

Supplementary materials

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Supplementary Tables

Table S1. Source, resolution and limitations of swept-area-ratio (SAR) data that was used to calculate the bottom trawling intensity for mobile bottom gears. Two tables are given, one for the SAR used in the risk assessment analysis, and one for the SAR used in the statistical prediction of the sensitivity layer. For the risk assessment analysis, grid cell resolutions in the Mediterranean regions of France and Italy are re-estimated to 0.05 degree using the approach described in the method section. For all other areas, the 0.05-degree resolution was provided. VMS = vessel monitoring system data from satellites used to monitor vessel activity in the EU. AIS = Automatic Identification System. EEZ = exclusive economic zone. A c-square is a spatial indexing system (Rees, 2003). For metier abbreviations see Table S2.

SAR data used in the risk assessment analysis						
Region	Origin of SAR data	Grid cell resolution	Metiers included or excluded	Coverage of countries (exclusions or inclusions)	What years used for risk assessment analysis	Estimate of fraction of effort missing (e.g. small-scale fisheries, countries, metiers)
Bulgaria EEZ	VMS from National Fisheries and Aquaculture Agency	C-square 0.05 x 0.05 degree	Otter trawl and beam trawl included	Bulgaria only	2015-2017	Dredging for clams missing – boats with length < 12 m without VMS
Greek EEZ	VMS from Hellenic Ministry of Mercantile Marine and Island Policy	C-square 0.05 x 0.05 degree	All included (only demersal otter trawls are used)	Greece only	2017-2019	VMS dataset concerns only bottom trawlers belonging to the Greek fleet. Proportion from foreign trawlers (Italian and Turkish) estimated at 11% of effort. Small scale fisheries (non-mobile gears) not included.
Italian EEZ and adjacent areas of the Adriatic Sea	VMS and AIS	VMS: 1km x 1km grid; AIS: C-square 0.05 x 0.05 degree	VMS: Bottom otter trawl and rapido trawl; AIS bottom otter trawling	VMS: Italy only; AIS: Italy, Croatia, Slovenia, Albania, Montenegro.	2017-2019	VMS: Vessels with length < 12 m without VMS are missing. AIS: data derived from GFW restricted to only bottom otter trawlers

French Mediterranean EEZ	VMS from French Ministry- Direction Générale des Affaires Maritimes, de la Pêche et de l'Aquaculture (DGAMPA) (Georges <i>et al.</i> , 2021)	1x1 minutes = 0.016667°. (about 1.9 x 1.4 km) (IFREMER, 2022)	All - in the French Mediterranean EEZ, only DRB, OTB, OTT are relevant to SAR computation	France, Italy, Spain	2017-2019	Most dredging for clams missing – boats with length < 12 m without VMS. OTB and OTT generate over 99% of total abrasion. They use similar ground gear, usually a single heavy chain without spheres, rubbers or disks.
Spanish Mediterranean	VMS from General Secretariat for Fisheries (Spanish Ministry)	C-square 0.05 x 0.05 degree	Bottom otter trawl	Spain	2017-2019	n/a
Portugal EEZ	ICES VMS database	C-square 0.05 x 0.05 degree	All metiers and vessels >12m length included	All EU countries	2015-2017	VMS data in Portugal EEZ is incomplete. In ICES area 9a, fishing effort not monitored is 29% (ICES, 2024); Small-scale fisheries, including bivalve dredges missing;
Spain EEZ (Atlantic)	ICES VMS database	C-square 0.05 x 0.05 degree	All metiers and vessels >12m length included	All EU countries	2018-2021, proportionally allocated to métiers using 2017-2019 information	VMS data for Spain in primary source (see Text S2) is incomplete and updated with total SAR data from ICES Ecosystem Overview.
Other Atlantic and Baltic areas	ICES VMS database	C-square 0.05 x 0.05 degree	All metiers and vessels >12m length included	All EU countries	2017-2019	Fishing effort not monitored by VMS is: <ul style="list-style-type: none"> • up to 1% in the North Sea (higher in specific parts: 8–33% in the Channel and Skagerrak) (ICES, 2024);

						<ul style="list-style-type: none"> • up to 23% in North Iberia/Bay of Biscay/Celtic Sea (ICES, 2024); • up to 15% in the Irish Sea (ICES, 2024); • between 0 and 31% in Baltic Sea areas that are regularly trawled and much higher in the eastern and north Baltic where bottom trawling effort is very low (ICES, 2024). • up to 29% in ICES area 9a (Spedicato <i>et al.</i>, 2019; ICES, 2024)
SAR data used in the prediction of the sensitivity layer						
Region	Origin of SAR data	Grid cell resolution	Metiers included or excluded	Coverage of countries (exclusions or inclusions)	What years used for seabed samples statistical models	Estimate of fraction of effort missing (e.g. small-scale fisheries, countries, metiers)
1. Bulgaria EEZ	VMS from National Fisheries and Aquaculture Agency	0.5x0.5 km	Otter trawl and beam trawl included	Bulgaria only	2013 to 2017	Dredging for clams missing – boats with length < 12 m without VMS
2. Greek EEZ	VMS from Hellenic Ministry of Mercantile Marine and Island Policy	C-square 0.05 x 0.05 degree	All included (only demersal otter trawls are used)	Greece only	annual average of the SAR for the years 2015 to 2018.	VMS dataset concerns only bottom trawlers belonging to the Greek fleet. Proportion from foreign trawlers (Italian and Turkish) estimated at 11% of effort. Small scale fisheries (non-mobile gears) not included.

3.	North/Central Adriatic	VMS and AIS	1x1 km	Only bottom otter trawl and rapido trawl	Italy only	average SAR value assessed annually from 2017 to 2019	boats with length < 12 m without VMS
4.	Adriatic Sea/Western Ionian Sea	AIS data	C-square 0.05 x 0.05 degree	Only bottom otter trawling	Italy, Croatia, Slovenia, Albania, Montenegro	from 2017 to 2021	AIS data derived from GFW restricted to only bottom otter trawlers
5.	Sicily	VMS	1x1 km	Bottom otter trawling vessels (with a length greater than 15m)	Italy only	2007 to 2019	VMS dataset restricted to only bottom otter trawlers belonging to the Italian fleet. Small scale fisheries not included (vessels with length less than 15 m).
6.	Italy west coast	Direct tracking on board + VMS	C-square 0.05 x 0.05 degree	Bottom otter trawling vessels	Italy only	2023	Vessels with length < 12 m without VMS are missing
7.	French Mediterranean EEZ	VMS from French Ministry- Direction Générale des Affaires Maritimes, de la Pêche et de l'Aquaculture (DGAMPA) (Georges <i>et al.</i> , 2021)	1x1 minutes = 0.016667°. (about 1.9 x 1.4 km) (IFREMER, 2022)	All - in the French Mediterranean EEZ, only DRB, OTB, OTT are relevant to SAR computation	France, Italy, Spain	2012-2020	Most dredging for clams missing – boats with length < 12 m without VMS. OTB and OTT generate over 99% of total abrasion. They use similar ground gear, usually a single heavy chain without spheres, rubbers or disks.
8.	Spanish Mediterranean	VMS from General Secretariat for Fisheries (Spanish Ministry)	C-square 0.05 x 0.05 degree	Bottom otter trawl	Spain	2010-2022	n/a
9.	Gulf of Cadiz	ICES VMS database	C-square 0.05 x 0.05 degree	All metiers and vessels >12m length included	All EU countries	2013-2020	In ICES area 9a, fishing effort not monitored is 29% (Spedicato <i>et al.</i> , 2019; ICES, 2024)

10. Portugal	ICES VMS database	C-square 0.05 x 0.05 degree	All metiers and vessels >12m length included	All EU countries	2007-2008, 2010-2011	VMS data in Portugal EEZ is incomplete. In addition, in ICES area 9a, fishing effort not monitored by VMS is 29% (ICES, 2024); small-scale fisheries, including bivalve dredges missing
11. North Iberia/Bay of Biscay/Celtic Sea	ICES VMS database	C-square 0.05 x 0.05 degree	All metiers and vessels >12m length included	All EU countries	2017-2019	Fishing effort not monitored is 23% or less (ICES, 2024)
12. Irish Sea, Bristol Channel, Celtic Sea North	ICES VMS database	C-square 0.05 x 0.05 degree	All metiers and vessels >12m length included	All EU countries	Median SAR for 2009-2017	Fishing effort not monitored in the Irish Sea is 15% (ICES, 2024)
13. North Sea & Channel, including Skagerrak and shallow northwest Scotland	ICES VMS database, BENTHIS VMS database, and VMS national databases	Varying resolutions ranging from C-square 0.05 x 0.05 degree to 1 x 1 min grid cells	All metiers and vessels >12m length included	Sampling data was matched to fishing data using the best available information. For most samples, this was done using the ICES/BENTHIS databases that covered most EU countries. For sampling data in Swedish and Danish EEZ, it was based on national VMS data.	2010-2020	Fishing effort not monitored by VMS is considered to be relatively low (up to 1% in the North Sea) but is higher in specific parts (8–33% in the Channel and Skagerrak) % (ICES, 2024).
North Sea (epi)	ICES VMS database	C-square 0.05x0.05 degree	All metiers and vessels >12m length included	All EU countries	Median SAR for 2009-2020	Fishing effort not monitored by VMS is considered to be relatively low (up to 1% in the North Sea) (ICES, 2024)

14. Baltic Sea (including Kattegat)	ICES VMS database	C-square 0.05 x 0.05 degree	All metiers and vessels >12m length included	All EU countries	Average SAR between 2012 and 2016 was used to exclude fished sampling stations	Fishing effort not monitored by VMS ranges from 0 to 31% in the areas that are regularly trawled, but are much higher in the eastern and north Baltic where bottom trawling effort is very low overall (ICES, 2024).
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Table S2. Gear types, target species and depletion rates for the 10 different metier types used in the risk assessment analysis. In most of the Mediterranean and Black Sea regions only TBB (beam trawl), OTB (bottom otter trawl) and DRB (boat dredge) is provided, and we used the higher grouping values. Depletion rates of demersal seines and shrimp-targeting beam trawls are inferred from other métiers (*indicated with an asterisk), as estimates for their depletion rates or penetration depths are not available (Rijnsdorp et al., 2020).

Metier	Main gear type	Target species assemblage group	Main target species	Depletion rate
DRB_MOL	Dredge	Molluscs	Scallops	0.200
OT_CRU	Otter trawl	Crustaceans	<i>Nephrops, Pandalus</i> , mixed fish	0.100
OT_DMF	Otter trawl	Demersal fish	Cod or plaice	0.026
OT_MIX	Otter trawl	Mixed fish	Mixed fish	0.074
OT_SPF	Otter trawl	Small pelagic fish	Sprat or sandeel	0.009
SDN_DMF	Danish seine	Demersal fish	Plaice, cod	0.009*
SSC_DMF	Flyshooter (seine)	Demersal fish	Cod, haddock, flatfish	0.016*
TBB_CRU	Beam trawl	Crustaceans	Brown shrimp	0.060*
TBB_DMF	Beam trawl	Demersal fish	Flatfish	0.140
TBB_MOL	Beam trawl	Molluscs	Whelk, snails and scallops	0.060
Higher metier groupings				
TBB	Beam trawl			0.140
OTB	Otter trawl			0.060

Table S3. Characteristics of the seabed samples used to estimate biomass~longevity distributions per region for the sensitivity layer. DEMERSALES, EVHOE, IGFS, CGFS MEDITS, IBTS and MERMAN are the names of fish or invertebrate surveys. (Rodríguez-Mendoza, 2022; European Commission, 2023; International Council for the Exploration of the, 2024; Monitoring et al., 2024). GSA = Geographical Sub-Area.

