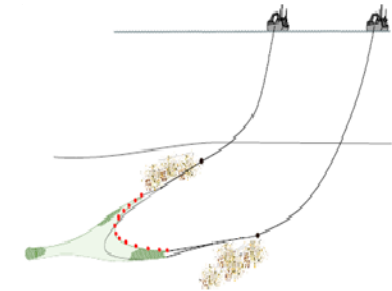
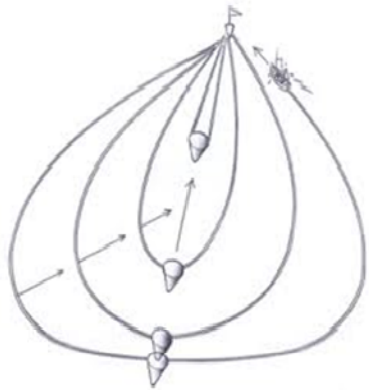


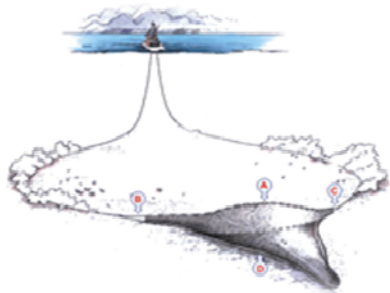
European bottom trawling: Fishing pressure distribution and intensity

Ole Ritzau Eigaard, DTU Aqua
Final BENTHIS Symposium, Brussels, 14-06-2017

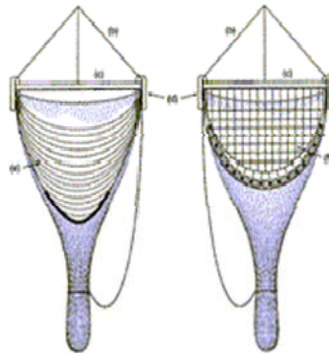
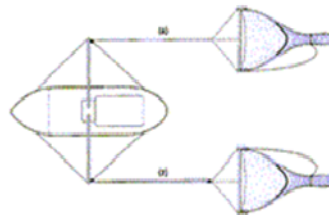
Mobile bottom contacting gears



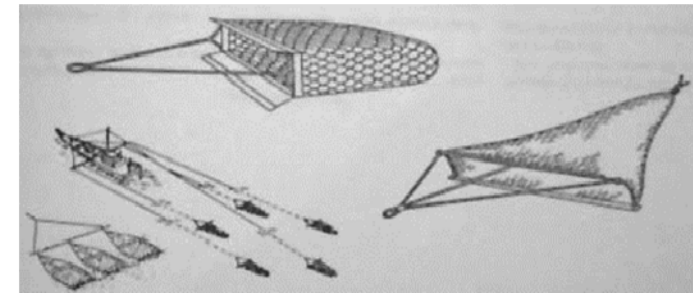
Otter trawls



Demersal seines



Beam trawls

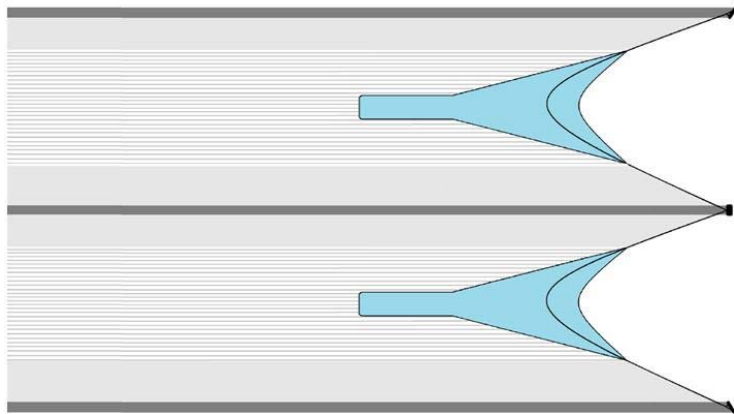
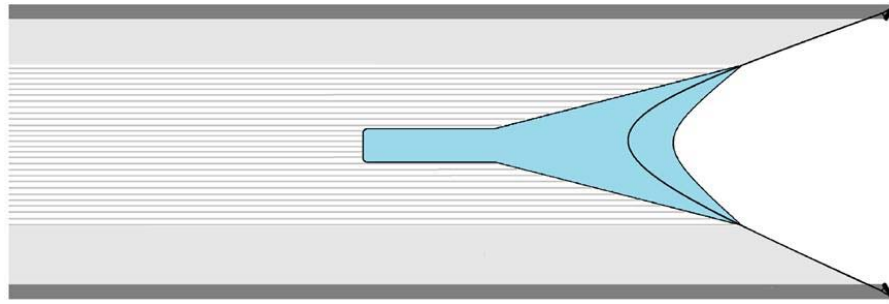





