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Spatial analysis of marine protected area networks in Europe's seas

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Acronyms

ABNJ	Area beyond national jurisdiction
BSPA	Baltic Sea Protected Area (Helsinki Convention)
CDDA	Common Database on Designated Areas
CDR	Eionet Central Data Repository
CLCS	Commission on the Limits of the Continental Shelf
EEA	European Environment Agency
EEZ	Economic Exclusion Zone
EPZ	Ecologic Protection Zone
ETC/BD	European Topic Centre on Biological Diversity
ETC/ICM	European Topic Centre on Inland, Coastal and Marine waters
ETRS89	European Terrestrial Reference System 1989
GSHHG	Global Self-consistent, Hierarchical, High-resolution Geography
HELCOM	Baltic Marine Environment Protection Commission, Helsinki Commission
ICES	International Council for the Exploration of the Sea
ISPRA	Istituto Superiore per la Protezione e la Ricerca Ambientale
JNCC	Joint Nature Conservation Committee
LAEA	Lambert Azimuthal Equal Area
MEG	Marine Expert Group
MPA	Marine protected area
MSFD	Marine Strategy Framework Directive
N2K	Natura 2000
NDS	Nationally designated site
OSPAR	Convention for the protection of the marine environment of the north-east Atlantic
QA	Quality assurance
RAC/SPA	Regional Activity Centre for Specially Protected Areas
RSC	Regional Sea Convention
SAC	Special areas of conservation
SCI	Site of Community Importance
SDF	Standard Data Form
SPA	Special Protection Area
SPAMI	Specially Protected Area of Mediterranean Importance
UNCLOS	United Nations Convention on the Law of the Sea
VLIZ	Flanders Marine Institute

Marine regions/subregions:

ADRI	Adriatic Sea
AELE	Aegean and Levantine Sea
BALT	Baltic Sea
BBIC	Bay of Biscay and Iberian Coast
BLAC	Black Sea
CELT	Celtic Sea
GNKE	Greater North Sea, incl. the Kattegat and the English Channel
ICME	Ionian and Central Mediterranean Sea
MACA	Macaronesia
NEAO	North-east Atlantic Ocean
WMED	Western Mediterranean Sea

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1 Introduction

1.1 Aims and scope of the report

This European Environment Agency (EEA) technical report presents an overview of the 2012 spatial distribution of the networks of marine protected areas (MPAs) established in the waters of EU), excluding overseas territories.

The report contains a detailed explanation of the methodology and data sets used and the reasoning behind the spatial statistical analysis outlining the distribution of marine MPAs established by EU Member States in the regional seas surrounding Europe. In so doing, the report also covers aspects concerning data-handling issues experienced during the analysis process, explanations of problem resolutions, and suggestions for improvement of future iterations of the same analysis.

The networks of MPAs taken into account in the analysis are those established under the framework of:

1. the EU nature directives, i.e. the Habitats and Birds Directives (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora; and Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds), recorded in the respective Natura 2000 (N2K) databases;

2. national designation, i.e. the nationally designated sites (NDSs) recorded in the Common Database on Designated Areas (CDDA);

3. the Regional Sea Conventions (RSCs) encompassing Europe's regional seas and containing EU waters.

In this respect, it is important to note that the RSCs encompassing EU waters are the:

- Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention);

- Convention for the Protection of the Marine Environment of the North-east Atlantic (OSPAR Convention);

- Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean Sea (Barcelona Convention);

- Convention on the Protection of the Black Sea against Pollution (Bucharest Convention).

The conservation of species and habitats through the establishment of MPAs is set out in the mandates and targets of all four conventions. But at present, only the first three conventions listed above have in place a specific mechanism for establishing, recognising and reporting MPAs; this is why only the networks of MPAs established under these first three conventions are considered.

It should also be noted that the method used in this report presents numbers and areas of MPAs that may differ from those available in national databases of EU Member States. The explanation for such discrepancies varies from case to case:

- Additional sites might have been designated after the cut-off date for using the databases.

- Some countries might not yet have reported all available information.