Region	Sub-area	Year(s) sampled	Sampling gear, sampled area, sieve size	Number of samples, including replicates	Infauna/epifauna	Fauna included/Excluded	Conversions from abundance to biomass?
1. Bulgaria EEZ	Coastal and shelf area	2013-2017	0.1 m ² Van Veen grab. 0.5mm sieve	700	Infauna	Macrozoobenthos included	No
2. Greek EEZ		Early 90s to 2020	0.1 m ² Smith-McIntyre or van Veen grab. 0.5mm sieve.	200 sites and more than 800 sampling locations ranging in depths from 7 to 1200 m.	Infauna	Larger individuals, where the biomass of a large individual was larger than the biomass of the rest of the sample, were excluded.	No
3. North/Central Adriatic		2016-2021	Rapido trawl. Width 3.5 m and square Mesh 40 mm (cod-end).	410 sampling locations	Epifauna	Exclusion of commercial species, pelagic, high mobility species (fish) and cephalopods	Yes
4. Adriatic Sea/Western Ionian Sea	GSA's 17, 18, 19	2017-2021	MEDITS survey bottom trawl net GOC73, 20mm mesh size	1335 sampling locations ranging in depths from 10 to 800 m.	Epifauna	Exclusion of commercial species, pelagic, high mobility species (fish) and cephalopods	No
5. Sicily		2010-2013 (Mangano et al., 2013), 2016-2020	Bottom otter trawl, average distance between doors 40m and 50mm cod end mesh size. Trawlers with similar characteristics of otter door spread and mesh net reflecting the standardized	173 trawls	Epifauna	Exclusion of commercial species, pelagic, high mobility species (fish) and cephalopods	For 2016-2020, only individual counts were recorded and converted to

		(ISPRA, Italian National Monitoring Program), and 2019-2020 (Interreg HARMONY Project).	and routinely applied MEDITS protocol (MEDITS, 2017).				biomass using average biomass per individual from other years.
6. Italy west coast	Ligurian and northern Tyrrhenian Sea	2023	Sampling with Bottom Trawlers with 40mm mesh	91 trawls	Epifauna	Exclusion of commercial species, pelagic, high mobility species (fish) and cephalopods	Direct measurements. No conversion
7. French Med. EEZ	GSA7 and 8	2017-2019	MEDITS GOC73 bottom trawl. Horizontal opening varies between 10-20m. 20mm cod end mesh size (MEDITS, 2017; Certain <i>et al.</i> , 2024) NOURMED 3m Beam trawl. 3m horizontal opening and 20mm cod end mesh size. (Jadaud & Certain, 1994; Vaz, 2018b, a)	295 bottom trawls and 204 beam trawls	Mega epifauna	Exclusion of vertebrates, cephalopods and pelagic invertebrates	Direct biomass measurements. Standardisation in g.km ⁻²
8. Spanish Mediterranean	Levantine-Balearic Demarcation	2014-2022	MEDITS GOC-73 bottom trawl. Horizontal opening 16m and vertical opening 2.7-3.2 m. 20 mm codend mesh size (Spedicato <i>et al.</i> , 2019).	1425	Epifauna	Exclusion of vertebrates, highly mobile cephalopods and gelatinous species.	No
9. Gulf of Cadiz	South Atlantic Demarcation	2013-2020	Spanish Surveys from ICES IBTS for the Gulf of Cadiz (Q1 & Q4, ARSA surveys) and the northern coast of Spain. BACA44/60 otter trawl gear	611 otter trawls in the Gulf of Cadiz and 1043 otter trawls in the northern coast of Spain	Epifauna	Exclusion of vertebrates, highly mobile cephalopods and gelatinous species.	No
10. Portugal	Mainland Portugal	2007-2008 (ACOSHelf project), and 2010-2011	0.1 m ² Smith-McIntyre grab. 1mm sieve	326 grab samples	Infauna	All fauna included, excepting Nematoda and pelagic invertebrates	Yes, abundance estimates were transformed to biomass using trait

		(Mesh Atlantic project)					information on mean body size per species.
11. North Iberia/Bay of Biscay/Celtic Sea			4 trawling surveys (DEMERSALES, EVHOE, IGFS, CGFS) compiled dataset for time period from 2014 to 2022. Gear characteristics vary with survey. Spanish EEZ (DEMERSALES): Baca 44/60 otter trawl gear French Biscay Shelf, Celtic Seas and channel: standard IBTS surveys GOV 36/47 (with rockhopper ground gear in the western channel).		Epifauna	Exclusion of vertebrates, highly mobile cephalopods and gelatinous species. Benthic taxa were restricted to Arthropoda, Mollusca, Echinodermata, Annelida, Cnidaria, Porifera, Platyhelminthes, Sipuncula, Priapulida, Nemertea, Acanthocephala	No
12. Irish Sea, Bristol Channel, Celtic Sea North		2001-2017	Grab (Hamon, Day and Van Veen grab). 0.1 m ² sampled area. 1mm sieve size.	320 samples in 146 unique 0.05 x 0.05 grid cells	Infauna	All fauna included	No
13. North Sea & Channel, including Skagerrak and shallow northwest Scotland	North Sea	2000-2010	0.1 or 0.078-m ² grabs or box-cores; 1-mm mesh sieve. Compilations of multiple datasets from (Rijnsdorp <i>et al.</i> , 2018).	2611	Infauna	All fauna included from grab/core. Part of the data was converted from ash free dry weight to wet weight to make a more similar comparison of longevity between locations with wet weight and ash free dry weight observations.	No
	Denmark	2012, 2014-2019, 2021-2022	The Danish national monitoring programme for Aquatic environments and nature (NOVANA). 0.0143 m ² HAPS corer; 1 mm sieve.	2628	Infauna	All samples included from North Sea region. The program has up to 42 samples per location per year and fractional longevities are averaged for all samples in each location.	No

	Swedish part of Skagerrak, coastal zone and open sea	2010-2023	National monitoring and research project data. 0.1 m ² Smith-McIntyre grab, 1 mm sieve.	1320	Infauna	All fauna on 1 mm sieve. No of individuals and biomass per taxa analysed in lab.	No
	United Kingdom EEZ	2000-2017	Compilation of multiple datasets from CEFAS and MERMAN, excluding the data already used in Rijnsdorp et al. (2018). Samples are collected with 0.1 m ² Hamon / Day grab and 1 mm sieve (Cefas; (Bolam et al., 2010) and Van Veen grab sieve size unknown (MERMAN).	1024	Infauna	(Bolam et al., 2010) All macrofauna extracted and analysed in the lab to lowest taxonomic level possible. MERMAN (accessed 17/06/22) – study site dependant but expected all fauna extracted and submitted to MERMAN using Biology input sheet.	No
	North Sea (epi)	2006-2021	Combination of different monitoring surveys: Benthic epifauna samples were collected during the Ifremer bottom trawl survey in the English Channel and Southern North Sea (2006-2018) and consisted of benthic invertebrates' by-catches. Data was collected using Very High Vertical Opening (VHVO) bottom trawls (or "GOV") equipped with a 10 mm mesh size at the cod-end for catching juveniles of demersal species (Vaz et al., 2019). Ifremer epifauna data was subsequently supplemented with BTS (international beam trawl survey) data extracted from DATRAS to ensure sufficient spatial coverage of the Greater North Sea area. IBTS data was restricted to consist only	4849	Epifauna	Vertebrates, highly mobile cephalopods, and gelatinous species were excluded from consideration. Benthic taxa were limited to the following groups: Arthropoda, Mollusca, Echinodermata, Annelida, Cnidaria, Porifera, Platyhelminthes, Sipuncula, Priapulida, Nemertea, and Acanthocephala	No

			of the region of interest and samples were collected from 2006-2021 using beam trawls (ICES, 2009).				
14. Baltic Sea (including Kattegat)		2000-2013	Grab/core mixture; see (Gogina <i>et al.</i> , 2016)	1558	Infauna	All fauna included that were collated in (Gogina <i>et al.</i> , 2016)	No

Table S4. The full and final models for each region and faunal group describing the biomass~longevity distributions in the sensitivity layer. Generalised Linear mixed model using Binomial family. All models use cumulative biomass as the response variable, log(longevity) as a fixed effect and (1 | Station) as a random effect. MSFD = MFSD habitat category, Hab = other habitat category than MSFD. SAR = trawling intensity as swept-area-ratio per year.

Region	Type of data	How dealt with SAR history?	Other choices	Parameters included in the full model	Selected final model
1. Bulgaria EEZ	Grab	SAR in model	all grid cells deeper than 100m are excluded because of anoxia	Habitat factor (Sand, Mud, Mixed, Other), Depth	Log longevity + Hab x Depth + SAR
2. Greek EEZ	Grab	Stations with SAR < 0.1 selected, SAR not in model		MSFD, Depth	Log longevity + MSFD x Depth
3. North/Central Adriatic	Trawl	SAR in model		MSFD, Depth, SAR	Log longevity + Depth + MSFD + SAR
4. Adriatic Sea/Western Ionian Sea	Trawl	SAR in model	MSFD habitats with less than 10 sampling locations are excluded	MSFD habitat, Bottom current speed, Bottom dissolved oxygen, Bottom temperature, Bottom nitrates, Bottom phosphates, Bottom salinity, chlorophyll a, Depth, SAR	Adriatic Sea: Log longevity + Bottom current + Bottom dissolved oxygen + Bottom temperature + MSFD + SAR Western Ionian Sea: Log longevity + Bottom current + Bottom salinity + Bottom temperature + SAR
5. Sicily	Trawl	SAR in model		Depth + SAR	Log longevity + Log Depth + log(SAR+0.01) + log(Depth) x log(SAR+0.01)
6. Italy west coast	Trawl	Stations with SAR < 0.5 selected, SAR not in model		Depth + MSFD	Log Longevity +Depth
7. French Med. EEZ	Trawl	Stations with SAR <0.1 for circalittoral sand and upper bathyal sediment SAR in the model for circalittoral and offshore circalittoral mud	One model developed for each MFSD habitat type with sufficient biological data: Circalittoral sand, Circalittoral mud, Offshore circalittoral mud, Upper bathyal sediment.	SAR, bathymetry (m), Seabed stress (N m ⁻²), sediment average grain size (mm), mean bottom temperature (°C), mean surface Chlorophyll a concentration (mg m ⁻³), mean bottom dissolved oxygen concentration (mmol m ⁻³), Stratification index. The dredge-function of the R-package MuMIn was used to evaluate all	Depending on habitat: Circalittoral sand: Log longevity + mean bottom temperature emp Upper bathyal sediment: Log longevity + oxygen concentration + Stratification index + Seabed stress

				possible model formulations based on the Bayesian information criterium (BIC).	Circularittoral mud: Log longevity + SAR Offshore circularittoral mud: Log longevity + SAR
8. Spanish Mediterranean	Trawl	SAR in model		Depth, Habitat, SAR	Log longevity + Depth x Hab + SAR + (1 Station/Year)
9. Gulf of Cadiz	Grab	<0.5 SAR		Substrate, Chlorophyll, Seabed energy and temperature	Log longevity + as.factor(Substrate) + Chl + AllEnergy + Temp
10. Portugal	Grab	SAR in model		Depth, SAR	Log longevity + log(Depth + 1) + log(SAR + 0.01)
11. North Iberia/Bay of Biscay/Celtic Sea	Trawl	SAR in model		Minimum chlorophyll, scaled, Substrate	Minimum chlorophyll + scaled depth x log(SAR) + log longevity x Substrate + (1 Survey)
12. Irish Sea, Bristol Channel, Celtic Sea North	Grab	SAR in model		Scaled bathymetry, scaled tidal energy, median grain size (d50), % sand, % mud, % gravel, log-subsurfaceSAR, log-surfaceSAR, (categoric) MSFD habitat	Log longevity + % gravel x log(SAR) + median grain size x tidal energy (Van Hoey <i>et al.</i> , 2023)
13. North Sea & Channel, including Skagerrak and shallow northwest Scotland	Grab	Sub-surface SAR in model		Mud%, Gravel%, Bed shear stress, Sub-surface SAR	Log(Longevity) + log(subsurf. Abras + 0.01) + mud, + gravel + log(shear stress + 0.01) + log(subsurf. Abras + 0.01) x log(shear stress + 0.01) + log(longevity) x gravel
	Trawl	SAR not in model		Scaled depth, % gravel, median grain size (d50) and scaled tidal energy	Depth scaled + % gravel x median grain size (d50) + Log longevity + scaled tidal energy
14. Baltic Sea (including Kattegat)	Grab	Only included stations with <0.1 (average SAR per year based on ICES data 2012-2016) in the model. SAR not in model.	Stations with seasonal minimum bottom oxygen concentrations <3.2 ml per litre were excluded in the model.	Salinity + Depth + Wave exposure at bottom	Log(longevity) + salinity + log(depth) + log(wave expos) + log(longevity) x salinity + salinity x log(depth) + log(longevity x log(depth))

Table S5. Source of environmental data layers, including habitat layer used for reporting. Include both the data that is used to fit the statistical model and the data used to extrapolate to the region (e.g. depth can be measured to fit the model and can be from a data source when extrapolating).