Dredges

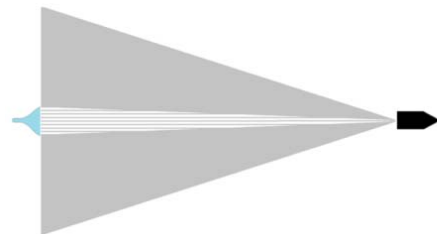
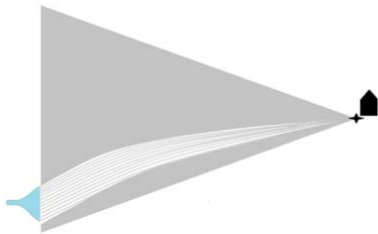
Gear components with seabed contact






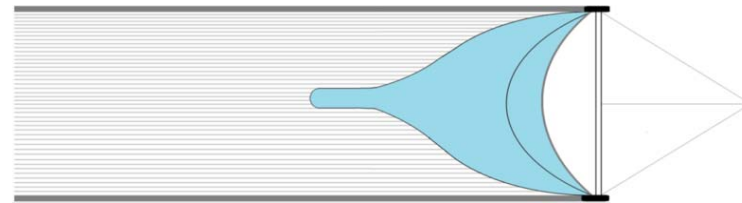
Conceptual gear footprints



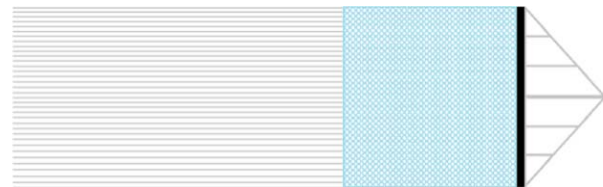
-  OT: Doors/Clumps/weights
-  OT: Sweeps and bridles
-  OT: Groundgear