- It is a requirement of the analysis that the marine species or habitats for which the MPA (N2K sites) is designated be listed in the tabular data reported for each site. The tabular data are used as a quality assurance (QA) parameter. If no marine species or habitats have been listed for a site, then the site is not recognised as an MPA through the method used for QA of the analysis (see detailed explanation in Section 2.6).

- Sites close to the shore or parts thereof might be cut off due to differences in the resolution of the coastline available for all EU Member States. As EU Member States have not reported a harmonised coastline a coarser EU coastline was applied.

A prerequisite for setting up a spatial assessment is the delineation of assessment areas. The EEA has chosen to delineate marine areas using a 200 nautical mile (NM)

limit from the coast or one of equidistance to non-EU countries, except for Greece where a 6 NM limit has been used. MPAs do exist beyond these boundaries, but they have not been included in the analysis.

Boundaries between assessment areas have been harmonised with existing boundaries established under the Regional Sea Conventions, the biogeographic boundaries established under the Habitats Directive and the boundaries reported by EU Member States under the Marine Strategy Framework Directive (MSFD) (Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for Community action in the field of marine environmental policy). These boundaries are being further aligned with the International Council for the Exploration of the Sea (ICES) ecoregions.

Please note that neither the European Commission, the EEA nor its European Topic Centre on Inland, Coastal and Marine waters (ETC/ICM) are the competent authorities in the geographical demarcation of EU Member States borders. This is also the case in establishing the limits of the continental shelf of EU Member States, where international law applies. According to Article 76 (8) of the United Nations Convention on the Law of the Sea (UNCLOS), only the coastal State is the competent authority in establishing the outer limits of its continental shelf. It is to act in line with the recommendations of the Commission on the Limits of the Continental Shelf (CLCS).

The figures and tables used to illustrate the evaluation of the available data sets **are not intended** to influence or otherwise have a bearing on any ongoing negotiations in UNCLOS or jurisdictional contexts regarding maritime boundaries of EU Member States or third countries located in Europe's seas. Neither the European Commission, the EEA nor its ETC/ICM is responsible for the use that may be made of information provided in the tables and maps of this report. Moreover, all maps carry a disclaimer: the maps serve for information purposes only, and may not and shall not be construed as official maps representing maritime borders in accordance with international law.

The assessment and its timeline was presented to the Marine Expert Group (MEG) established under the Habitats and Marine Strategy Directives in November 2012 by the EEA. The EEA presented its work on databases containing information on MPAs, and following discussion with MEG experts, the Commission defined a work programme involving use of already existing data-reporting flows, in order to collect necessary information for the Commission report on MPAs, as defined by Article 21 of the MSFD. This Commission working document was published in March 2013 (EEA, 2013a).

The ETC/ICM activities on MPA-related matters have therefore focused on elaborating baseline information for establishment of networks of MPAs, work directly underpinning the EEA's supporting role to the Commission on progress reporting on the establishment of MPAs. In this context, ETC/ICM work in 2013 first focused on generating base reference layers for the MPA query process, defining the appropriate methodology for the extraction of true marine sites from existing EEA and RSC databases on MPAs, and generating preliminary statistics on MPA network coverage (i.e. values on network distribution, overlap, size, minimum distances amongst sites, etc.). In 2014, given the availability of reported national marine waters, ETC work concentrated on defining methodological approaches to resolving spatial boundary issues, and elaborating country profiles of marine N2K sites.

1.2 Organisation of work for the report

The work was conducted by Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) in 2013, partially under its ETC/BD-related consortium activities, and through a specific consultancy agreement commissioned through the ETC/ICM in 2013, and entirely through ETC/ICM activities in 2014. ISPRA was responsible for developing the methodology required for the spatial analysis, elaborating the general statistics (size and distance values of the different MPA networks, distribution according to marine regions/subregions and buffer distance belts), elaborating the N2K country profiles, double checking for possible errors, and writing the report.

TC Vode, ETC/ICM's partner, created and generated the base shapefiles necessary for running the general statistics and country profiles on N2K (i.e. correction of specific errors in the EEA coastline, creation of buffer distance belts, and filtering of marine N2K sites and related tabular data).