Region	Environmental Layers	Abbreviation	Source
All	MSFD Benthic Broad Habitat Types	MSFD habitat	EUSeamap 2021 (Vasquez et al., 2023)
Greece	Depth, meters	Depth	EMODnet seabed habitat data portal (EUSeamap, 2021)
Greece	MSFD Benthic Broad Habitat Types	Habitat	EMODnet seabed habitat data portal (EUSeamap, 2021)
Black Sea	Depth, meters	Depth	<i>In situ</i> measurements. IO-BAS monitoring data
Black Sea	Sediment type	Hab	Grain size analyses and sediment classification or visual observation. IO-BAS monitoring data. The polygon layers are from EUSeaMap, produced by modelling from depth layer (acoustic data and <i>in situ</i> measurements), substrate type layer (point data on grain size, visual census) and biological zones (boundaries modelled from different biologically important variables - wave energy, bottom T, O ₂) validated by point data on characteristic zoobenthic communities. These habitat layers are associated with high uncertainty from various sources.
Baltic Sea (including Kattegat)	Depth, meters	Depth	Baltic Sea Hydrographic Commission. 2013. Baltic Sea Bathymetry Database Version 0.9.3. http://data.bshc.pro/ (last accessed 21 February 2017).
Baltic Sea (including Kattegat)	Wave exposure at seabed, relative value	Wave expos	(Bekkby <i>et al.</i> , 2008)
Baltic Sea (including Kattegat)	Bottom salinity, ppt	salinity	Bottom salinity data were obtained from the ICES data portal and interpolated to cover a Baltic-wide grid based on all data from 2005 to 2015, see (Denderen <i>et al.</i> , 2020)
North Sea & Channel, including Skagerrak and shallow northwest Scotland	Mud, %	Mud	Statistical fit: 60% of the stations had measured observations / 40% were based on modelled information. Modelled information: 1 x 1 min grid cell obtained from (Wilson <i>et al.</i> , 2018)
North Sea & Channel, including Skagerrak and shallow northwest Scotland	Gravel, %	Gravel	Statistical fit: 60% of the stations had measured observations / 40% were based on modelled information. Modelled information: 1 x 1 min grid cell obtained from (Wilson <i>et al.</i> , 2018)
North Sea & Channel, including Skagerrak and	Tidal bed shear stress (N/m ²)	Shear stress	Hydrodynamic model by John Aldridge (CEFAS) as used in Hiddink et al. (2006) (Hiddink <i>et al.</i> , 2006)

shallow northwest Scotland			
Sicily, Irish Sea, Bristol Channel, Celtic Sea North	Depth, meters	Depth	(Thierry <i>et al.</i> , 2019)
Irish Sea, Bristol Channel, Celtic Sea North	Mean tidal velocity (m/s), Median grain size (d50), % sand, % mud, % gravel	Mean tidal velocity	(Wilson <i>et al.</i> , 2018)
French Med. EEZ	Seabed stress (N m ⁻²), mean bottom temperature (°C), mean bottom dissolved oxygen concentration (mmol m ⁻³), Stratification index.	bedstress, Btemp, BOx, Stratif	Btemp: MyOcean (http://marine.copernicus.eu/): "MEDSEA_REANA-LYSIS_PHYS_006_004" over a 0.042x0.042° spatial resolution) Box: MyOcean (http://marine.copernicus.eu/): "MEDSEA_REANALYSIS_BIO_006_008" Stratif: Considered as the average absolute difference between surface and 30 (± 5) m depth density over 20 years. Salinity and temperature data used to compute density cover the 1994-2014 period and were from monthly model (MyOcean http://marine.copernicus.eu/): "MEDSEA_REANA-LYSIS_PHYS_006_004" over a 0.042x0.042° spatial resolution). High Pressure International Equation of State of Seawater (1980) was used to compute Sea water Density
Spanish Mediterranean	Depth, MSFD Benthic Broad Habitat Type, Current	Depth, Hab, Current	EUSeamap 2021 http://marine.copernicus.eu/
Gulf of Cadiz.	Swept Area Ratio, Substrate, Chlorophyll, Seabed energy and temperature		Depth was downloaded from EMODNET bathymetry (https://www.emodnet-bathymetry.eu/) and resampled to a final resolution of 3 x 3 km using a bilinear interpolation. Substrate type was downloaded from EMODNET seabed habitats (https://emodnet.ec.europa.eu/en/seabed-habitats). The original layer was rasterized to the same final resolution than the depth layer (3 x 3 km) and simplified by merging the original categories into just 5 values; Mud (including fine mud, muddy sand, sandy mud and combinations of these categories), sand, coarse sand, mixed sediment and sediment (including "seabed" category). Seabed stress was also downloaded from EMODNET seabed habitats, using the different models available for the different areas included in this exercise. This layer is divided in two different datasets, including "kinetic energy at the seabed due to waves" and "kinetic energy at the seabed due to currents" which were added to create the final layer. The temperature near bottom was down-loaded from two different oceanographic models available in https://marine.copernicus.eu/ . In the northern part of the study area, we used data from the model "Atlantic- European North West Shelf- Ocean Physics Reanalysis" whereas in the southern part (Iberian region) we used data from the model "Atlantic-Iberian Biscay Irish- Ocean Physics Analysis and Forecast". Both models were resampled to the final resolution using a bilinear interpolation and merged using the function merge from raster package (Hijmans, 2021), keeping data from the northern

			model in the overlapping areas. Finally, a layer with chlorophyll values (as a proxy to primary production) from satellite observations was extracted from https://marine.copernicus.eu/ , specifically from the product: “North Atlantic Chlorophyll Concentration from Satellite observations (daily average) Reprocessed L4 (ESA-CCI)”. The mean value for the months of April and May during the period 2016–2020 was computed and resampled to the final resolution using bilinear inter-polation.
North/Central Adriatic	MSFD Benthic Broad Habitat Types	MSFD habitat	EUSeamap 2019 (2021 version was not used because of some areas with topological problems)
North/Central Adriatic	Depth, meters	Depth	Depth of sampling stations from MSFD monitoring campaigns, Depth of Adriatic Sea MRU from “Istituto Idrografico della Marina”.
Adriatic Sea/Western Ionian Sea	Bottom ocean current velocity (m/s)	botcur	Copernicus Mediterranean Sea Physics Reanalysis (MEDSEA_MULTIYEAR_PHY_006_004) product Eastward ocean current velocity and northward ocean current velocity combined. https://doi.org/10.25423/CMCC/MEDSEA_MULTIYEAR_PHY_006_004_E3R1
	Sea floor potential temperature (°C)	botT	Copernicus Mediterranean Sea Physics Reanalysis (MEDSEA_MULTIYEAR_PHY_006_004) product https://doi.org/10.25423/CMCC/MEDSEA_MULTIYEAR_PHY_006_004_E3R1
	Bottom dissolved oxygen concentration (mmol/m ³)	botDox	Copernicus Mediterranean Sea Biogeochemistry Reanalysis MEDSEA_MULTIYEAR_BGC_006_008 https://doi.org/10.25423/cmcc/medsea_multiyear_bgc_006_008_medbfm3
	Bottom nitrates concentration (mmol/m ³)	botNit	Copernicus Mediterranean Sea Biogeochemistry Reanalysis MEDSEA_MULTIYEAR_BGC_006_008 https://doi.org/10.25423/cmcc/medsea_multiyear_bgc_006_008_medbfm3
	Bottom phosphate concentration (mmol/m ³)	botPho	Copernicus Mediterranean Sea Biogeochemistry Reanalysis MEDSEA_MULTIYEAR_BGC_006_008 https://doi.org/10.25423/cmcc/medsea_multiyear_bgc_006_008_medbfm3
	Bottom salinity (psu)	botso	Copernicus Mediterranean Sea Physics Reanalysis (MEDSEA_MULTIYEAR_PHY_006_004) product https://doi.org/10.25423/CMCC/MEDSEA_MULTIYEAR_PHY_006_004_E3R1
	chlorophyll A (mg/m ³)	Chl	Copernicus Mediterranean Sea Biogeochemistry Reanalysis MEDSEA_MULTIYEAR_BGC_006_008 https://doi.org/10.25423/cmcc/medsea_multiyear_bgc_006_008_medbfm3
	Depth	Depth	EMODnet Bathymetry DTM https://emodnet.ec.europa.eu/geoviewer/
North Sea (epi)	Mean tidal velocity (m/s), Median grain size (d50), % sand, % mud, % gravel	Mean tidal velocity	(Wilson <i>et al.</i> , 2018)
	Depth	Depth	EUSeamap, 2021 (EMODNET portal)

Table S6. Percentage of the area covered by state predictions per ecoregion for all fishable areas in the EEZs of the EU countries, UK and Norway. Fishable areas are all grid cells shallower than 800m in Atlantic, all grid cells shallower than 1000m in Mediterranean Sea and all grid cells shallower than 100m in the Black Sea (areas deeper than 100m are anoxic).

Ecoregion	Infauna	Epifauna
Black Sea	35	0
Aegean-Levantine Sea	84	0
Ionian Sea and the Central Mediterranean Sea	15	31
Adriatic Sea	0	90
Western Mediterranean Sea	0	67
Bay of Biscay and the Iberian Coast	21	74
Celtic Seas	44	65
North Sea	89	82
Baltic Sea	100	0

Table S7. Summary of the fishing pressure and benthic state by dominant MSFD habitats per region. GES_0.5 is the fraction of the area where $RBS_{tot} > 0.5$. n is the number of c-squares assessed. Where there are overlapping assessments, RBS values were averaged per c-square before analysis. Rows where the fraction of cells in GES ($RBS_{tot} > 0.75$) is smaller than 0.8 are bold.