-  SDN/SSC: Seine ropes
-  SDN/SSC: Groundgear
-  SDN: Anchor buoy



-  TBB: Shoes
-  TBB: Ground gear

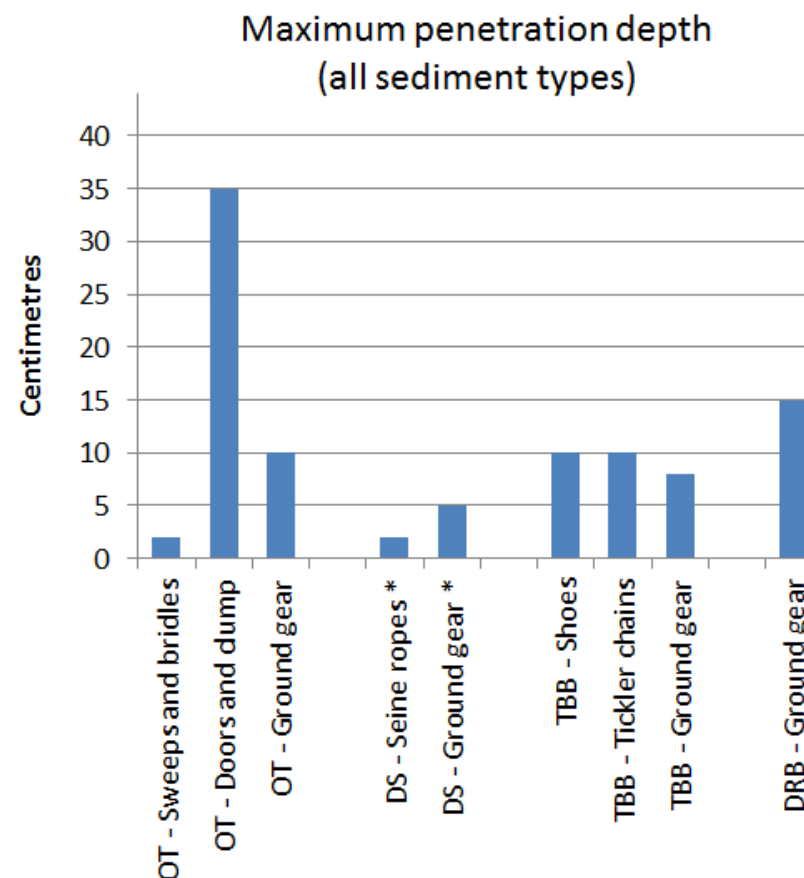


-  DRB: Ground gear

Parameterization of gear footprints

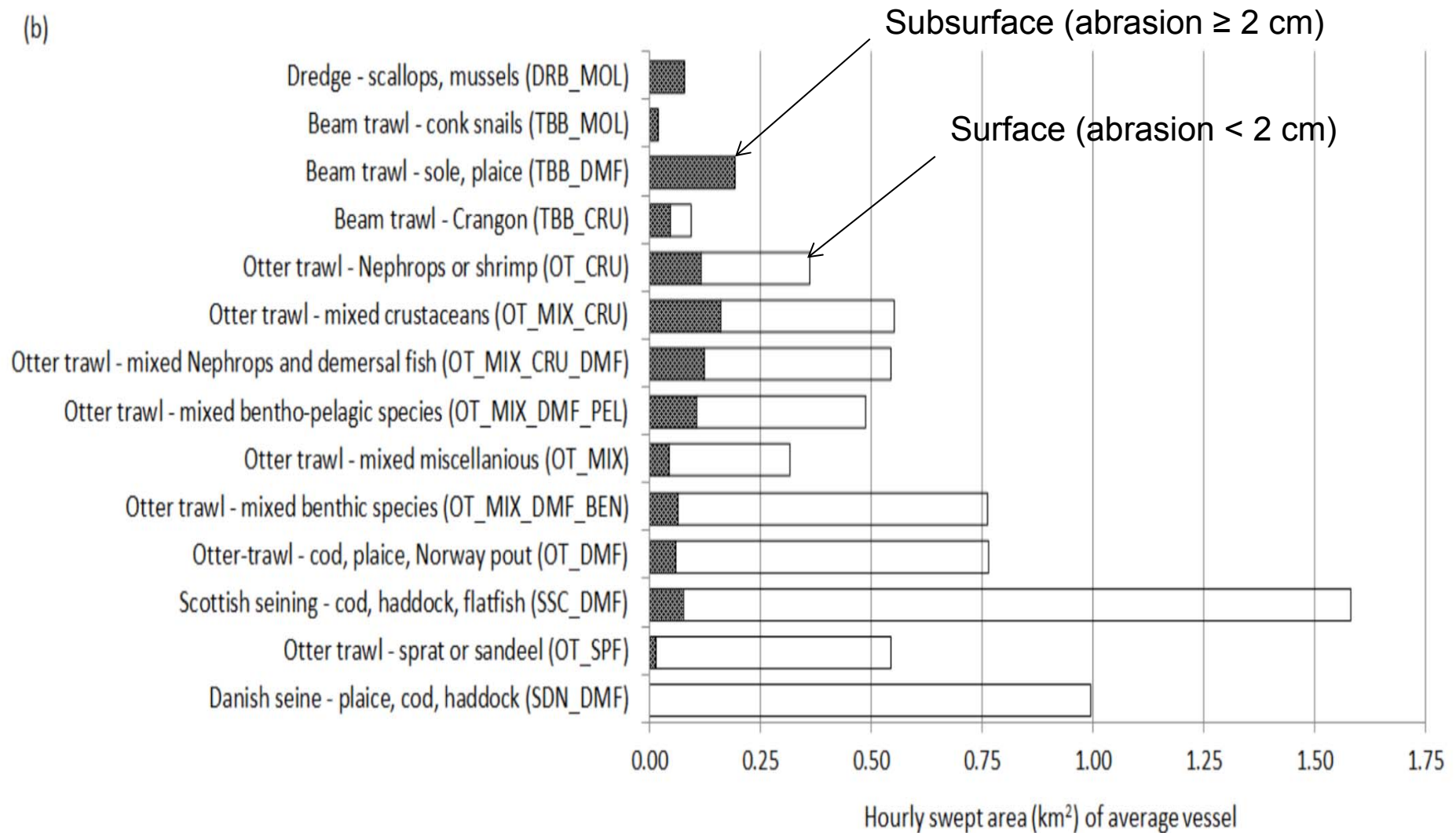
- Size gear components from industry survey (1132 responses from 11 countries)
- Penetration depth from literature review