2 Data sets and methodology

This chapter contains information on the data sets and methodologies used to define the base shapefiles (buffer distance belts) and the different MPA networks which were considered for spatial analysis and generation of statistics of European MPAs. It also covers the data and methods used to define the surface area extension of marine waters of EU Member States, obtained by using data reported by EU Member States under the MSFD in 2013. This calculation played a functional role in the computation of national marine N2K surface cover.

Annex 1 presents the problems encountered in each section and describes how they were solved in specific cases (for the coastline and MPA assessment areas). The annex offers insight into the implications of the chosen approach as well as possible solutions to improve the querying approach in future iterations of this procedure.

2.1 Data sets and software

Table 2.1 presents the data sets used to construct the base and MPA network shapefiles required for the spatial analysis. Since the founding part of the work, consisting in defining and testing an appropriate methodology for the extraction of true marine sites from existing MPA databases, was carried out in 2013, the databases used for generating the basic statistics were those having undergone QA/QC by mid 2013. This means that the baseline information presented in the report is based on MPA data reported either at the end of 2012 (N2K data) or the beginning of 2013 (CDDA). Since EU Member States reporting and QA/QC of reported N2K and CDDA is not synchronous, analysis of different MPA network information means considering annual data sets whose publication dates may be several months apart.

It is for this reason that the present report is based on analysis of N2K data reported at the end of 2012 and made publicly available in July 2013, and CDDA data reported at the beginning of 2013 and made publicly available in August 2013. These dates notwithstanding, the data may be considered to represent the state of play in sites established at the end of 2012.

In accordance with EEA guidelines, all the layers used for the construction of the maps and for the data elaborations refer to the ETRS89-LAEA 52N 10E, i.e. the Lambert Azimuthal Equal Area for projection, and the European Terrestrial Reference System 1989 as the geodetic reference system. The spatial and statistical elaborations were carried out using the version 10.1 release of ArcGIS (Esri inc.). The GIS analyses run in order to compile the statistical tables and produce the maps were processed using ad hoc developed Python scripts. In a few cases, the ArcGIS 'model builder' tool was used, because it is better suited to stealthier GIS analysis. Use of Python scripts and the model builder are of strategic importance, because they allow for acceleration of the elaboration processes, as well as for reruns of the analytical procedure in case of new data input modifications.

2.2 Definition of MPA assessment areas

The spatial extent of the MPA assessment areas was defined as the marine waters surrounding the EU countries whose outer limit is defined by the 200 NM boundary from the coast (possibly coinciding with formally recognised EEZ boundaries) or the equidistance (in cases of opposite neighbouring EU countries), or by the presence of a boundary defined by an agreed treaty. However, since no formal boundary of this map exists and since this limit coincides with the boundary of the maritime area (water column) submitted by EU Member States under MSFD Articles 8, 9 and 10 in the Eionet Central Data Repository (CDR) ([1]), the decision was taken to use the MSFD Region/Subregion boundary shapefile assembled in 2013 by ETC/ICM (ETC/ICM, 2013), based on EU Member States reported data integrated with information from the Flanders Marine Institute (VLIZ) Maritime Boundaries (version 7) to delimit the MPA assessment areas ([2]).

([1]) See http://cdr.eionet.europa.eu.
([2]) See http://www.marineregions.org/downloads.php.