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBStot	RBSsen	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBSsen
Adriatic Sea	Circolittoral mud	infauna	4	92.56	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adriatic Sea	Circolittoral sand	infauna	7	166.23	0.22	0.00	0.78	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adriatic Sea	Infralittoral sand	infauna	3	71.31	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adriatic Sea	Offshore circolittoral mud	infauna	8	189.58	0.09	0.38	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adriatic Sea	Offshore circolittoral sand	infauna	3	71.04	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adriatic Sea	Upper bathyal sediment or Lower bathyal sediment	infauna	15	355.14	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aegean-Levantine Sea	Circolittoral coarse sediment	infauna	30	727.28	0.06	0.33	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aegean-Levantine Sea	Circolittoral mixed sediment	infauna	22	530.98	0.03	0.59	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aegean-Levantine Sea	Circolittoral mud	infauna	799	19332.74	0.53	0.47	0.64	0.99	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Aegean-Levantine Sea	Circolittoral sand	infauna	369	8834.90	0.63	0.46	0.63	0.98	0.96	1.00	1.00	1.00	1.00	1.00	0.96	0.99
Aegean-Levantine Sea	Infralittoral mixed sediment	infauna	7	168.65	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aegean-Levantine Sea	Infralittoral mud	infauna	201	4899.74	0.02	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBStot	RBSsen	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBSsen
Aegean-Levantine Sea	Infralittoral sand	infauna	146	3514.45	0.06	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Aegean-Levantine Sea	Offshore circalittoral coarse sediment	infauna	1	23.95	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aegean-Levantine Sea	Offshore circalittoral mixed sediment	infauna	3	72.17	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aegean-Levantine Sea	Offshore circalittoral mud	infauna	525	12666.63	0.40	0.12	0.65	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aegean-Levantine Sea	Offshore circalittoral sand	infauna	22	527.65	0.28	0.50	0.76	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aegean-Levantine Sea	Upper bathyal sediment or Lower bathyal sediment	infauna	4,920	120797.51	0.11	0.48	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Circalittoral coarse sediment	infauna	597	9698.30	0.01	0.90	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Circalittoral mixed sediment	infauna	7,130	109163.87	0.04	0.93	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Circalittoral mud	infauna	1,719	28216.82	0.28	0.83	0.89	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.98	0.98
Baltic Sea	Circalittoral mud or Circalittoral sand	infauna	3,735	56932.77	0.03	0.88	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Circalittoral rock and biogenic reef	infauna	378	6027.85	0.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Circalittoral sand	infauna	2,032	33101.25	0.31	0.65	0.85	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.99	0.99
Baltic Sea	Infralittoral coarse sediment	infauna	390	6621.57	0.02	0.85	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Baltic Sea	Infralittoral mixed sediment	infauna	1,253	20218.63	0.03	0.91	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Infralittoral mud	infauna	164	2699.94	0.04	0.84	0.96	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	0.99
Baltic Sea	Infralittoral mud or Infralittoral sand	infauna	296	4855.37	0.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Infralittoral sand	infauna	1,534	26820.01	0.32	0.55	0.83	0.99	0.98	1.00	1.00	1.00	1.00	1.00	0.99	0.99
Baltic Sea	Offshore circalittoral coarse sediment	infauna	15	241.23	0.01	0.80	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Offshore circalittoral mixed sediment	infauna	1,125	19005.76	0.74	0.62	0.79	0.99	0.97	1.00	1.00	0.99	0.99	0.99	0.96	0.98
Baltic Sea	Offshore circalittoral mud	infauna	1,287	21868.36	0.91	0.44	0.62	0.98	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.99
Baltic Sea	Offshore circalittoral mud or Offshore circalittoral sand	infauna	2,087	34739.88	0.07	0.81	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baltic Sea	Offshore circalittoral sand	infauna	137	2368.07	1.15	0.42	0.63	0.98	0.96	1.00	1.00	1.00	1.00	1.00	0.96	0.99
Bay of Biscay and the Iberian Coast	Circalittoral mixed sediment	infauna	101	2388.52	0.01	0.95	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Circalittoral mud	infauna	83	1998.87	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Circalittoral rock and biogenic reef	infauna	87	2081.34	0.01	0.93	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Circalittoral sand	infauna	139	3300.46	0.01	0.96	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Bay of Biscay and the Iberian Coast	Infralittoral mud	infauna	3	73.74	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Infralittoral sand	infauna	87	2106.58	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Lower bathyal sediment or Lower bathyal rock and biogenic reef	infauna	3	70.91	0.00	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Offshore circalittoral coarse sediment	infauna	2	48.78	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Offshore circalittoral mixed sediment	infauna	14	331.57	0.04	0.71	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Offshore circalittoral mud	infauna	390	9353.52	0.26	0.63	0.81	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Offshore circalittoral sand	infauna	80	1903.32	0.60	0.44	0.59	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Upper bathyal sediment	infauna	224	5423.51	0.59	0.52	0.70	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Sea	Circalittoral coarse sediment	infauna	6	137.12	0.05	0.17	0.95	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Sea	Circalittoral mixed sediment	infauna	41	926.29	0.07	0.00	0.93	0.99	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Sea	Circalittoral mud	infauna	194	4405.17	0.10	0.02	0.90	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Sea	Circalittoral sand	infauna	4	90.69	0.13	0.00	0.87	0.98	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Sea	Infralittoral sand	infauna	6	135.77	0.05	0.00	0.95	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Black Sea	Offshore circalittoral mixed sediment	infauna	125	2811.41	0.03	0.01	0.97	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Sea	Offshore circalittoral mud	infauna	95	2170.76	0.02	0.18	0.98	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Celtic Seas	Circalittoral coarse sediment	infauna	768	14018.13	0.17	0.42	0.88	0.98	0.95	1.00	1.00	1.00	0.99	0.99	0.94	0.94
Celtic Seas	Circalittoral mixed sediment	infauna	23	418.57	0.47	0.26	0.68	0.95	0.88	1.00	1.00	1.00	0.96	0.96	0.83	0.83
Celtic Seas	Circalittoral mud	infauna	176	3173.41	0.61	0.32	0.74	0.94	0.87	0.99	0.97	0.93	0.91	0.90	0.81	0.80
Celtic Seas	Circalittoral rock and biogenic reef	infauna	344	6050.06	0.15	0.61	0.89	0.99	0.98	1.00	1.00	1.00	1.00	1.00	0.98	0.98
Celtic Seas	Circalittoral sand	infauna	402	7451.56	0.19	0.50	0.87	0.98	0.95	1.00	1.00	1.00	1.00	0.99	0.94	0.93
Celtic Seas	Infralittoral coarse sediment	infauna	24	433.70	0.03	0.67	0.97	0.99	0.98	1.00	1.00	1.00	1.00	1.00	0.96	0.96
Celtic Seas	Infralittoral mixed sediment	infauna	1	19.32	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Celtic Seas	Infralittoral mud	infauna	11	205.64	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Celtic Seas	Infralittoral sand	infauna	41	757.01	0.03	0.78	0.97	0.99	0.98	1.00	1.00	1.00	1.00	1.00	0.98	0.98
Celtic Seas	Offshore circalittoral coarse sediment	infauna	5,539	97747.88	1.69	0.19	0.51	0.93	0.82	0.99	0.97	0.95	0.93	0.89	0.75	0.73
Celtic Seas	Offshore circalittoral mixed sediment	infauna	263	4737.84	1.32	0.19	0.56	0.91	0.79	0.98	0.96	0.91	0.87	0.83	0.74	0.70
Celtic Seas	Offshore circalittoral mud	infauna	1,827	33461.79	4.36	0.02	0.11	0.72	0.46	0.78	0.71	0.63	0.58	0.51	0.31	0.29

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Celtic Seas	Offshore circalittoral sand	infauna	3,943	67424.91	1.72	0.13	0.40	0.93	0.84	1.00	0.99	0.96	0.95	0.92	0.79	0.78
Celtic Seas	Upper bathyal sediment	infauna	648	9889.27	3.01	0.02	0.26	0.90	0.77	0.98	0.95	0.90	0.88	0.84	0.67	0.68
Greater North Sea	Circalittoral coarse sediment	infauna	1,548	29189.25	1.25	0.29	0.67	0.93	0.87	0.96	0.95	0.94	0.93	0.91	0.84	0.84
Greater North Sea	Circalittoral mixed sediment	infauna	317	5555.81	0.45	0.35	0.72	0.95	0.89	0.99	0.99	0.97	0.96	0.95	0.80	0.82
Greater North Sea	Circalittoral mud	infauna	436	7694.13	1.41	0.19	0.48	0.86	0.71	0.91	0.87	0.82	0.79	0.75	0.63	0.64
Greater North Sea	Circalittoral rock and biogenic reef	infauna	185	3401.22	0.13	0.44	0.90	0.99	0.97	1.00	1.00	1.00	0.99	0.99	0.98	0.99
Greater North Sea	Circalittoral sand	infauna	4,214	75926.70	1.40	0.10	0.44	0.91	0.81	0.98	0.96	0.93	0.90	0.87	0.72	0.74
Greater North Sea	Infralittoral coarse sediment	infauna	166	3159.87	1.13	0.20	0.47	0.92	0.81	0.97	0.93	0.92	0.87	0.86	0.79	0.79
Greater North Sea	Infralittoral mixed sediment	infauna	64	1090.99	0.01	0.75	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Greater North Sea	Infralittoral mud	infauna	82	1481.65	0.65	0.67	0.84	0.97	0.92	1.00	0.98	0.95	0.95	0.91	0.89	0.89
Greater North Sea	Infralittoral sand	infauna	978	17466.17	0.83	0.44	0.62	0.95	0.89	0.99	0.98	0.97	0.95	0.93	0.87	0.87
Greater North Sea	Offshore circalittoral coarse sediment	infauna	4,145	76620.86	2.40	0.06	0.42	0.87	0.73	0.93	0.89	0.85	0.82	0.79	0.65	0.65
Greater North Sea	Offshore circalittoral mixed sediment	infauna	337	5939.59	2.41	0.05	0.34	0.85	0.67	0.96	0.93	0.85	0.81	0.74	0.50	0.48
Greater North Sea	Offshore circalittoral mud	infauna	6,340	106312.05	3.08	0.03	0.14	0.81	0.65	0.89	0.84	0.79	0.75	0.70	0.50	0.54

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Greater North Sea	Offshore circalittoral sand	infauna	14,155	241730.28	1.34	0.16	0.45	0.93	0.86	0.99	0.98	0.97	0.95	0.92	0.79	0.81
Greater North Sea	Upper bathyal sediment	infauna	2,571	40598.31	0.66	0.53	0.77	0.97	0.93	0.98	0.97	0.95	0.95	0.94	0.92	0.92
Ionian Sea and the Central Mediterranean Sea	Circalittoral mud	infauna	32	782.72	0.39	0.59	0.70	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ionian Sea and the Central Mediterranean Sea	Circalittoral sand	infauna	83	2019.83	0.80	0.35	0.50	0.97	0.95	1.00	1.00	1.00	1.00	1.00	0.98	1.00
Ionian Sea and the Central Mediterranean Sea	Infralittoral mud	infauna	12	291.32	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ionian Sea and the Central Mediterranean Sea	Infralittoral sand	infauna	54	1315.30	0.07	0.87	0.94	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ionian Sea and the Central Mediterranean Sea	Offshore circalittoral mud	infauna	25	610.04	0.61	0.16	0.54	0.98	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ionian Sea and the Central Mediterranean Sea	Offshore circalittoral sand	infauna	6	144.61	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ionian Sea and the Central Mediterranean Sea	Upper bathyal sediment or Lower bathyal sediment	infauna	639	15660.54	0.06	0.62	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adriatic Sea	Circalittoral mud	epifauna	1,318	29547.31	10.64	0.06	0.20	0.52	0.34	0.47	0.40	0.36	0.35	0.33	0.28	0.27
Adriatic Sea	Circalittoral mud or Offshore circalittoral mud	epifauna	15	339.74	4.20	0.13	0.45	0.75	0.70	0.80	0.73	0.67	0.67	0.67	0.67	0.67

