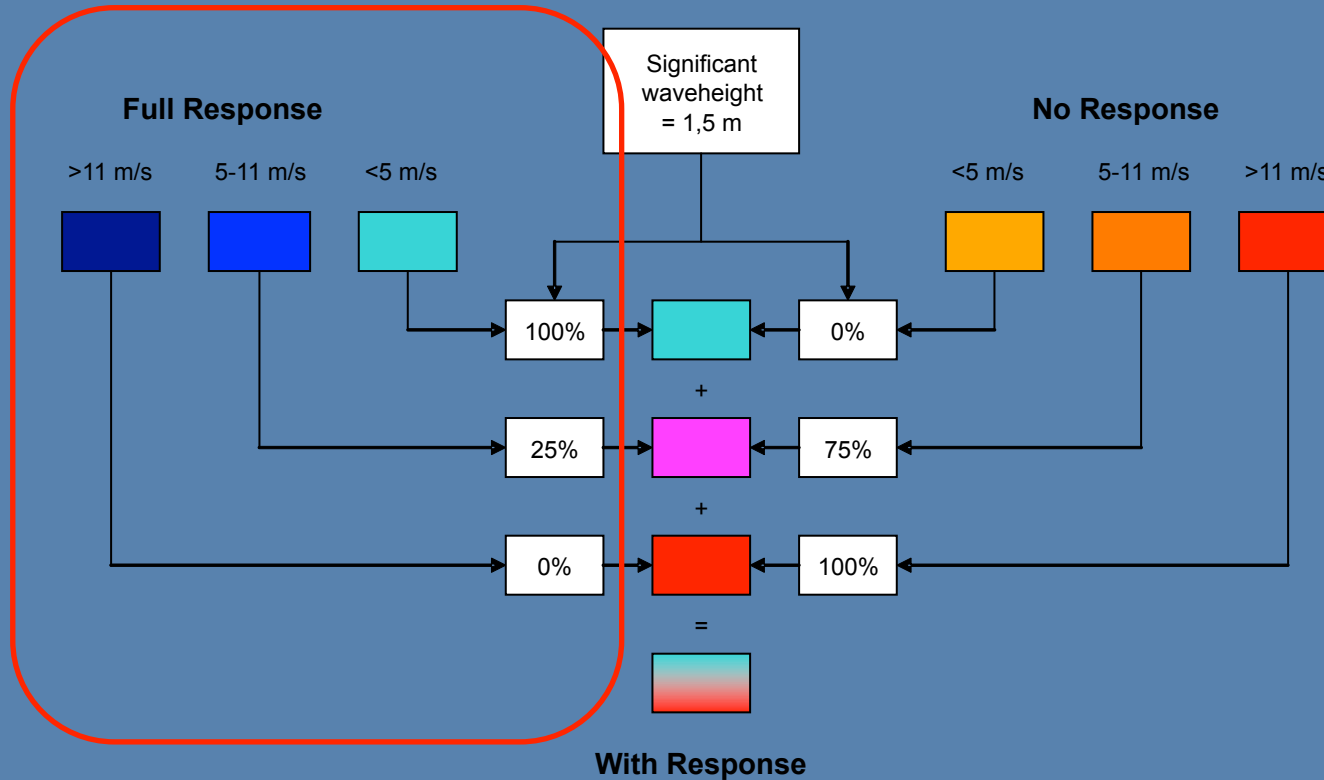


24 hours



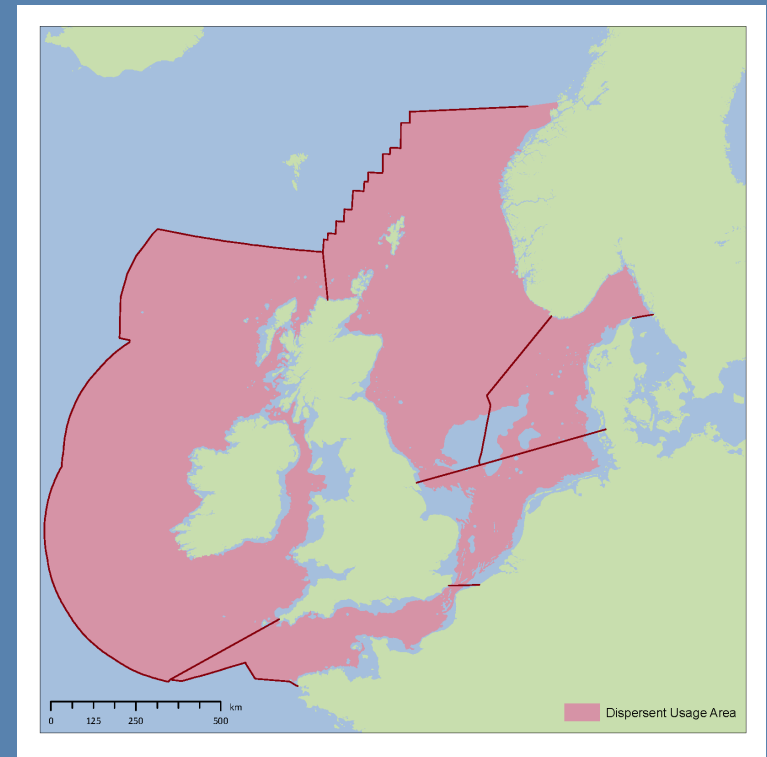
60 hours

Method aggregation overview



Model run with dispersants only

- Spills where dispersants are applied.
 - Position of the spills (are dispersants used, possible to use)
 - Oil type
 - Weather window - can spill be reached with sufficient amount of dispersants within given amount of time
 - Exact definitions need to be established



Upcoming tasks overview

- Run response only
- Run dispersant only
- Aggregation
- Repeat process with relevant changes for various scenarios