Table 2.1 GIS and tabular data sets used in MPA analysis

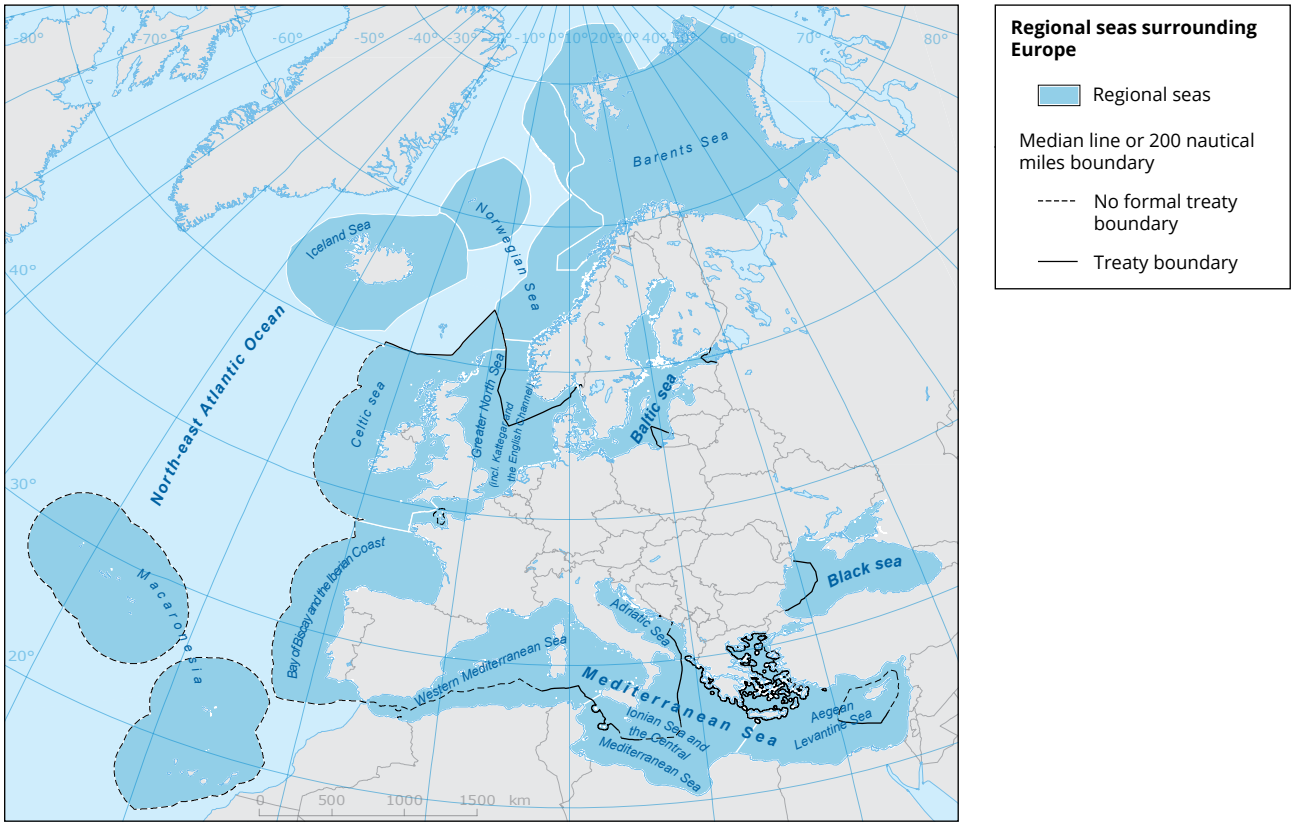
Description of data layer	Name of the database version	Date made available/ downloaded	Obtained from
European coastline shapefile	Europe_ coastline_20130605 ([a])	10.06.2013	EEA; Mette Palitzsch Lund: http://www.eea.europa.eu/data-and-maps/data/eea-coastline-for-analysis
Marine region/subregion boundaries shapefile	MSFD_Marine_Subregions_ draft_EU_EEZ_20130614 ([a])	20.06.2013	EEA; Hans Mose Jensen (ETC/ICM)
Boundaries of European Seas shapefile	Regional_seas_extended_ version_ETRS89_20130614	20.06.2013	EEA, 2013
Extension of Member States declared marine waters	MSFD_marine_waters_ VLIZ_20140513_raw	13.05.2014	Hans Mose Jensen (ETC/ICM; ICES)
Country terrestrial borders	CNTR_RG_100K_2010_XK (Country borders)	n/a	GISCO (Geographical Information and maps) by Eurostat (European Commission); © EuroGeographics for the administrative boundaries: https://sdi.eea.europa.eu/data/global/geography/eea_v_4258_100_k_gisco-admin-boundaries-kosovo_2010 (Eionet login is needed)
Country terrestrial borders	CNTR_RG_01M_2010_XK (Country borders)	n/a	GISCO (Geographical Information and maps) by Eurostat (European Commission); © EuroGeographics for the administrative boundaries: https://sdi.eea.europa.eu/data/global/geography/eea_v_4258_1_mio_gisco-admin-boundaries-kosovo_2010 Eiomet login is needed
Natura 2000 tabular database	PublicNatura2000End2012.mdb	12.07.2013	EEA; Mette Palitzsch Lund: http://www.eea.europa.eu/data-and-maps/data/natura-3
Natura 2000 shapefile	Natura2000_end2012	18.07.2013	EEA; Mauro Michielon and Marek Staron: http://www.eea.europa.eu/data-and-maps/data/natura-3/#tab-gis-data
OSPAR Convention MPAs shapefile	OSPAR_MPA-db_2013.zip	September 2013	http://www.ospar.org/ospar-data/ospar_mpa-db_2013.zip
Helsinki Convention MPA (BSPA) shapefile	BalticSeaProtectedAreas.shp	March 2013	HELCOM Secretariat
Barcelona Convention MPA (SPAMI) shapefiles	Single shapefiles of each SPAMI were downloaded	September 2013	http://www.medpan.org/web/database/home (select list in the webpage)
Barcelona Convention MPA (SPAMI) tabular data	ASPIM_27062013.xls	30.07.2013	RAC/SPA secretariat
CDDA shapefile	CDDA_ver11_shapefile.zip	19.08.2013	EEA: http://www.eea.europa.eu/data-and-maps/data/nationally-designated-areas-national-cdda-8#tab-gis-data