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Adriatic Sea	Circolittoral sand	epifauna	1,102	24598.30	3.34	0.05	0.36	0.81	0.63	0.86	0.83	0.78	0.75	0.71	0.57	0.50
Adriatic Sea	Infralittoral sand	epifauna	31	692.59	3.11	0.23	0.56	0.82	0.74	0.81	0.81	0.81	0.74	0.74	0.68	0.74
Adriatic Sea	Offshore circolittoral mud	epifauna	1,352	31001.15	6.53	0.04	0.13	0.57	0.29	0.59	0.53	0.44	0.40	0.34	0.22	0.17
Adriatic Sea	Offshore circolittoral sand	epifauna	319	7287.29	2.37	0.08	0.33	0.81	0.57	0.87	0.84	0.80	0.75	0.68	0.49	0.42
Adriatic Sea	Upper bathyal sediment or Lower bathyal sediment	epifauna	881	20494.40	1.19	0.19	0.71	0.91	0.81	0.95	0.93	0.90	0.89	0.86	0.79	0.77
Bay of Biscay and the Iberian Coast	Circolittoral coarse sediment	epifauna	388	8316.13	6.41	0.03	0.15	0.72	0.50	0.83	0.74	0.62	0.54	0.45	0.29	0.30
Bay of Biscay and the Iberian Coast	Circolittoral mixed sediment	epifauna	17	394.05	6.64	0.41	0.47	0.89	0.80	0.94	0.88	0.82	0.82	0.82	0.65	0.82
Bay of Biscay and the Iberian Coast	Circolittoral mud	epifauna	221	4973.05	5.43	0.16	0.40	0.84	0.74	0.90	0.86	0.82	0.76	0.71	0.56	0.62
Bay of Biscay and the Iberian Coast	Circolittoral rock and biogenic reef	epifauna	286	6253.38	0.42	0.41	0.76	0.98	0.95	1.00	0.99	0.99	0.97	0.97	0.94	0.94
Bay of Biscay and the Iberian Coast	Circolittoral sand	epifauna	671	14867.03	3.52	0.15	0.30	0.83	0.65	0.94	0.88	0.79	0.72	0.64	0.48	0.49
Bay of Biscay and the Iberian Coast	Infralittoral coarse sediment	epifauna	23	504.30	0.14	0.43	0.90	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Infralittoral mixed sediment	epifauna	30	674.60	0.18	0.77	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Infralittoral mud	epifauna	49	1063.12	0.05	0.82	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Infralittoral sand	epifauna	114	2537.48	0.19	0.75	0.93	0.99	0.98	1.00	0.99	0.99	0.99	0.99	0.98	0.98

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBStot	RBSsen	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBSsen
Bay of Biscay and the Iberian Coast	Lower bathyal sediment	epifauna	14	305.03	0.05	0.36	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Lower bathyal sediment or Lower bathyal rock and biogenic reef	epifauna	11	244.92	0.03	0.55	0.97	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bay of Biscay and the Iberian Coast	Offshore circalittoral coarse sediment	epifauna	522	11191.84	3.05	0.01	0.10	0.87	0.71	0.99	0.97	0.93	0.88	0.80	0.48	0.53
Bay of Biscay and the Iberian Coast	Offshore circalittoral mixed sediment	epifauna	108	2307.06	9.10	0.01	0.01	0.36	0.17	0.31	0.27	0.24	0.22	0.19	0.07	0.07
Bay of Biscay and the Iberian Coast	Offshore circalittoral mud	epifauna	1,099	23764.75	5.63	0.00	0.03	0.68	0.45	0.77	0.73	0.65	0.59	0.47	0.18	0.19
Bay of Biscay and the Iberian Coast	Offshore circalittoral sand	epifauna	1,561	33859.37	2.54	0.01	0.12	0.88	0.71	0.99	0.99	0.96	0.92	0.83	0.49	0.48
Bay of Biscay and the Iberian Coast	Upper bathyal sediment	epifauna	1,092	24720.80	2.33	0.21	0.48	0.91	0.80	0.98	0.96	0.91	0.87	0.83	0.71	0.72
Celtic Seas	Circalittoral coarse sediment	epifauna	933	17261.59	0.17	0.51	0.90	0.98	0.95	1.00	0.99	0.98	0.98	0.96	0.93	0.93
Celtic Seas	Circalittoral mixed sediment	epifauna	33	604.18	0.38	0.30	0.72	0.95	0.86	1.00	1.00	0.97	0.94	0.91	0.82	0.82
Celtic Seas	Circalittoral mud	epifauna	274	5002.37	0.47	0.34	0.77	0.94	0.86	0.96	0.95	0.92	0.90	0.88	0.83	0.83
Celtic Seas	Circalittoral rock and biogenic reef	epifauna	348	6587.45	0.07	0.57	0.94	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Celtic Seas	Circalittoral sand	epifauna	613	11414.09	0.19	0.49	0.87	0.98	0.95	1.00	0.99	0.99	0.98	0.97	0.93	0.93
Celtic Seas	Infralittoral coarse sediment	epifauna	46	842.52	0.03	0.67	0.97	0.99	0.98	1.00	1.00	1.00	1.00	1.00	0.96	0.96

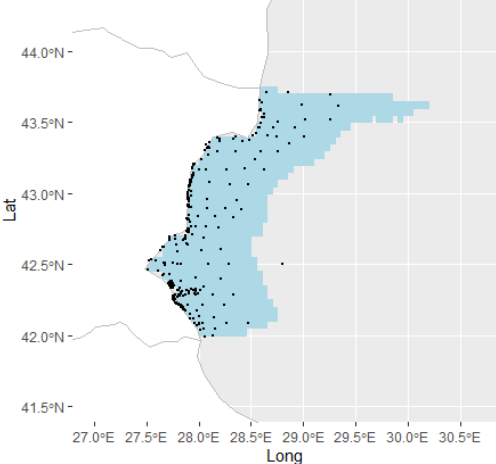
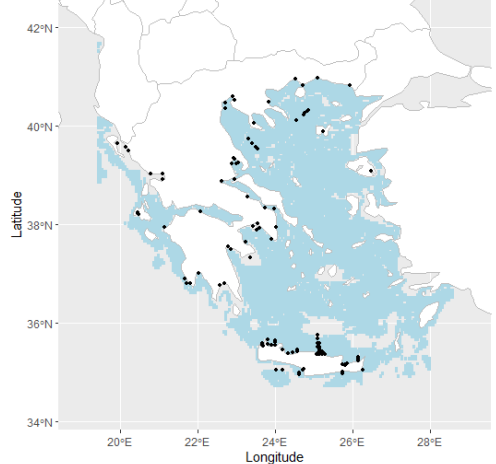
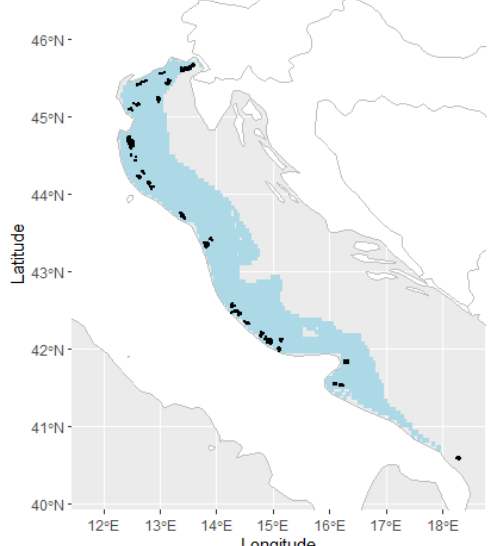
Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Celtic Seas	Infralittoral mixed sediment	epifauna	12	223.51	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Celtic Seas	Infralittoral mud	epifauna	26	477.72	0.02	0.85	0.98	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Celtic Seas	Infralittoral sand	epifauna	111	2072.67	0.03	0.79	0.97	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.99	0.99
Celtic Seas	Offshore circalittoral coarse sediment	epifauna	5,110	98004.88	2.06	0.20	0.45	0.87	0.74	0.96	0.93	0.87	0.81	0.75	0.59	0.61
Celtic Seas	Offshore circalittoral mixed sediment	epifauna	331	6018.05	0.86	0.37	0.73	0.92	0.84	0.96	0.92	0.89	0.87	0.85	0.79	0.79
Celtic Seas	Offshore circalittoral mud	epifauna	2,554	48685.63	3.65	0.01	0.10	0.71	0.50	0.77	0.71	0.65	0.62	0.57	0.36	0.36
Celtic Seas	Offshore circalittoral sand	epifauna	4,827	94307.87	1.89	0.06	0.25	0.89	0.75	0.98	0.97	0.94	0.91	0.86	0.61	0.60
Celtic Seas	Upper bathyal sediment	epifauna	1,583	29404.19	2.99	0.08	0.21	0.82	0.53	0.96	0.92	0.83	0.73	0.61	0.34	0.31
Greater North Sea	Circalittoral coarse sediment	epifauna	1,510	28608.70	1.25	0.29	0.67	0.92	0.88	0.95	0.95	0.93	0.91	0.89	0.82	0.87
Greater North Sea	Circalittoral mixed sediment	epifauna	180	3236.78	0.44	0.23	0.68	0.95	0.92	1.00	1.00	1.00	0.99	0.96	0.77	0.92
Greater North Sea	Circalittoral mud	epifauna	206	3772.93	1.71	0.05	0.39	0.86	0.78	0.94	0.90	0.86	0.83	0.78	0.55	0.71
Greater North Sea	Circalittoral rock and biogenic reef	epifauna	150	2854.55	0.15	0.40	0.89	0.99	0.98	1.00	1.00	1.00	1.00	1.00	0.97	0.99
Greater North Sea	Circalittoral sand	epifauna	3,712	67401.38	1.23	0.09	0.44	0.89	0.85	0.96	0.94	0.90	0.87	0.83	0.67	0.80
Greater North Sea	Infralittoral coarse sediment	epifauna	152	2952.67	1.26	0.11	0.41	0.88	0.79	0.93	0.91	0.86	0.84	0.83	0.74	0.75

Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Greater North Sea	Infralittoral mud	epifauna	38	744.93	2.65	0.34	0.61	0.89	0.79	0.95	0.89	0.87	0.79	0.79	0.71	0.71
Greater North Sea	Infralittoral sand	epifauna	521	9696.12	1.38	0.13	0.37	0.90	0.85	0.97	0.93	0.91	0.87	0.85	0.75	0.81
Greater North Sea	Offshore circalittoral coarse sediment	epifauna	4,129	76367.78	2.40	0.06	0.42	0.82	0.74	0.87	0.83	0.79	0.76	0.73	0.59	0.68
Greater North Sea	Offshore circalittoral mixed sediment	epifauna	235	4251.93	2.50	0.03	0.31	0.84	0.74	0.96	0.92	0.85	0.78	0.70	0.46	0.61
Greater North Sea	Offshore circalittoral mud	epifauna	5,472	91973.18	2.74	0.02	0.14	0.80	0.74	0.89	0.86	0.79	0.75	0.69	0.46	0.66
Greater North Sea	Offshore circalittoral sand	epifauna	14,009	239296.26	1.22	0.16	0.45	0.92	0.89	0.98	0.97	0.93	0.91	0.88	0.76	0.87
Greater North Sea	Upper bathyal sediment	epifauna	2,958	46008.48	0.20	0.66	0.87	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.98	0.99
Ionian Sea and the Central Mediterranean Sea	Circalittoral mud	epifauna	21	516.29	3.45	0.14	0.22	0.52	0.25	0.33	0.29	0.29	0.29	0.24	0.24	0.24
Ionian Sea and the Central Mediterranean Sea	Circalittoral sand	epifauna	402	9875.95	6.23	0.03	0.17	0.54	0.31	0.58	0.51	0.44	0.41	0.34	0.20	0.19
Ionian Sea and the Central Mediterranean Sea	Infralittoral sand	epifauna	30	739.05	2.35	0.37	0.65	0.83	0.75	0.83	0.83	0.80	0.80	0.80	0.70	0.70
Ionian Sea and the Central Mediterranean Sea	Offshore circalittoral mud	epifauna	110	2687.67	9.11	0.05	0.17	0.50	0.31	0.51	0.49	0.44	0.35	0.34	0.22	0.20

