



Large Scale survey data to support noise assessment in the Black Sea

Frassà Veronica¹, Prospathopoulos Aristides², Maglio Alessio³, Ortega Noelia⁴, Paiu Marian⁶, Azzellino Arianna¹

¹ Politecnico di Milano DICA, ²Hellenic Centre for Marine Research (HCMR), ³ SINAY maritime data solution, ⁴ Centro Tecnológico Naval y del Mar, CTN-Marine Technology Centre, ⁵Mare Nostrum NGO, ⁶ Biology Faculty, Bucharest University

INTRODUCTION

Sighting data deriving from the ACCOBAMS Survey Initiative (ASI-CeNoBS Project), enabled to investigate the habitat preferences of the three cetacean species occurring in the Black Sea waters: bottlenose dolphin, common dolphin and harbour porpoise. The aims of this study are to develop habitat models in order to estimate the presence probability of the three cetacean species and to demonstrate the usefulness of these habitat models in support of environmental status assessments where the stressor is the shipping noise. This study is part of the QuietSEAS project funded by DG Environment of EU Commission (www.quietseas.eu).

MATERIALS AND METHODS

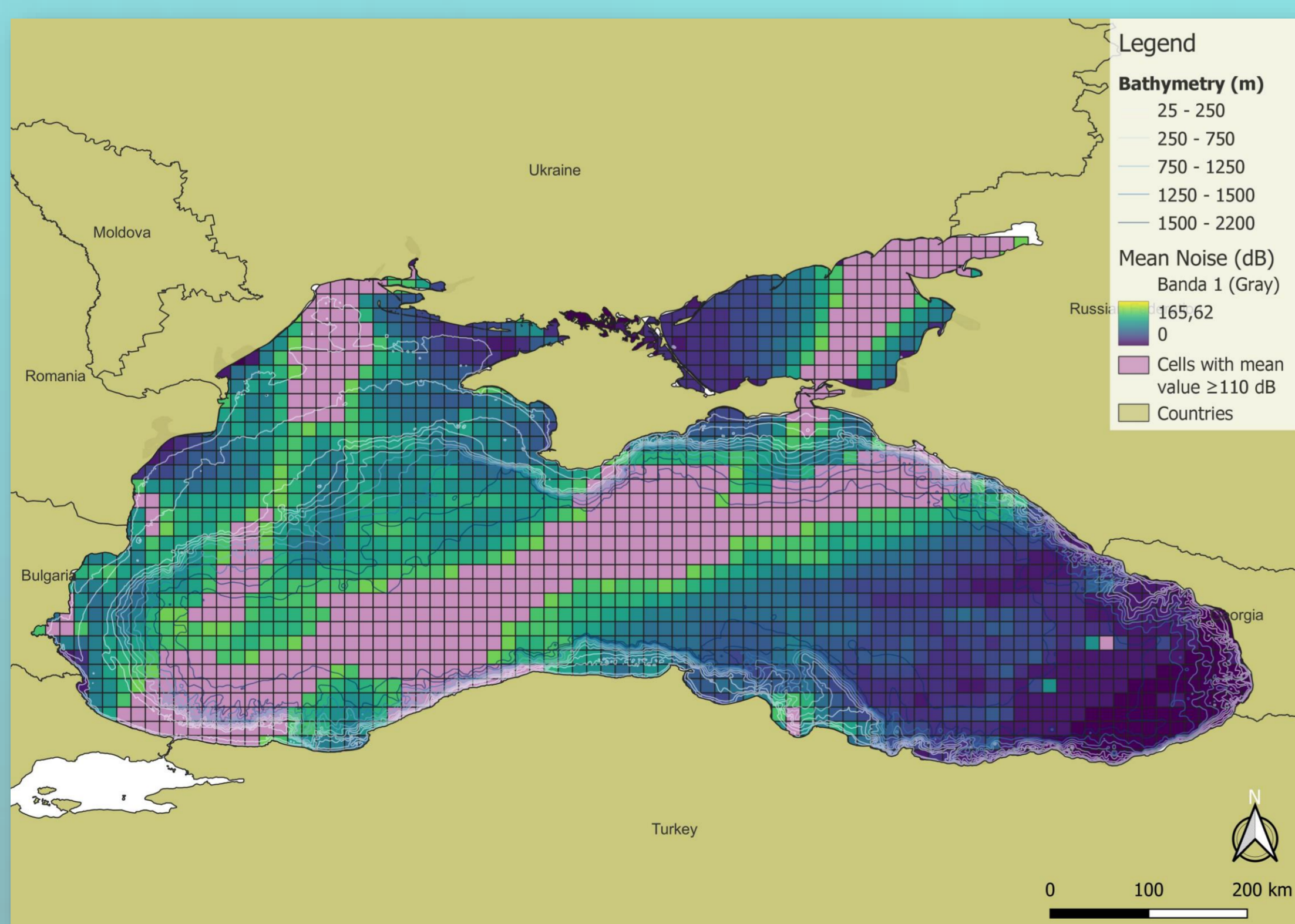
The sightings from the aerial survey are distributed as follows: 117 of bottlenose dolphin, 715 of common dolphin and 884 of harbour porpoise. A stepwise binary logistic regression analysis was applied to the species presence and absence gridded data using depth and sea bed slope cell statistics as possible covariates. The noise assessment was conducted generating risk maps by superimposing noise maps with Potential Usable Habitat Area (PUHA) maps, derived from habitat models, and calculating the overall proportion of the area exposed to shipping noise above 110 dB re 1µPa noise level for the three target species (QuietSEAS Project Deliverable 5.2).

