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Transnational mapping of cetacean bycatch risk in the Bay of Biscay and the Atlantic Iberian coast



Project CETAMBICION (DG ENV/MSFD 2020)

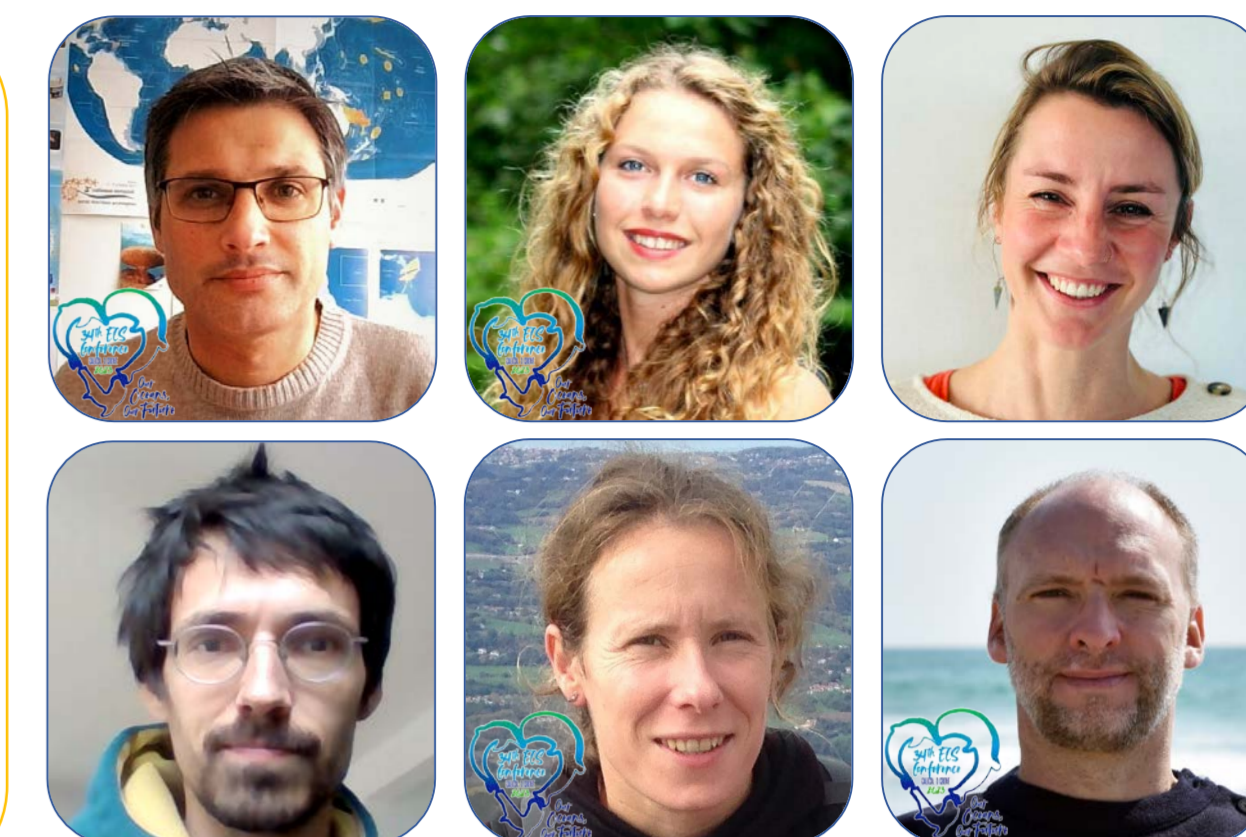
Fernando TEMPERA, Chloé MERRIEN, Nolwenn COZANNET, Vincent TOISON, Stéphanie TACHOIRES & Benjamin GUICHARD

What's going on?

- Mass mortality events linked to fisheries bycatch have intensified in the Bay of Biscay and Iberian coast over the last decade
- The phenomenon calls for urgent investigation and fisheries impact mitigation

Why it matters?

- EU member states are committed to protect marine mammals under the Habitats and the Marine Strategy Framework Directives
- Common Fisheries Policy sets bycatch reduction goals (Technical Measures Regulation)
- Strong societal demand for protected species bycatch reduction



See you at ECS 2023

What's in CETAMBICION WP2 task 3.2?

- A spatially-explicit risk analysis identifying geographical sectors where professional fishing activities have a higher probability of inducing cetacean by-catch.