Country:		
Fishing area:		Bottom trawls
Date:		BENTHIS-2013
vessel:		(partner)
Trawl	type and name	
Trawling mode*	one or two vessels (single or pair trawling)	
Rigging	number of trawls per vessel	
Net maker	company name	
Codend	stretched mesh size (mm)	
Target species	single species fishery: cod, plaice, Nephrops, etc. or mixed fishery: "cod, haddock and saithe", "nephrops and monkfish", etc. (common name(s) + FAO-code)	
Bottom type	bedrock, hard bottom, sand, hard clay, mud	
Vessel	engine power in kW	
	tonnage in GRT	
	Loa: overall length in metres	
Trawl circumference	number of meshes	
	stretched mesh size (mm)	
Trawl	Trawl height (metres)	
	Wing spread (metres)	
Doors	pelagic or bottom	
	number	
	producer and model	
	length (m)	
	height (m)	
	weight (kg)	
Door spread	door spread (metres)	
Sweeps	sweep length (metres)	
Bridles	number and length (metres)	
Tickler chains/lines	number	
	total weight of each chain or line (kg)	
Groundgear	length of groundgear (metres)	
	type, e.g. rockhopper, bobbins, discs, etc.	
	diameter of ground-gear (mm)	
	total weight of ground gear (kg)	
Clump	type (e.g. chain or roller)	
	weight of clump (kg)	
Other chains in gear	number and location in gear	
	total weight of each (kg)	
* In cases of pair trawling, it is sufficient with vessel information (kW, length and GRT) from the vessel/skipper interview		
Trawling speed (knots):		
Steaming speed (knots):		
Fuel consumption trawling (litres/hour):		
Fuel consumption steaming (litres/hour):		
Consumption other activities (litres/hour and activity):		