Note: ([a]) As described in this chapter, the databases were subsequently modified to take into account errors needing to be amended before carrying out statistical elaborations.

It is important to note that the assessment area does not include the extended continental shelf beyond 200 NM, in which some countries have advanced seabed/subsoil claims, nor does it extend beyond the 6 NM territorial water extension claimed by Greece. Thus, this report's baseline inventory of MPAs purposefully does not contain information on MPAs lying in areas beyond national jurisdiction (ABNJs). This is partly because the purpose of the report is to characterise EU Member States' protection efforts through MPA establishment in waters where EU Member States (or the EU) can exercise full rights over the management of activities being conducted in the water column and subsoil, thereby allowing ecosystemic management. It is also because some sea areas might still be disputed between parties.

Map 2.1 illustrates the extent of European seas covering the coasts of EU and third countries, as well as the MPA assessment areas delimited by the boundary limits mentioned above. For the purpose of data reporting in the figures, maps and tables of this report, different parts of the assessment area refer to the name of marine region/subregion in which each falls. The boundaries used in this report only reflect assessment boundaries, rather than the official maritime boundaries of individual EU Member States.

Map 2.1 **EEA MPA assessment areas delimited by the regional seas surrounding Europe and identified according to the European seas regions**



2.3 Creation of distance buffer zones and correction of the coastline

The European coastline, published by the EEA at a scale of 1:100 000, is a product derived from the combination of two data sources: EU-Hydro and A Global Self-consistent, Hierarchical, High-resolution Geography Database (GSHHG). The version of the coastline, published in 2013, was amended to account for some features which needed to be modified or added. The amendments to the coastline are explained below.

More specifically, the coastline layer concerning Kalogeroi islands (coordinates 38.169, 25.287) in Greece, was updated by TC Vode. In the original version of the coastline, the polygon representing the islands had resulted from clipping the N2K polygon containing the islands, which attributed a disproportionally large surface area of 17.5 km^2 to this island. So the polygon representing the islands was replaced by five smaller polygons with a common area of 0.007 km^2. The polygons of the islands originate from the marine waters shapefile reported on Eionet by Greece under MSFD reporting ([3]). Using the method described above, the geography of the site was more accurately represented. The object ID of the polygon that was removed from the European coastline layer is no 4079, and the new inserted object IDs in the modified coastline layer for the Kalogeroi islands are nos 52331, 52332, 52333, 52334 and 52335.

