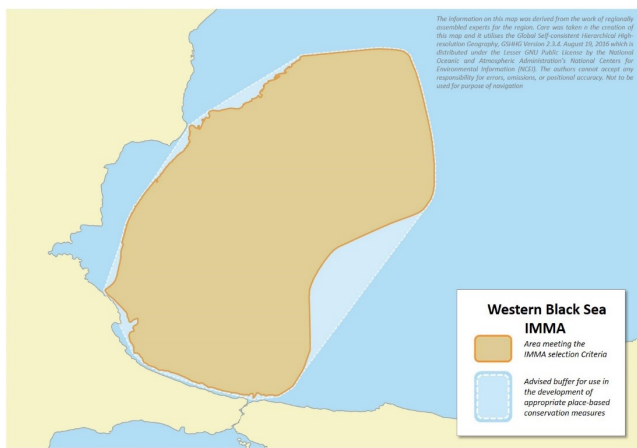


Western Black Sea IMMA

Description

The Western Black Sea IMMA extends from the 60 m isobath out to the 2000 m isobath, including waters off Romania, Bulgaria and Turkey. It is characterized by a combination of shelf and offshore regions, covering broad-scale habitats like deep circalittoral coarse mixed sediments (shelly muds with *Modiolula phaseolina*), deep circalittoral sand and sandy mud (sand and sandy mud with tunicates), deep circalittoral mud (mud with *Terebellides stroemii*, *Pachycerianthus solitarius*, *Amphiura stepanovi*), deep circalittoral suboxic calcareous muds (white muds with *Bougainvillia muscus* and nematode communities) and deep circalittoral anoxic muds and abyssal seabed.

The peculiarities of cetacean ecology in the Black Sea are conditioned mainly by the high degree of geographical isolation of the sea, its relatively low salinity, the significant seasonal fluctuations of water temperature, and the presence of anoxic water saturated with hydrogen sulphide (Gol'din et al., in press). The specific water-mass structure of the Black Sea shelf and offshore region includes the existence of two distinct layers, each with differing hydrographic properties and divided by a constant pycnocline (halocline). The occurrence of hydrogen sulphide at depths of more than 125-224 m limits the aerobic processes to the upper layer. The Black Sea basin-scale circulation is characterized by the clockwise Rim Current, generally located over the continental slope, and the western and eastern cyclonic gyres in the open sea, creating a convergence zone above the slope. In winter, due to the low temperatures and the strong winds, the shelf zone is subject to intense vertical mixing, which covers the total water column, from the surface to the bottom. In the northwestern part of the Black Sea the summer vertical stratification is better expressed owing to the influence of river inflow. Significant river discharge (e.g. the Danube) causes an increase in the nutrient concentration and phytoplankton abundance in the periphery of the sea. Development of the



Area Size

43,912 km²

Qualifying Species and Criteria

Black Sea harbour porpoise –

Phocoena phocoena relicta

Criteria A, B2, C2,

Marine Mammal Diversity

Phocoena phocoena relicta, *Delphinus delphis ponticus*, *Tursiops truncatus ponticus*

Summary

This IMMA is located in the shelf and offshore waters of the southwestern Black Sea and extends from the 60 m to 2000 m isobath. Seasonal aggregations of Black Sea harbour porpoise (*Phocoena phocoena relicta*) (EN) and the Black Sea bottlenose dolphin (*Tursiops truncatus ponticus*) (EN) were recorded during two aerial surveys and several vessel surveys in the past 10 years. Survey data show that in summer the IMMA includes more than 70% of the harbour porpoise population in the Black Sea. The area overlaps with several protected marine areas and includes the migration routes of the prey species of the three cetacean species inhabiting the Black Sea. These species are listed in IUCN Red List and covered by Annex IV of the European Union Habitats Directive falling under Criterion A, and the harbour porpoise is subject to Criterion C2.