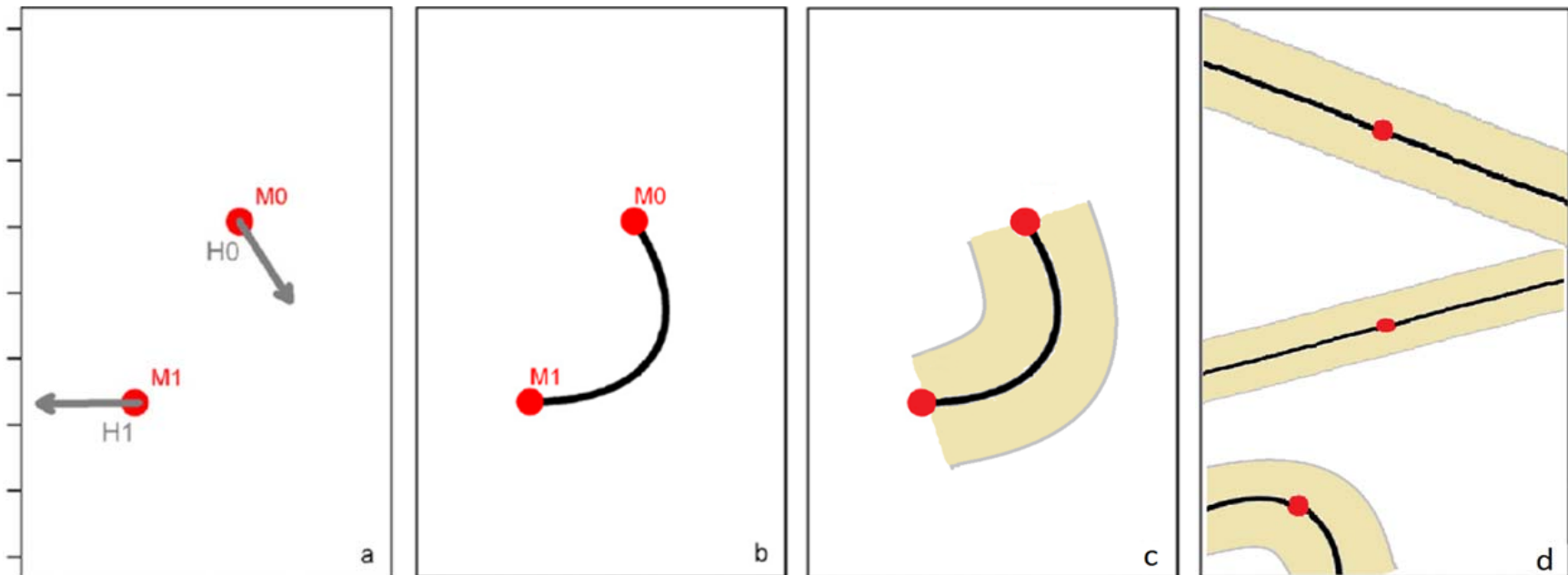
Gear footprints by metier

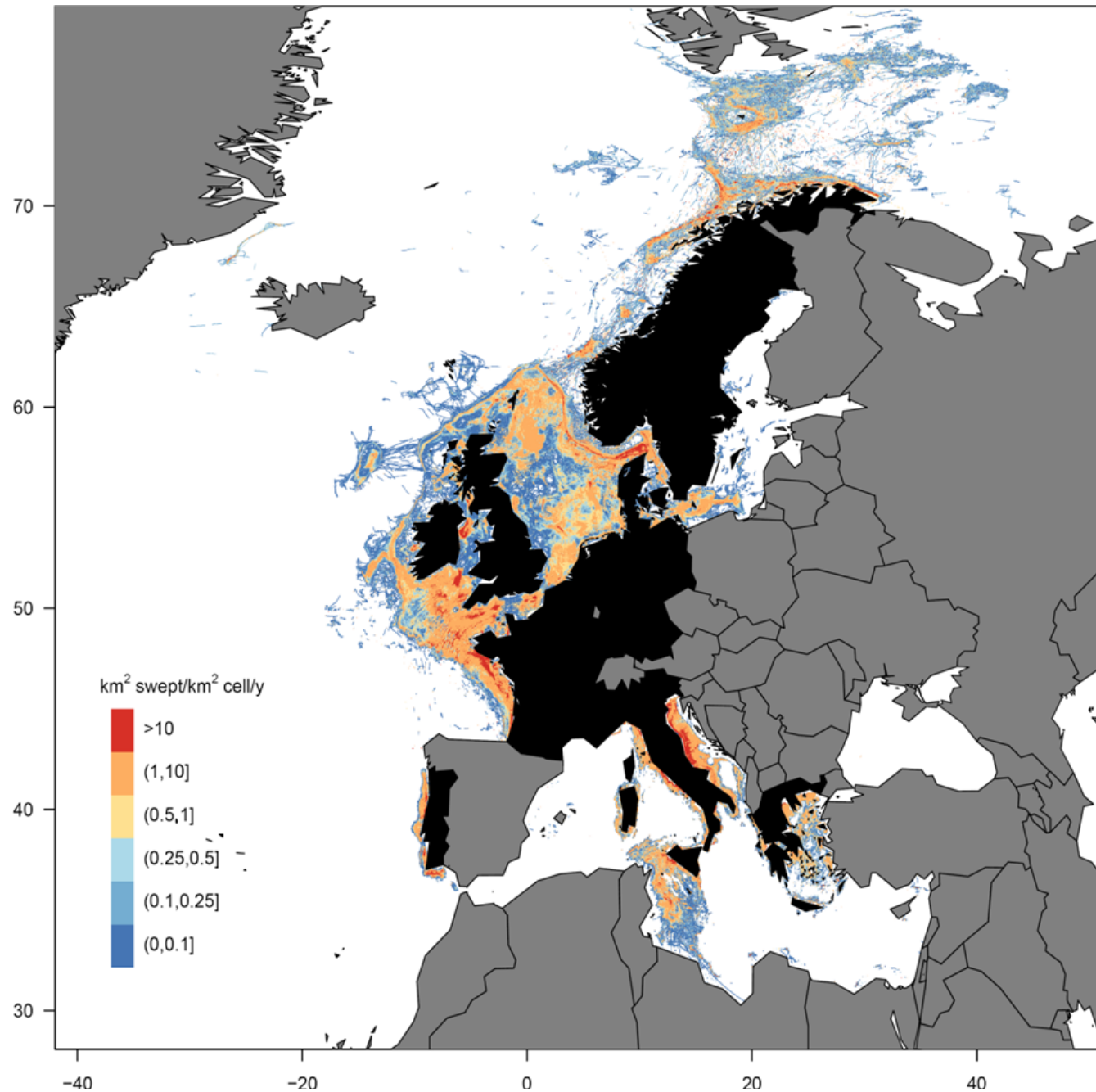
(b)



High-resolution mapping of fishing pressure from VMS and logbook data

- Extract trawling positions in VMS data based on speed profiles
- Interpolate vessel tracks from vessel speed and course
- Merge with modelled gear footprint size in logbook data to provide swept area
- Aggregate swept areas by year in gridcells of 1×1 min (longitude and latitude)





European wide map of trawling intensity in 1x1 min grid cells (approx. 2 km²)