RESULTS

Stepwise binary logistic regression analysis reported overall percentage of correct predictions from 89% to 92% for the three species.

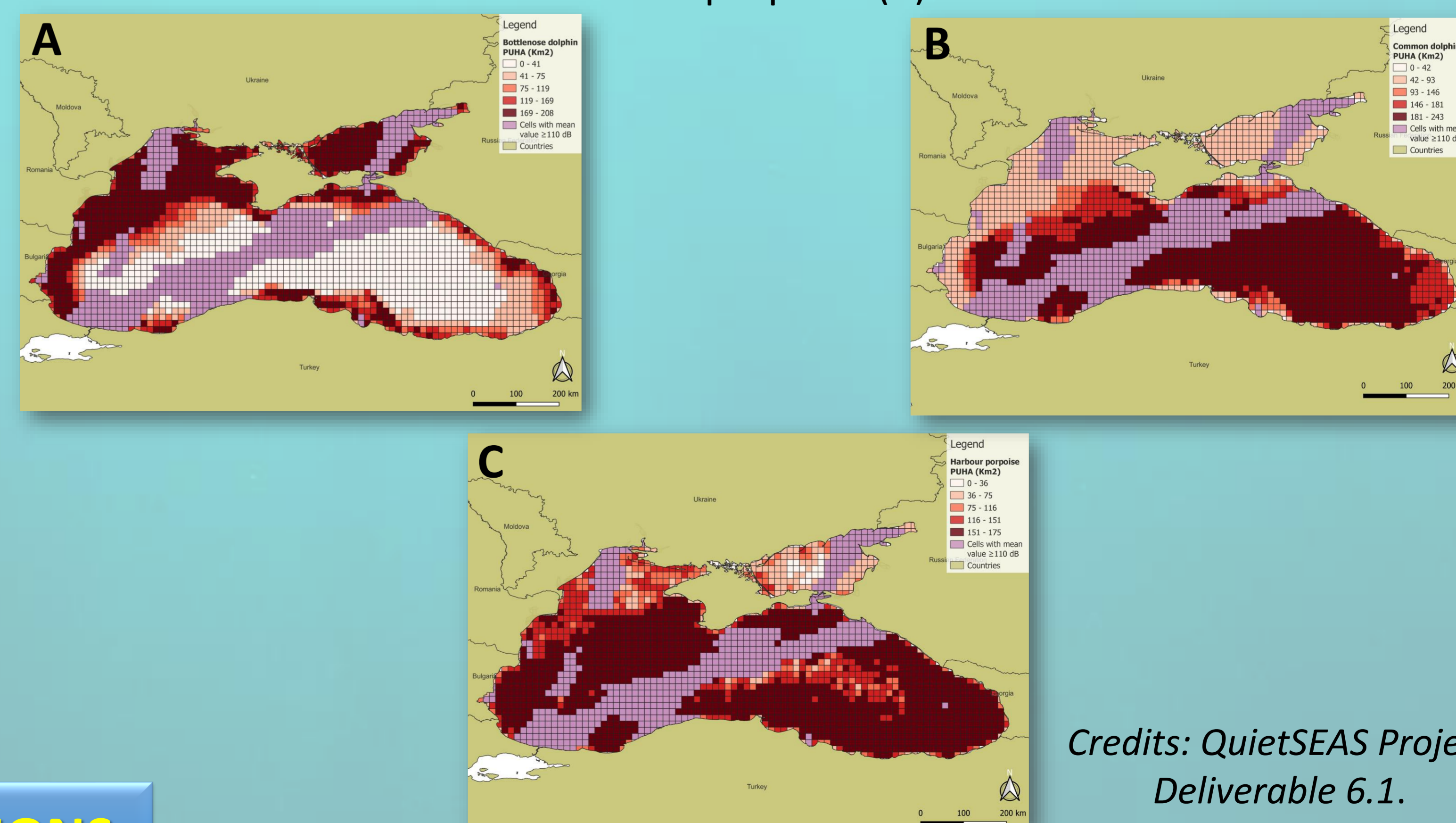
Species	Covariates	Regression coefficients (B)	Significance level	Overall Correct Predictions (%)
Bottlenose Dolphin	Cell effort (km)	0.181	<0.001	90.0
	Cell mean depth (m)	-0.002	<0.001	
	Constant	-1.228	0.003	
Common Dolphin	Cell effort (km)	0.153	<0.001	89.1
	Cell Mean Depth (m)	-0.001	0.015	
	Cell Max Depth (m)	0.002	<0.001	
	Constant	-3.430	<0.001	
Harbour Porpoise	Cell effort (km)	0.193	<0.001	92.5
	Cell Mean Slope (m)	0.033	0.045	
	Constant	-5.106	<0.001	

The simulated noise map shows that noise SPL (sound pressure level) above 110 dB re 1 µPA occupies 25.2% of the Black Sea.



Credits: QuietSEAS Project Deliverable 5.2

Overlaying the noise map with the species habitats it can be shown that the percentage of impacted habitat is very similar for the three species: 21.4% for bottlenose dolphin (A), 26.18% for common dolphin (B) and 24.46% for harbour porpoise (C).



Credits: QuietSEAS Project Deliverable 6.1.

CONCLUSIONS

Large-scale synoptic surveys may provide data that are useful and functional for modelling the species habitat suitability. This study shows how physical predictors such as depth and sea bed slope may be very effective in predicting the potential distribution and habitat preferences of cetaceans. It has been shown how the application of habitat models may contribute to the assessment of the species noise exposure and corresponding risk, supporting management.