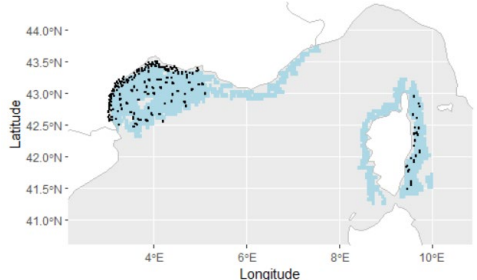
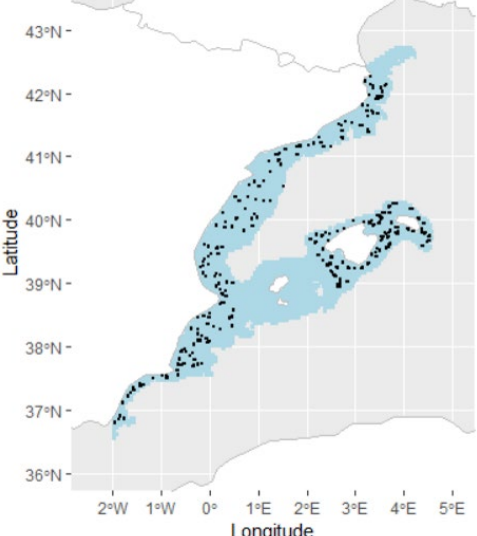
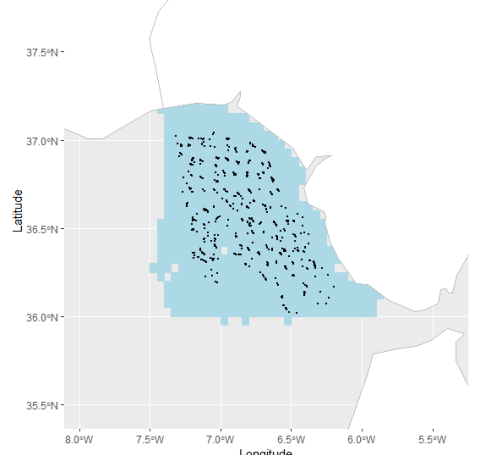
Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBS _{tot}	RBS _{sen}	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBS _{sen}
Ionian Sea and the Central Mediterranean Sea	Offshore circalittoral sand	epifauna	85	2086.85	6.22	0.11	0.27	0.58	0.40	0.61	0.59	0.55	0.52	0.49	0.31	0.28
Ionian Sea and the Central Mediterranean Sea	Upper bathyal sediment or Lower bathyal sediment	epifauna	863	20972.51	1.79	0.15	0.63	0.87	0.74	0.90	0.86	0.82	0.79	0.77	0.71	0.68
Western Mediterranean Sea	Circalittoral coarse sediment	epifauna	154	3665.21	2.38	0.11	0.40	0.84	0.61	0.90	0.86	0.82	0.79	0.73	0.56	0.47
Western Mediterranean Sea	Circalittoral mixed sediment	epifauna	84	1993.15	5.00	0.00	0.10	0.71	0.26	0.85	0.74	0.56	0.44	0.33	0.15	0.13
Western Mediterranean Sea	Circalittoral mud	epifauna	659	15349.96	8.80	0.01	0.08	0.48	0.17	0.49	0.36	0.23	0.20	0.17	0.11	0.12
Western Mediterranean Sea	Circalittoral rock and biogenic reef	epifauna	13	304.16	2.13	0.08	0.51	0.86	0.73	0.92	0.85	0.85	0.85	0.69	0.54	0.69
Western Mediterranean Sea	Circalittoral sand	epifauna	782	18406.37	2.85	0.12	0.39	0.79	0.58	0.86	0.83	0.77	0.71	0.66	0.51	0.47
Western Mediterranean Sea	Infralittoral coarse sediment	epifauna	16	383.09	0.84	0.31	0.58	0.92	0.75	1.00	1.00	1.00	0.88	0.75	0.75	0.75
Western Mediterranean Sea	Infralittoral sand	epifauna	77	1819.67	1.22	0.32	0.68	0.90	0.82	0.92	0.91	0.91	0.91	0.87	0.83	0.77
Western Mediterranean Sea	Offshore circalittoral mixed sediment	epifauna	20	477.71	2.37	0.00	0.06	0.78	0.32	0.95	0.90	0.80	0.70	0.50	0.20	0.05

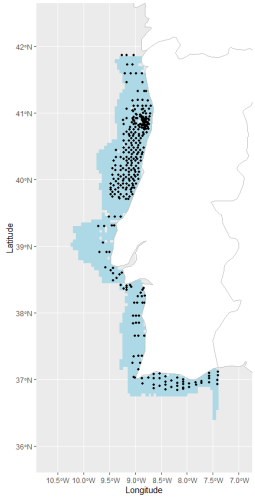
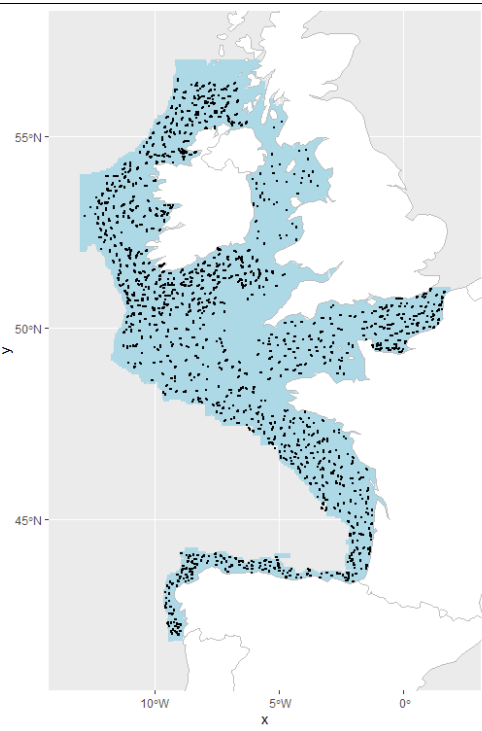
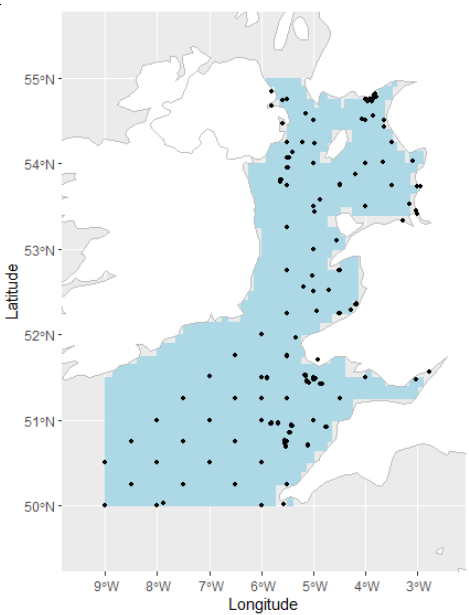
Ecoregion	Dominant MSFD	Group	n (cells)	Area km ²	Mean SAR	Unfished Cells	Unfished Area	RBStot	RBSsen	GES 0.50	GES 0.60	GES 0.70	GES 0.75	GES 0.80	GES 0.90	GES 0.75 RBSsen
Western Mediterranean Sea	Offshore circalittoral mud	epifauna	997	22967.27	5.35	0.00	0.10	0.54	0.27	0.57	0.45	0.34	0.29	0.25	0.13	0.15
Western Mediterranean Sea	Offshore circalittoral sand	epifauna	287	6777.36	1.68	0.08	0.37	0.85	0.60	0.95	0.91	0.87	0.81	0.77	0.53	0.42
Western Mediterranean Sea	Upper bathyal sediment or Lower bathyal sediment	epifauna	3,247	75879.73	1.84	0.27	0.54	0.82	0.68	0.85	0.81	0.76	0.73	0.70	0.61	0.61

Supplementary Figures

Area	Type of data	Distribution of sampling stations and area (in blue) for which a prediction was made
1. Bulgaria EEZ	Grab	 <p>A map of the Bulgarian Exclusive Economic Zone (EEZ) in the Black Sea. The y-axis is labeled 'Lat' and ranges from 41.5°N to 44.0°N. The x-axis is labeled 'Long' and ranges from 27.0°E to 30.5°E. A light blue shaded area represents the region where predictions were made, covering approximately 42.0°N to 43.8°N latitude and 27.5°E to 30.5°E longitude. Numerous black dots represent sampling stations scattered throughout this blue area.</p>
2. Greek EEZ	Grab	 <p>A map of the Greek Exclusive Economic Zone (EEZ) in the Aegean Sea. The y-axis is labeled 'Latitude' and ranges from 34°N to 42°N. The x-axis is labeled 'Longitude' and ranges from 20°E to 28°E. A light blue shaded area represents the region where predictions were made, covering approximately 35°N to 41°N latitude and 20°E to 28°E longitude. Black dots represent sampling stations scattered throughout this blue area.</p>
3. North/Central Adriatic	Trawl	 <p>A map of the North/Central Adriatic region. The y-axis is labeled 'Latitude' and ranges from 40°N to 46°N. The x-axis is labeled 'Longitude' and ranges from 12°E to 18°E. A light blue shaded area represents the region where predictions were made, covering approximately 41°N to 45.5°N latitude and 12°E to 18°E longitude. Black dots represent sampling stations scattered throughout this blue area.</p>

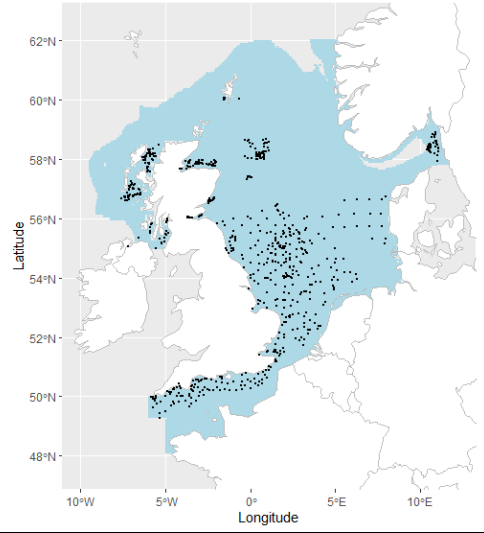
<p>4. Adriatic Sea/Western Ionian Sea</p>	<p>Trawl</p>	
<p>5. Sicily</p>	<p>Trawl</p>	
<p>6. Italy west coast</p>	<p>Trawl</p>	

<p>7. French Med. EEZ</p>	<p>Trawl</p>	
<p>8. Spanish Mediterranean</p>	<p>Trawl</p>	
<p>9. Gulf of Cadiz</p>	<p>Trawl</p>	

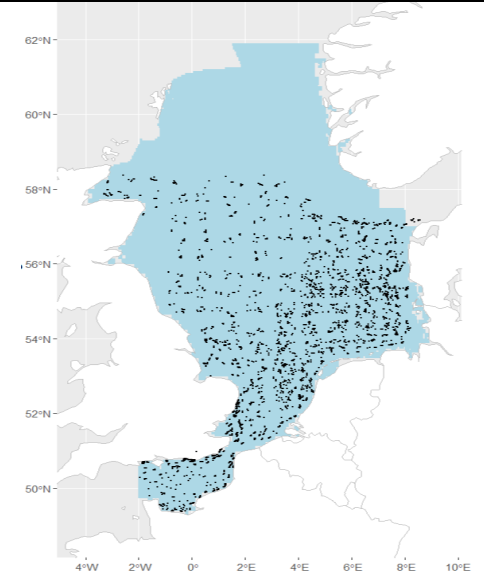
<p>10. Portugal</p>	<p>Grab</p>	
<p>11. North Iberia/Bay of Biscay/Celtic Sea</p>	<p>Trawl</p>	
<p>12. Irish Sea, Bristol Channel, Celtic Sea North</p>	<p>Grab</p>	

13. North Sea & Channel, including Skagerrak and shallow northwest Scotland

Grab



Trawl



14. Baltic Sea (including Kattegat)

Grab

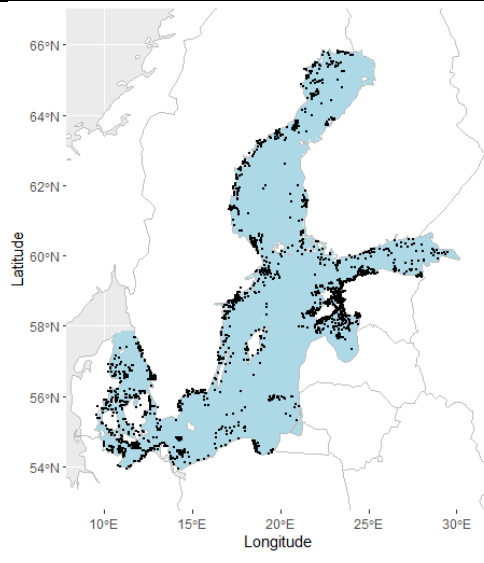


Figure S1. Regions and models with data. Dots show sampling locations, light blue is the area for which a sensitivity prediction is made. In grid cells with multiple predictions, the average median longevity is plotted.