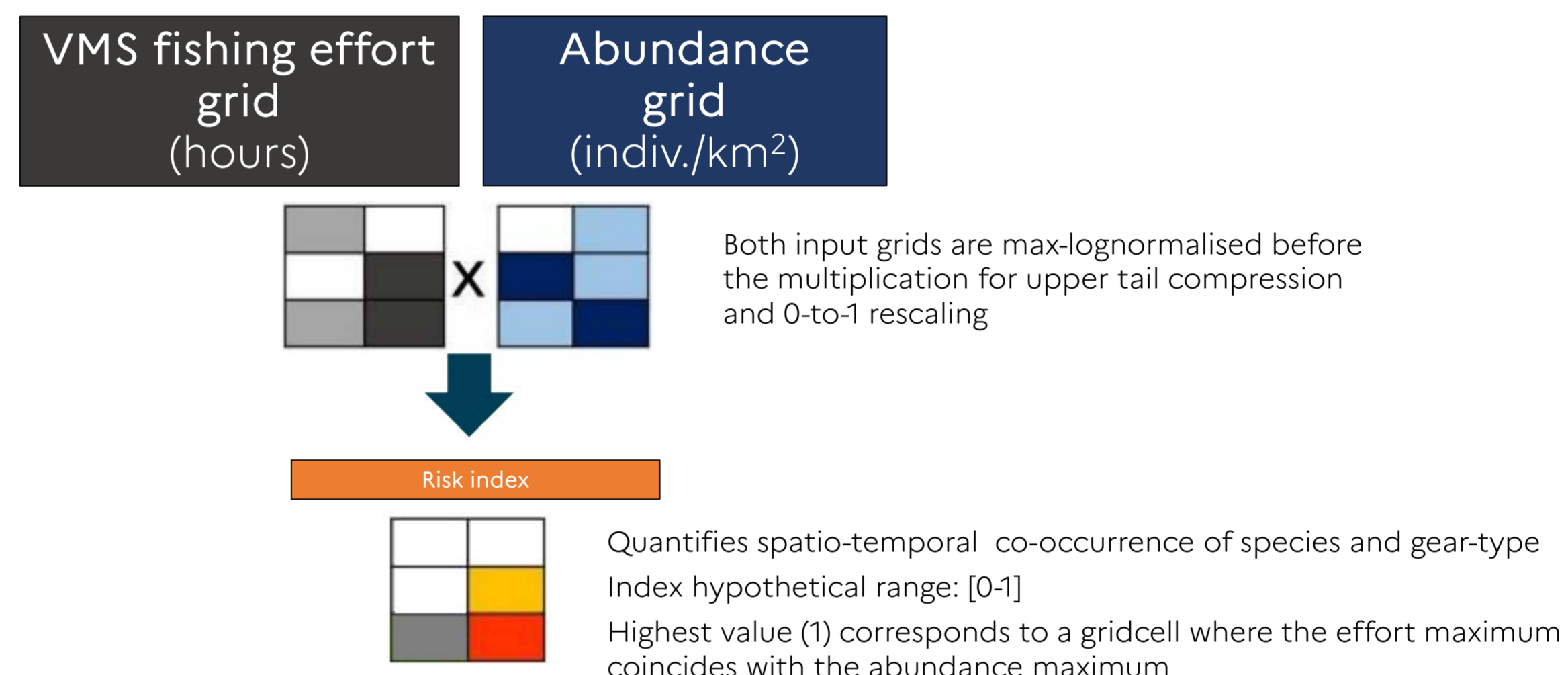
What species have been prioritised?

- A literature review highlighted the gears that are likely to generate by-catch for each species and those that do not present a risk.