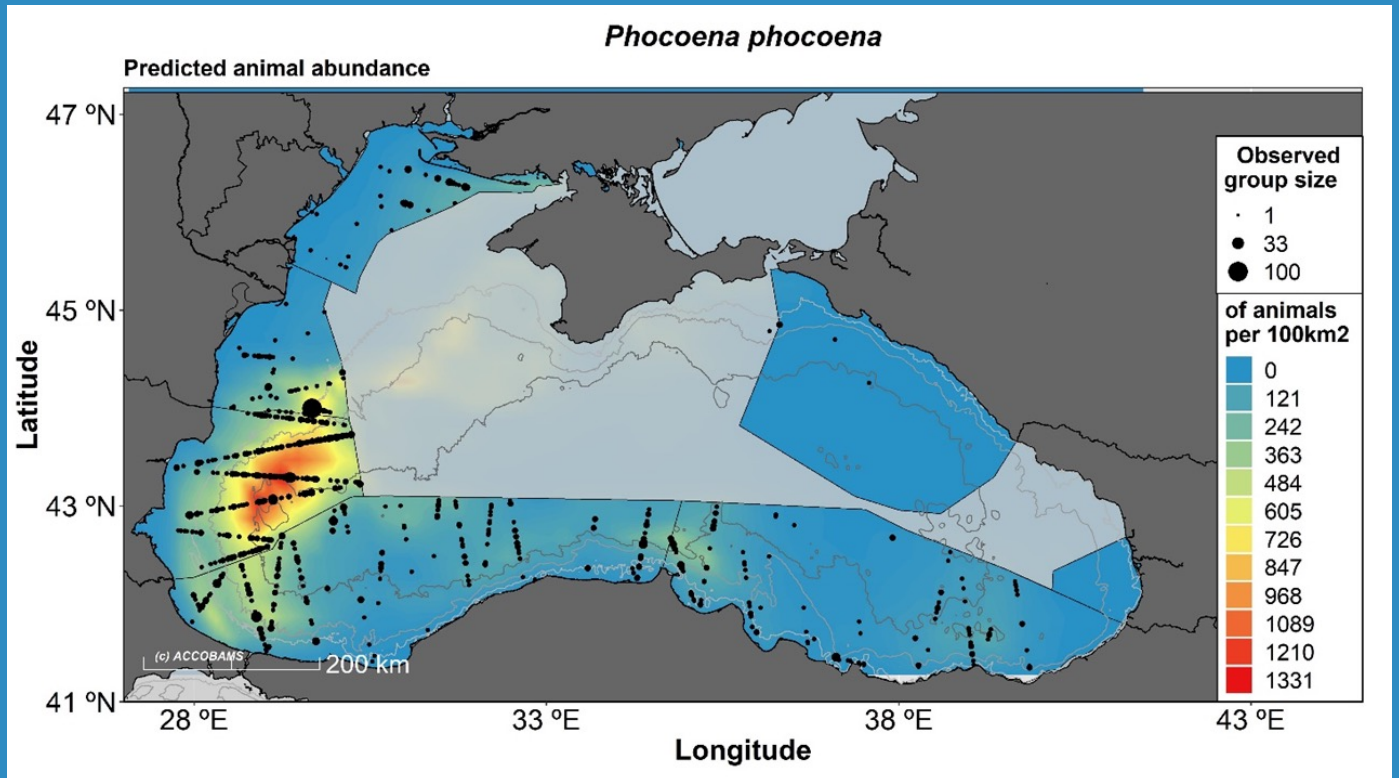


Figure 1: Predicted abundance of Black Sea harbour porpoise within the IMMA. From Paiu et al., 2021

narrow and rapid Rim Current establishes a dynamic barrier that restricts the shelf-deep sea exchange and produces "a scatter" of nutrients and plankton species over the entire sea area.

Criterion A: Species or Population Vulnerability

The Black Sea harbour porpoise (*Phocoena phocoena relicta*, Abel, 1905) (Fig. 2) is listed as Endangered on the IUCN Red List of endangered species.

Criterion B: Distribution and Abundance Sub-criterion B2: Aggregations

The IMMA is proposed based on the seasonal aggregation of harbour porpoises observed during the CeNoBS/ASI survey in 2019 (Paiu et al., 2021; Fig. 1) and Birkun (2014) within the western Black Sea waters. The IMMA includes waters from 60 m deep to the 2000 m isobath. The results of the CeNoBS project (Paiu et al., 2021) showed that in summer more than 70% of Black Sea harbour porpoise abundance was within the IMMA

The western boundary was selected as the 60 m isobath due to the additional available literature on cetacean presence during vessel surveys (abundance and distribution estimates or bycatch) performed in Romania, Bulgaria and western Turkey (Çelikkale et al., 1989; Cetacean bycatches, 2011; Gol'din et al., 2017; Mikhalev, 2005a,b; Panayotova and Todorova, 2015; Panayotova et al., 2017; 2020; Dede and Tonay, 2010; Paiu, 2019; Popov, 2017; 2018; 2019; 2020; Stanev, 1996). In the shelf regions of the IMMA, both species' show a marked preference for shallow coastal waters. The shallow depth preference generally concurs with some historical evidence (Birkun, 2006; Gol'din et al., in press; Tonay et al., in press).

Criterion C: Key Life Cycle Activities Sub-criterion C2: Feeding Areas

The shelf slope region of the IMMA is an important area for sprats and whittings the primary prey species for the harbour porpoise (BLASDOL, 1999; Gladilina and Gol'din, 2014). Presence of these prey species peaks in summer, which attracts the Black Sea cetacean species mentioned.

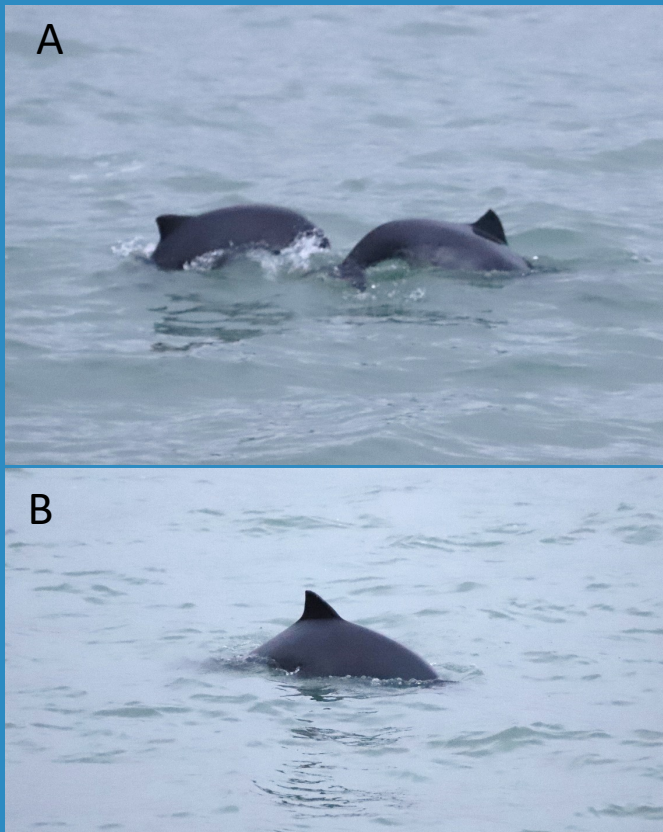


Figure 2 Black Sea harbour porpoises surfacing in the IMMA. Photos courtesy of Mare Nostrum, taken by (A) Marian Paiu and (B) Costin Timofte.

Supporting Information

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Acknowledgements

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