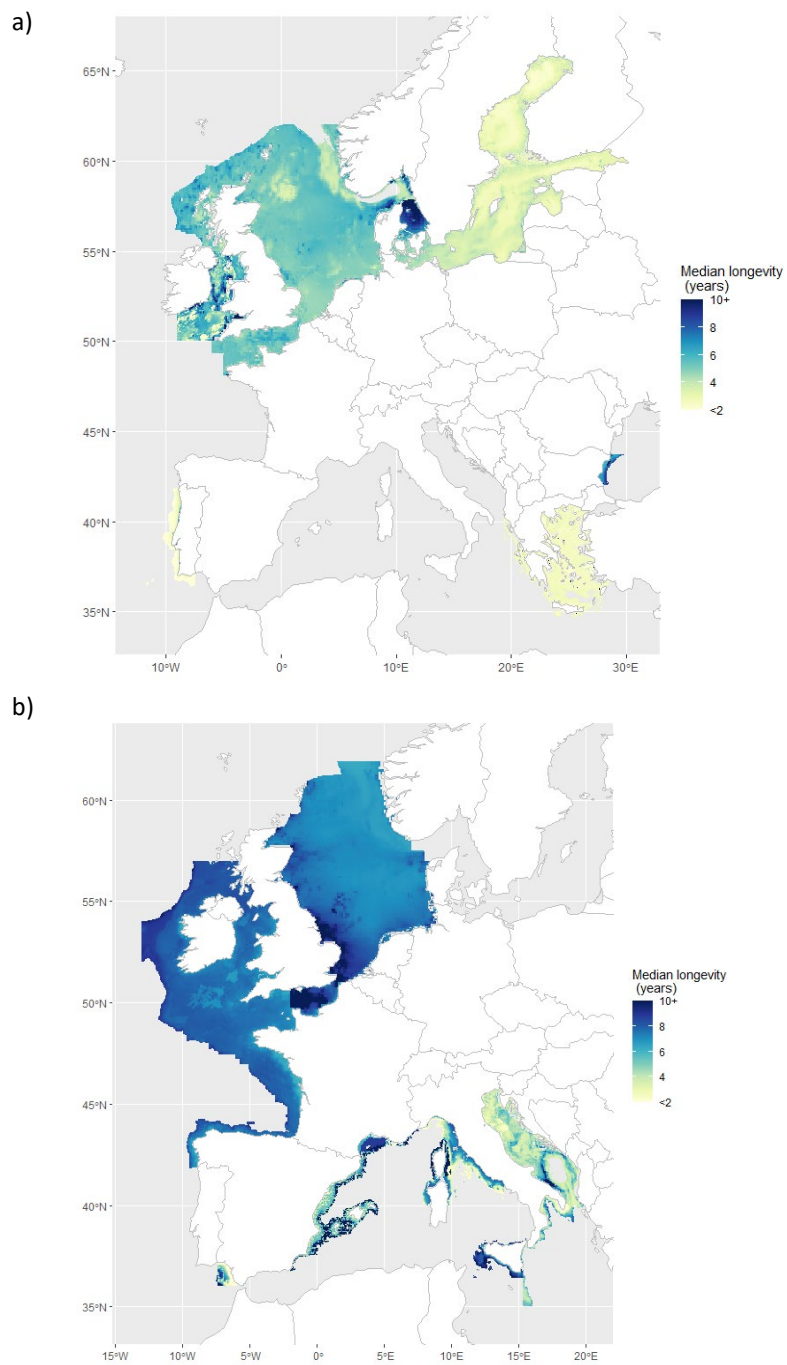


Figure S2. Map of benthic sensitivity for infauna (upper panel) and epifauna (lower panel). The sensitivity is shown as the median longevity, the longevity in years where the cumulative biomass proportion is 0.5. In grid cells with multiple predictions, the average median longevity is plotted.

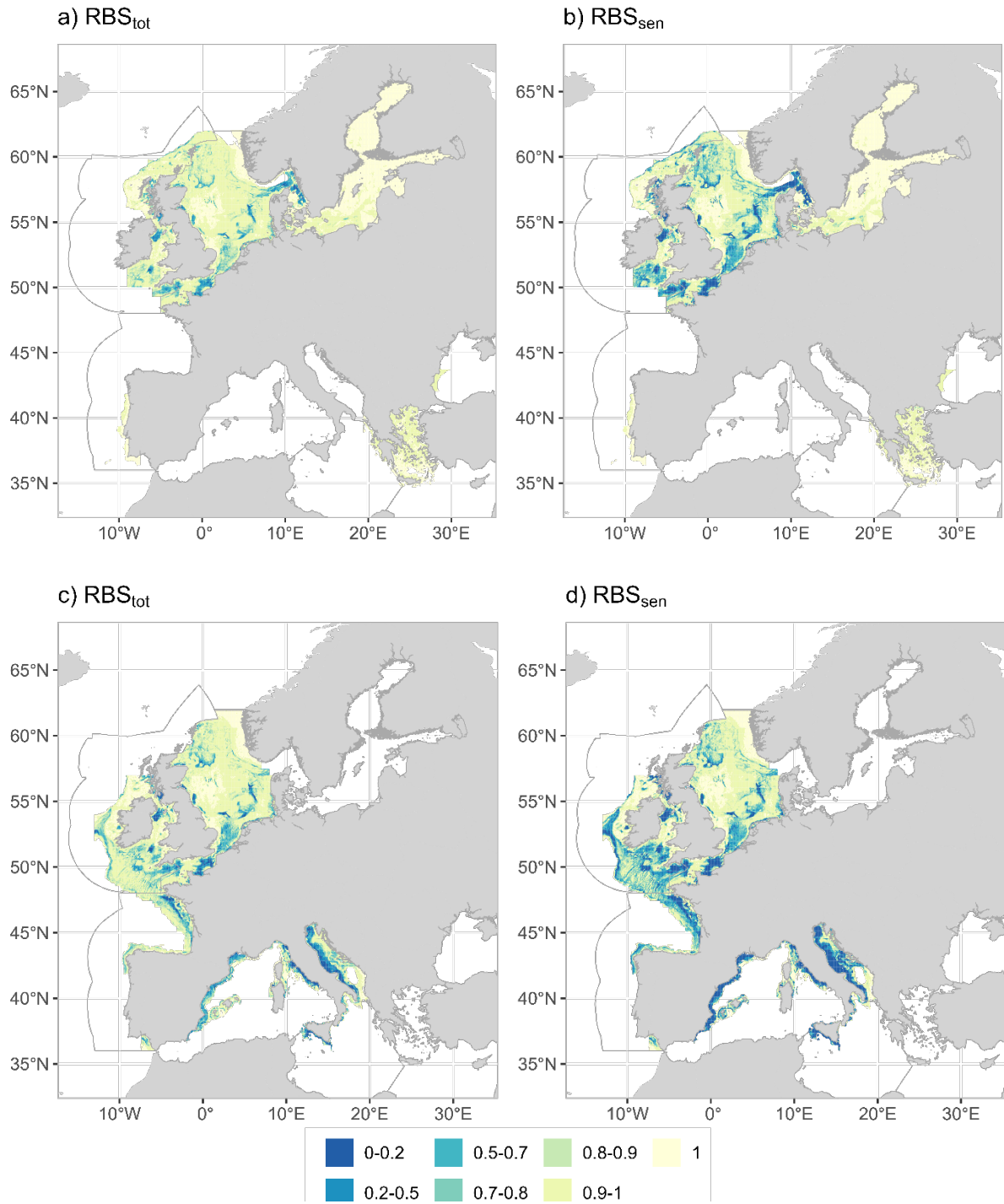


Figure S3. Maps of benthic state for (a, c) RBS_{tot} and (b, d) RBS_{sen} for infauna (a, b) and epifauna (c, d).

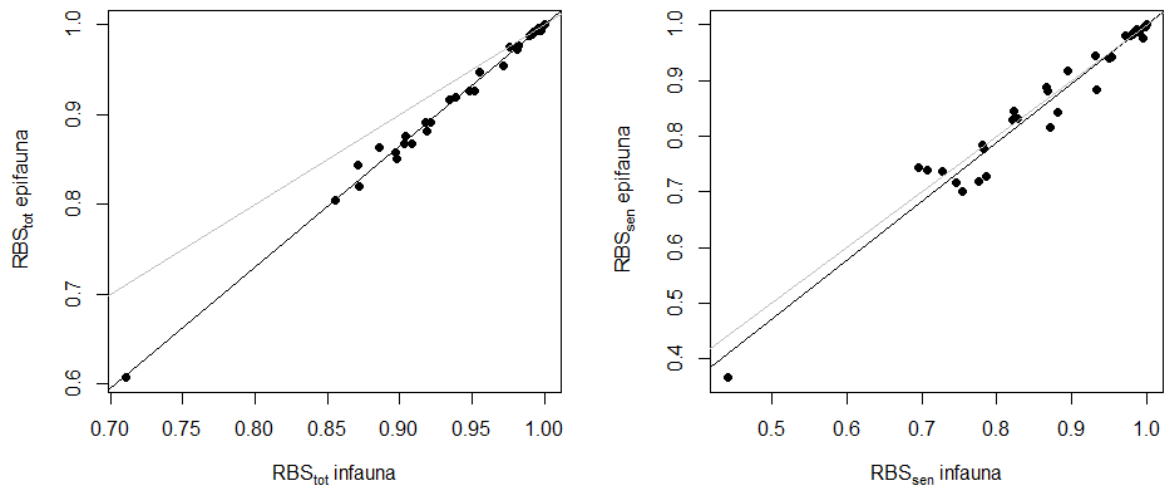


Figure S4. The relationship between infaunal and epifaunal RBS_{tot} and RBS_{sen} for cells that had assessment outputs for both groups, and compared the average RBS values for the combinations of region (North Sea, Celtic Sea, Adriatic Sea) and MFSD habitat (for combinations with $n > 5$ grid cells). The black line is the fitted regression line (RBS_{tot} : $R^2 = 0.99$, $F_{1,33}=5841$, epifauna = $-0.35 + 1.35 * infauna$; RBS_{sen} : $R^2 = 0.96$, $F_{1,33}=789$, epifauna = $-0.06 + 1.06 * infauna$), and the grey line is the 1:1 relationship that is expected if epifauna and infauna give the same results.

Text S1. Simplification of the MFSD broad habitat types

Category	MSFD habitat types (EMODnet, 2021)
Coarse	Offshore circalittoral coarse sediment, Circalittoral coarse sediment, Infralittoral coarse sediment
Mud	Offshore circalittoral mud, Circalittoral mud, Infralittoral mud, Circalittoral mud or Offshore circalittoral mud
Bathyal*	Upper bathyal sediment, Upper bathyal sediment or Upper bathyal rock and rock and biogenic reef, Upper bathyal rock and biogenic reef, Upper bathyal sediment or Lower bathyal sediment, Upper bathyal rock and biogenic reef or Lower bathyal rock and biogenic reef, Lower bathyal sediment, Lower bathyal sediment or Lower bathyal rock and biogenic reef
Sand	Offshore circalittoral sand, Circalittoral sand, Infralittoral sand
Mixed	Circalittoral mixed sediment, Offshore circalittoral mixed sediment, Infralittoral mixed sediment
Excluded	Na, Circalittoral rock and biogenic reef, NA, Offshore circalittoral rock and biogenic reef, Infralittoral rock and biogenic reef

* note that we included rock and biogenic reef in the bathyal areas as bathyal describes a depth range, not a sediment type. The predictions made are not representative for bathyal rock and biogenic reef.