Country/Map	Small toothed cetaceans			Large toothed cetaceans			Harbour porpoise			Baleen whales & sperm whale		
	FR	SP	PT	FR	SP	PT	FR	SP	PT	FR	SP	PT
Towed Dredges (DRB)	1-2	-	-	1-2	-	-	1-2	-	-	1-2	-	-
Single boat bottom otter trawl (OTB)	3	4	1-2	1-2	1-2	-	1-2	1-2	-	1-2	-	-
Bottom pair trawls (PTB)	3	4	-	1-2	3	-	1-2	1-2	-	1-2	-	-
Twin bottom otter trawls (OTT)	3	-	-	1-2	-	-	1-2	-	-	1-2	-	-
Beam trawls (TBB)	1-2	-	1-2	1-2	-	-	1-2	-	-	1-2	-	1-2
Single boat midwater otter trawls (OTM)	4	-	-	4	-	-	1-2	-	-	1-2	-	-
Midwater paired trawls (PTM)	4	-	-	4	-	-	1-2	-	-	1-2	-	-
Hand lines and hand-operated pole-and-lines (LHP)	-	1-2	-	1-2	-	-	1-2	-	-	1-2	-	-
Mechanised lines and pole-and-lines (LHM)	-	1-2	-	1-2	-	-	1-2	-	-	1-2	-	-
Trolling lines (LTL)	-	1-2	-	1-2	-	-	1-2	-	-	1-2	-	-
Drifting longlines (LLD)	-	1-2	-	3	-	1-2	-	-	-	1-2	-	-
Set longlines (LLS)	-	1-2	-	3	-	1-2	-	-	-	1-2	-	-
Pots (FPD)	-	1-2	-	1-2	-	-	1-2	-	-	3	-	1-2
Fyke nets (FYK)	-	-	1-2	-	-	-	-	1-2	-	-	-	1-2
Stationary uncovered pound nets (FPN)	-	-	1-2	-	-	1-2	-	1-2	-	-	-	1-2
Trammel nets (GTR)	-	4	-	4	-	-	4	-	-	3	-	1-2
Set gillnets (anchored) (GNS)	-	4	-	4	-	-	4	-	-	3	-	1-2
Drift gillnets (GND)	-	4	1-2	4	1-2	-	1-2	1-2	-	1-2	-	-
Purse seines (PS)	4	3	4	4	-	1-2	-	-	-	-	-	-
Surrounding nets without purse lines, lampara nets (LA)	3	-	-	1-2	-	-	-	3	-	-	1-2	-
Scottish seine (SV)	3	-	-	1-2	-	-	-	3	-	-	1-2	-
Danish seine (SV)	3	-	-	1-2	-	-	-	3	-	-	1-2	-
Pair seine (SV)	1-2	-	-	1-2	-	-	-	1-2	-	-	1-2	-
Beach seines and boat seines (SB) (SV)	-	-	4	-	-	1-2	-	-	4	-	-	1-2