Local trawling hot spots (intensity >10) exist in most management areas

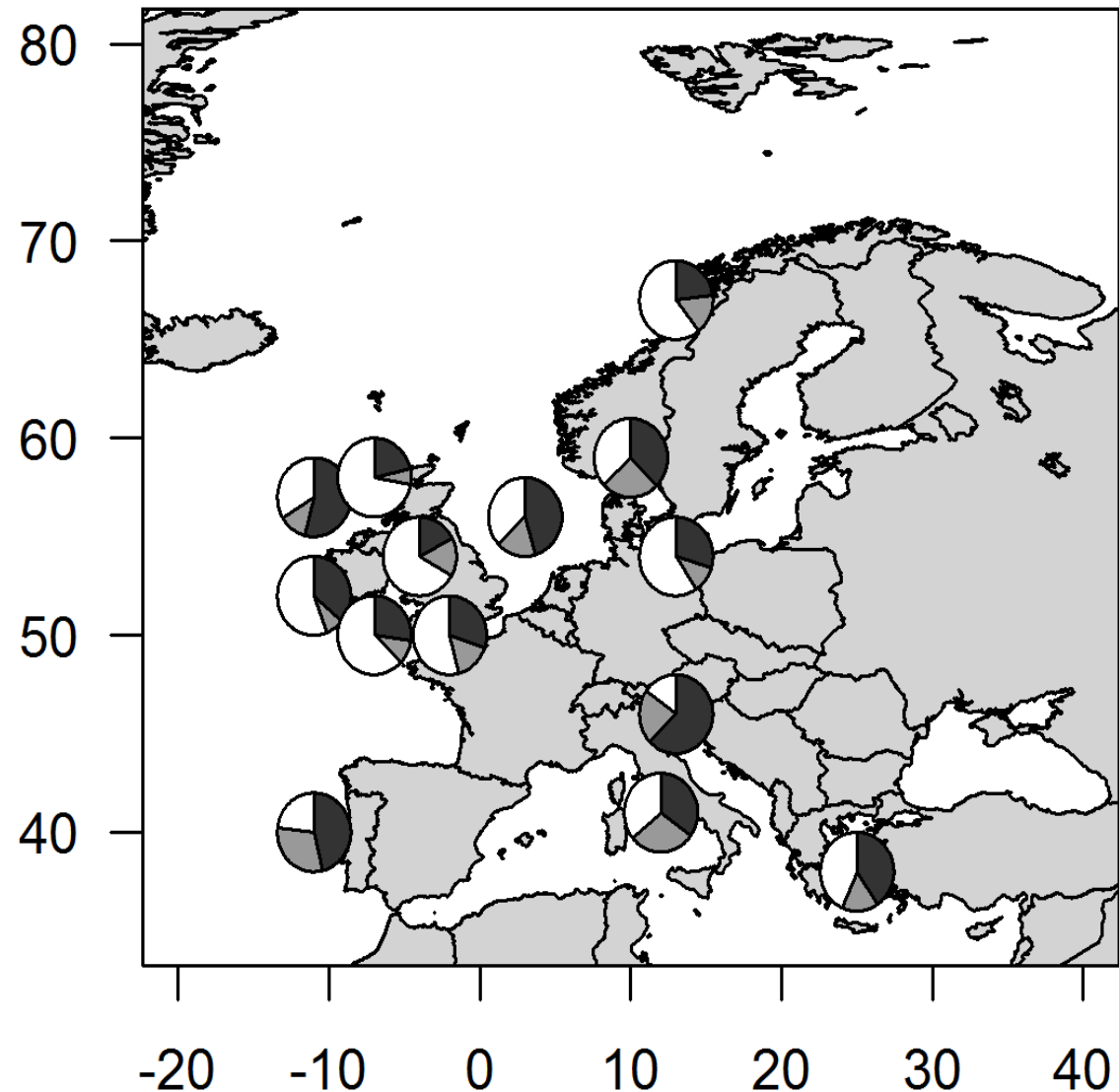
Highest average intensities (0-200m depth zone) in Adriatic Sea, Tyrrhenian Sea, off Portugal, Bay of Biscay, and Skagerrak




Footprint seabed – study period/short term (% seabed area trawled ≥ 1 x yearly)