Text S2. Data availability

Fishing intensity data for 0.05 x 0.05 grid cell used in the risk assessment analysis		
Region	Secondary data layer archived in (van Denderen <i>et al.</i> , 2025)	Note
Bulgarian EEZ	Yes	
Greek EEZ	Yes	Positional information is removed; areal extent of fishing per habitat type can be estimated.
Italian EEZ	Yes	Primary source of AIS data DOI: 10.5281/zenodo.15001436
French Med. EEZ	Yes	Primary source DOI: 10.12770/ec189ce9-05bd-4580-b5f3-4851e9f31df0
Spanish Med. EEZ	No	Please contact Maria Teresa Farriols Garau (mt.farriols@ieo.csic.es)
NE Atlantic	Yes	Primary source DOI: 10.17895/ices.data.8294
Baltic Sea	Yes	Primary source DOI: 10.17895/ices.data.20310255.v1

Benthic sensitivity data for 0.05 x 0.05 grid cell used in the risk assessment analysis		
Region	Primary data layer archived in (van Denderen <i>et al.</i> , 2025)	Notes
Bulgaria EEZ	Yes	
Greek EEZ	Yes	
Italian EEZ	Partly	Data of the Italian west coast is not included. Please contact Tomasso Russo (tommaso.russo@uniroma2.it) for these. Primary source for Adriatic Sea/Western Ionian Sea is DOI: 10.5281/zenodo.15001436
French Med. EEZ	Yes	
Spanish Med. EEZ	No	Please contact Maria Teresa Farriols Garau (mt.farriols@ieo.csic.es)
NE Atlantic	Yes	
Baltic Sea	Yes	

Dominant MSFD habitat type and mean depth by 0.05 x 0.05 grid cell used in the risk assessment analysis		
Region	Secondary data layer archived in (van Denderen <i>et al.</i> , 2025)	Notes
All regions	Yes	Primary open access source is EMODnet EUSeamap (2021) and EMODnet Digital Bathymetry (2018)

Predicted benthic state (PD _{tot} and PD _{sen}) by 0.05 x 0.05 grid cell		
Region	Primary data layer archived in (van Denderen <i>et al.</i> , 2025)	Notes
Bulgaria EEZ	Yes	
Greek EEZ	Yes	

Italy EEZ	Partly	Data of the Italian west coast is not included. Please contact Tommaso Russo (tommaso.russo@uniroma2.it) for these. Primary source for Adriatic Sea/Western Ionian Sea is DOI: 10.5281/zenodo.15001436
French Med. EEZ	Yes	
Spanish Med. EEZ	No	Please contact Maria Teresa Farriols Garau (mt.farriols@ieo.csic.es)
Northeast Atlantic	Yes	
Baltic Sea	Yes	

Fractional biomass by longevity class for each sample with environmental data by sampling location used as input to the statistical models. Each row corresponds to a statistical model.

Statistical model	Secondary data layer archived in (van Denderen et al., 2025)	Notes
Bulgarian EEZ	Yes	
Greek EEZ	Yes	Positional information is removed; statistical model can be performed
North/Central Adriatic	Yes	
Adriatic Sea/Western Ionian Sea	No	Partly restricted use for ongoing research project - please contact Walter Zupa zupa@fondazionecoispa.org
Sicily	No	Partly restricted use for ongoing research project - please contact mariacristina.mangano@szn.it
Italy west coast	No	Please contact Tommaso Russo (tommaso.russo@uniroma2.it)
French Med. EEZ	Yes	
Spanish Med. EEZ	No	Please contact Maria Teresa Farriols Garau (mt.farriols@ieo.csic.es)
Gulf of Cadiz	No	Please contact Marina Delgado (marina.delgado@ieo.csic.es)
Portugal EEZ	Yes	
North Iberia / Bay of Biscay / Celtic Sea	Yes	
Irish Sea, Bristol Channel, Celtic Sea North	Yes	
North Sea & Channel, including Skagerrak and shallow northwest Scotland (grab)	Partly	All data included except for the Danish and Swedish EEZs, which have partly restricted use for ongoing research projects. Please contact: Mattias sköld mattias.skold@slu.se and Grete Dinesen dine@dtu.dk
North Sea (trawl)	Yes	
Baltic Sea, including Kattegat	Yes	

Original source of benthic sampling data (where available) or contact details provided.

Statistical model	Original source for the data
Bulgarian EEZ	Todorova V., Stamatova H., Uzunova S. (2013). Zoobenthos data. In: Black Sea Monitoring 2013, Institute of Oceanology - BAS. DOI: 10.7546/IO.BAS.2024.11/monitoring-2013 Todorova V., Stamatova H. (2014). Zoobenthos data. In: Black Sea Monitoring 2014, Institute of Oceanology - BAS. DOI: 10.7546/IO.BAS.2024.12/monitoring-2014 ;

	Todorova V., Stamatova H. (2015). Zoobenthos data. In: Black Sea Monitoring 2015, Institute of Oceanology - BAS. DOI: 10.7546/IO.BAS.2024.13/monitoring-2015 ; Todorova V., Stamatova H. (2016). Zoobenthos data. In: Black Sea Monitoring 2016, Institute of Oceanology - BAS. DOI: 10.7546/IO.BAS.2024.14/monitoring-2016 ; Todorova V., Stamatova H. (2017). Zoobenthos data. In: Black Sea Monitoring 2017, Institute of Oceanology - BAS. DOI: 10.7546/IO.BAS.2024.15/monitoring-2017
Greek EEZ	Collated dataset from National monitoring programme for the implementation of MSFD and WFD, PhD projects and previous research projects. Please contact Irini Tsikopoulou itsikopoulou@hcmr.gr
North/Central Adriatic	National monitoring programme for the implementation of MSFD: https://strategiamarina.isprambiente.it
Adriatic Sea/ Western Ionian Sea	MEDITS survey data. Please contact MEDITS group.
Sicily	Partly restricted use for ongoing research project - please contact mariacristina.mangano
Italy west coast	Please contact Tommaso Russo (tommaso.russo@uniroma2.it)
French Med. EEZ	Jadaud, A. & Certain, G. (1994) MEDITS. DOI: 10.18142/7 Certain Gregoire, Jadaud Angelique, Vaz Sandrine, Metral Luisa, Cheret Isabelle, Billet Norbert, Schull Quentin, Tessier Emmanuel, Cornou Anne Sophie, Souplet Arnaud (2024). MEDITS catch data: Benthic-demersal assemblages of the Gulf of Lion and eastern Corsica (North-western Mediterranean) from 2016 to present. SEANOE. DOI: 10.17882/99052
Spanish Med EEZ	MEDITS survey data. Please contact MEDITS group.
Gulf of Cadiz	Please contact Marina Delgado (marina.delgado@ieo.csic.es)
Portugal EEZ	Dataset collated from the ACOSHelf and MeshAtlantic projects. Please contact Renato Mamede renatomamede@ua.pt
North Iberia / Bay of Biscay / Celtic Sea	Please contact Pascal Laffargue (Pascal.Laffargue@ifremer.fr)
Irish Sea, Bristol Channel, Celtic Sea North (grab)	UK EEZ dataset DOI: 10.17861/80548ab4-aa10-48ec-8003-eff10edb7423 collated by Heriot Watt University based on five public datasets: <ol style="list-style-type: none"> 1) MERMAN (17/06/2022). The data were supplied by the British Oceanographic Data Centre on behalf of the Clean Safe Seas Evidence Group. Data were collected by the Agri-Food and Biosciences Institute, Centre for Environment, Fisheries and Aquaculture Science, Department of Agriculture, Environment and Rural Affairs, Environment Agency, Food Standards Scotland, Marine Scotland Science, Natural Resource Wales and Scottish Environment Protection Agency. The data were funded by Agri-Food Biosciences institute, Department of Agriculture, Environment and Rural Affairs, Department for Environment, Food and Rural Affairs and Scottish Government. These data contain public sector information licensed under the Open Government Licence v3.0. 2) Bolam, S.G., Barrio-Frojan, C.R.S. & Eggleton, J.D. (2010) Macrofaunal production along the UK continental shelf. <i>Journal of Sea Research</i>, 64, 166-179. https://doi.org/10.1016/j.seares.2010.02.003 3) Sciberras M.; Hiddink J.G.; Woodward E.M.S.; Tait K. (2017). Community mediation on shelf-sea benthic nitrogen cycling following bottom trawling and organic enrichment. British Oceanographic Data Centre - Natural Environment Research Council, UK. DOI: 10.5285/46ecc183-c08d-2211-e053-6c86abc0d02c 4) Somerfield et al (2006). Relative impacts at sites of dredged-material relocation in the coastal environment: a phylum-level meta-analysis approach https://doi.org/10.1007/s00227-005-0168-1 5) Howarth, L. M., Waggitt, J. J., Bolam, S. G., Eggleton, J., Somerfield, P. J., & Hiddink, J. G. (2018). Effects of bottom trawling and primary production on the composition of biological traits in benthic assemblages. <i>Source: Marine Ecology Progress Series</i>, 602, 31–48. https://doi.org/10.2307/26508785
North Sea & Channel, including Skagerrak and shallow northwest Scotland (grab)	UK EEZ dataset DOI: 10.17861/80548ab4-aa10-48ec-8003-eff10edb7423 collated by Heriot Watt University based on five public datasets: <ol style="list-style-type: none"> 6) MERMAN (17/06/2022). The data were supplied by the British Oceanographic Data Centre on behalf of the Clean Safe Seas Evidence Group. Data were collected by the Agri-Food and Biosciences Institute, Centre for Environment, Fisheries and Aquaculture Science, Department of Agriculture, Environment and Rural Affairs, Environment Agency, Food Standards Scotland, Marine Scotland Science, Natural Resource Wales and Scottish Environment Protection Agency. The data were funded by Agri-Food Biosciences institute, Department of Agriculture, Environment and Rural Affairs, Department for Environment, Food and Rural Affairs and Scottish Government. These data contain public sector information licensed under the Open Government Licence v3.0. 7) Bolam, S.G., Barrio-Frojan, C.R.S. & Eggleton, J.D. (2010) Macrofaunal production along the UK continental shelf. <i>Journal of Sea Research</i>, 64, 166-179. https://doi.org/10.1016/j.seares.2010.02.003

	<p>8) Sciberras M.; Hiddink J.G.; Woodward E.M.S.; Tait K. (2017). Community mediation on shelf-sea benthic nitrogen cycling following bottom trawling and organic enrichment. British Oceanographic Data Centre - Natural Environment Research Council, UK. DOI:10.5285/46ecc183-c08d-2211-e053-6c86abc0d02c</p> <p>9) Somerfield et al (2006). Relative impacts at sites of dredged-material relocation in the coastal environment: a phylum-level meta-analysis approach https://doi.org/10.1007/s00227-005-0168-1</p> <p>10) Howarth, L. M., Waggitt, J. J., Bolam, S. G., Eggleton, J., Somerfield, P. J., & Hiddink, J. G. (2018). Effects of bottom trawling and primary production on the composition of biological traits in benthic assemblages. Source: Marine Ecology Progress Series, 602, 31–48. https://doi.org/10.2307/26508785</p>
	Dutch EEZ: https://www.rijkswaterstaat.nl
	North Sea data collected along five trawling gradients DOI: 10.5281/zenodo.8308126
	Swedish EEZ: Partly restricted use for ongoing research project covering marine protected areas - please contact: Mattias Sköld mattias.skold@slu.se
	Danish EEZ: Partly restricted use for ongoing research - please contact: Grete Dinesen dine@aquadtu.dk
North Sea (trawl)	ICES Database on Trawl Surveys (DATRAS), ICES, Copenhagen, Denmark. https://datras.ices.dk
Baltic Sea, including Kattegat	Collated data from Gogina et al. 2016 https://doi.org/10.1093/icesjms/fsv265 (data is available in supplement)

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