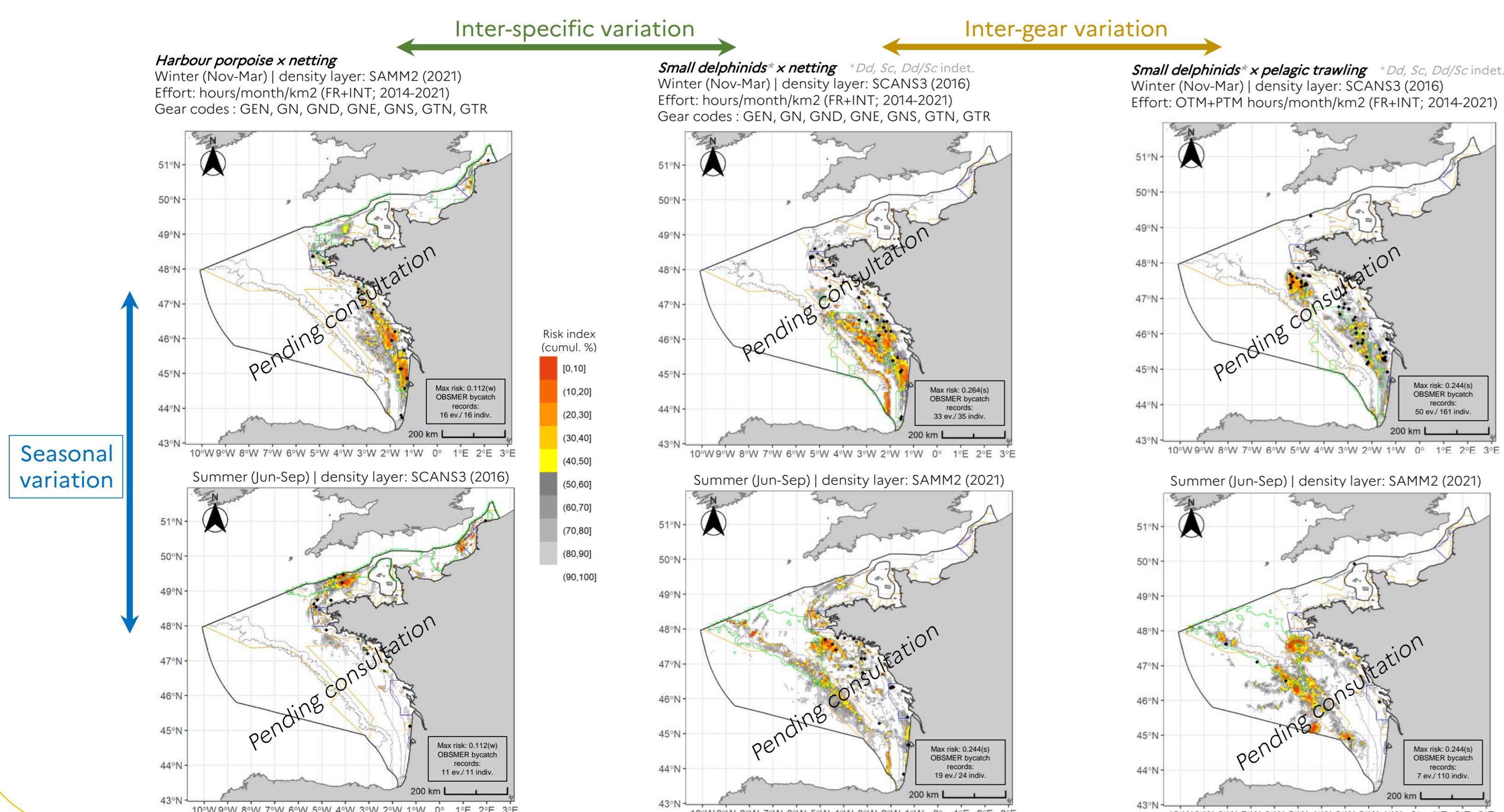
The bycatch risk analysis method

- Spatial resolution: harmonised 3 by 3 min grids
- Cetambicion species x gear type *interaction matrix*
- Species distributions: Predictive density surface layers
- VMS effort data: seasonally-averaged number of hours of fishing activity per month per pixel per gear type per vessel nationality



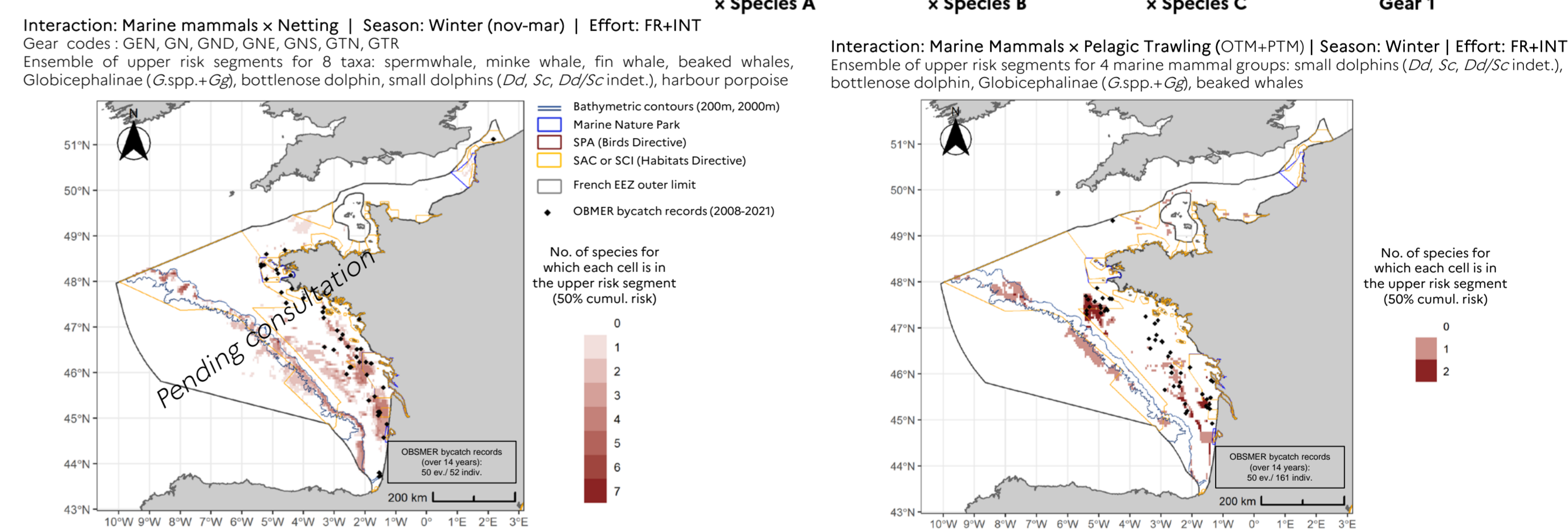
What we found

- Areas of high bycatch risk that vary between 'species x gear type' couples
- Good match between high risk areas and bycatch observations collected at sea under the French Fisheries Observers Programme (OBSMER, EU DCF)
- Joint risk maps that highlight coherent geographical sectors that gear-specific observation programmes might target
- Cetambicion risk analyses focus on marine mammals; in France the approach has been extended to all recognised 'protected species x gear type' interactions (incl. marine mammals, sea birds, sea turtles and anadromous fish)



Joint (multispecific) risk

- Number of species for which each cell is in the upper risk segment (50% of cumulative risk)



The code...

- R scripts developed to estimate and map bycatch risk for all recognized interactions 'marine protected species x gear type'
- Scripts automate, speed up and ensure repeatability of geomatic processing
- In the event of data updates, scripts permit re-running the analyses and producing revised risk maps

What's next?

- Fisheries observers programmes at sea to groundtruth risk areas
- Bycatch reduction trials and regulatory measures

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