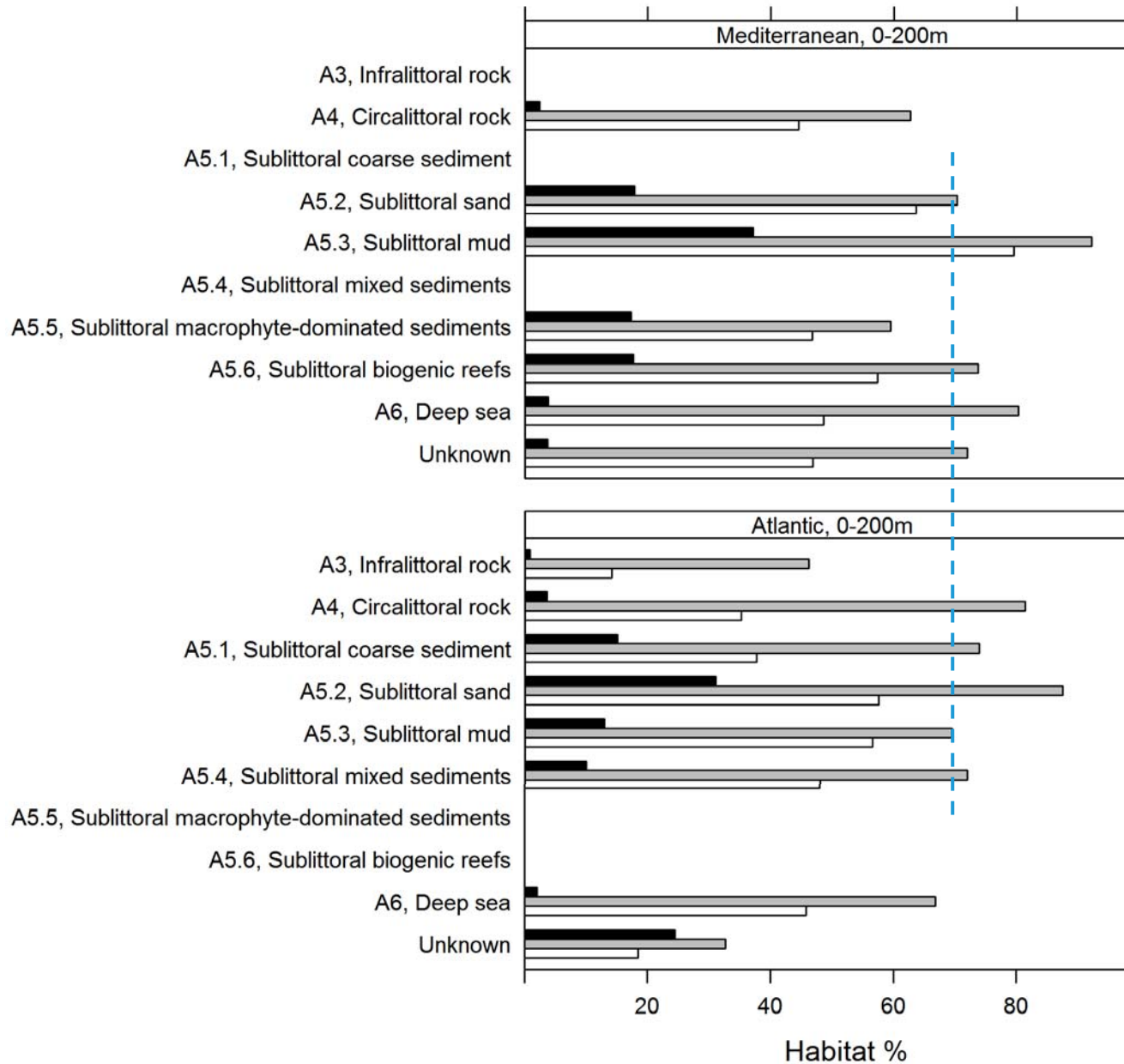
Only parts of the management areas trawled (black+grey)

Between 15% and 72% of the seabed area untrawled (white)

Trawling is aggregated with 90% of effort (black) in about 2/3 of footprint (black+grey)

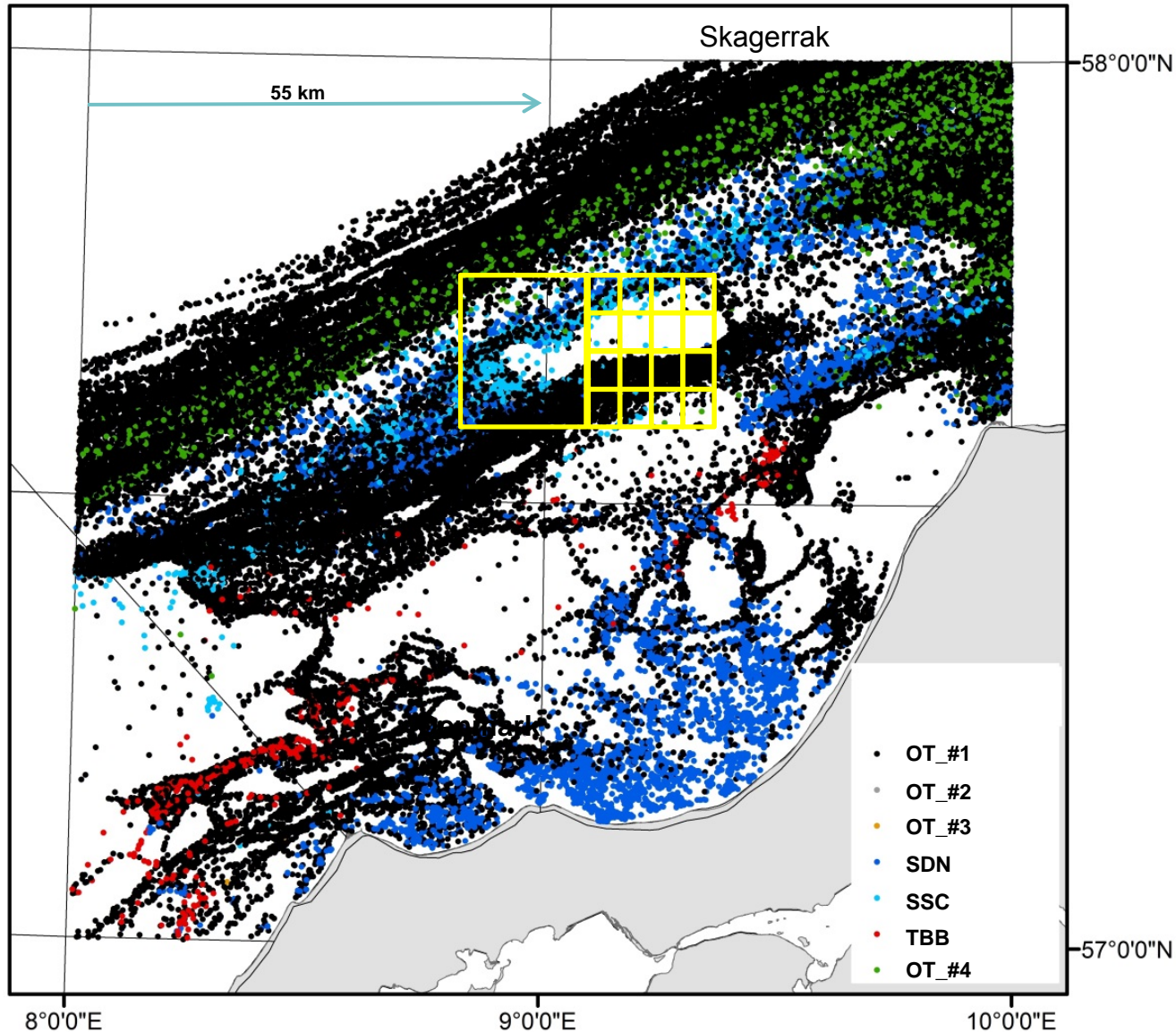


Footprint seabed  Footprint grid cells  Habitat surface area 



Trawling is extensive in all soft-sediment habitats, with grid cell footprints >70% for the 0-200m depth zone

Footprint estimates are scale dependent



- Trawling is mostly randomly distributed at fine scale (around 1x1 km), and becomes more structured with larger scale
- This distribution pattern is poorly captured by large scale analyses /grid cells, and footprints will typically be overestimated
- Bias increases with the scale of analyses/size of grid cells.

Overall conclusions

- Bottom trawls, seines and dredges are very different in design, dimensions and deployment and have very different gear footprints
- Over longer time periods, trawling is highly aggregated with 90% of all trawling effort occurring in only 50 % of the trawled grid cells
- This implies room for significant reductions of trawling impact at a minimal cost to the fishery
- The proportion of the sea floor that was untrawled in the study period varied between 15 – 72 % for the different management areas
- Highest trawling intensities were recorded in Adriatic Sea, Tyrrhenian Sea, Bay of Biscay, Skagerrak, and off Portugal
- Trawling occurs extensively over all soft sediment habitats with long term footprints of more than 70%



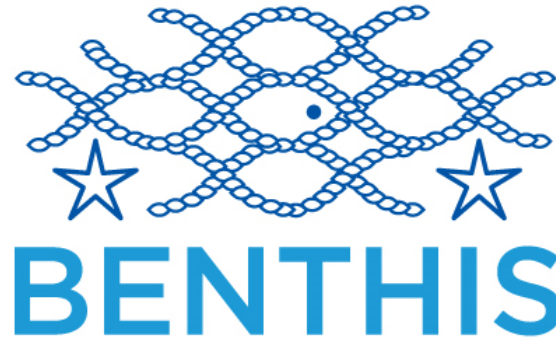
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WITTRUP SEAFOOD A/S



SYNTESA BUSINESS DEVELOPMENT



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