The whole coastline layer was then overlaid on the MPA assessment area (MSFD subregion shapefile) and cleared of unnecessary areas (non-EU regions, e.g. parts of Africa, Norway and Karelia), so as to cut geoprocessing time during the production of buffers and in further elaborations.

The MPA assessment areas were then used with the modified European coastline shapefile to generate buffer distance belts (hereafter referred to as buffer zones) of the following sizes for each marine region/subregion:

a) 0-1–NM

b) 1–12 NM

c) 12 NM to the end of the MPA assessment zone (hereafter referred to as 12 NM–END).

The purpose of creating buffer zones with which to define MPA distribution is to provide a preliminary description of the representativity of the network from a purely coastal to offshore perspective. The decision to use these three distance belts also allows us to pinpoint eventual patterns of protection effort exerted in very coastal waters (0–1 NM), and in territorial versus EEZ waters.

A key point is that in so doing, the buffer zones were constructed directly from the coastline without considering the presence or absence of eventual baselines. The reasons for this preference are threefold. The first is linked to the objective of the MPA baseline exercise itself, which is to describe the distribution of established MPAs within the context of different marine zones (as defined in the Commission working document of 2013). The work illustrated in the present document is therefore centred on providing an ecosystem perspective of MPA distribution rather than one strictly related to legal boundaries such as those implied by territorial jurisdiction. Moreover, since N2K sites are characterised by different marine habitat types occurring in areas lying between the coastline and eventual baselines (i.e. large bays and inlets, estuaries, etc.), limiting the construction of the buffer zones from the baseline would jeopardise the inclusion of these marine habitats into a baseline evaluation of the existing MPA network. It is for this reason that marine waters lying between the coastline and eventual baselines were considered. Furthermore, since no formal repository for a European baseline exists, it was not possible to develop a methodology to encompass baseline considerations within the generation of the 0–1 NM buffer zone.

Should formal reference layers containing baseline information become available, future MPA analysis iterations can be run using a coastal buffer zone that contains both the marine areas lying between the coast and the baseline, and the 0–1 NM buffer zone projected from the baseline. Buffer zone shapefile construction is described in Annex 1 and represented in Map 2.2.

Use of the above-mentioned European coastline with this type of resolution means that small islets might remain unperceived. In such cases, MPAs surrounding islets lying distant from the coast could end up ascribed to a buffer zone other than the 0–1 NM one; as such, the surface area of such sites would contribute to surface area coverage of more distant buffer zones than those EU Member States would consider when reporting national data using higher resolution coastline data. Moreover, the presence of small and large islands along the coast is likely to influence EU Member States definition of the national baseline, with obvious implications for the definition of the outer boundary of territorial waters. Data

([3]) See http://cdr.eionet.europa.eu/gr/eu/msfd8910/msfd4geo/envuhwe8q.

discrepancies on MPA spatial distribution reported at EU Member States level are therefore anticipated with respect to the overall description in this present exercise. It is expected that such discrepancies will continue to arise until a homogeneous high-resolution European coastline and baseline layer becomes available.

Another point worth noting concerns the extension of the third buffer distance belt from the territorial water boundary (12 NM): this varies from country to country because it is defined by either the 200 NM limit or the median line, or by the existence of a formal treaty. In most cases, however, this outer limit appears to correspond with the individual country border of the Exclusive Economic Zone (EEZ) or Ecologic Protection Zone (EPZ), and only exceptionally does it appear to extend into waters that do not benefit from holding a particular status (i.e. southern Italy).

Unlike most other EU countries, territorial water extension in Greece is limited to a distance of 6 NM from the baseline. Therefore, only two buffer distance belts were generated for Greece. The second buffer distance belt has a mere 5 NM width (and thereby ends at the farthermost distance of 6 NM from the coastline), as opposed to the 11 NM width of other countries (whose second buffer distance belt ends 12 NM from the coastline). However, for the purpose of harmonised category listing, when dealing with the reporting on compounded general statistics, this specific buffer in Greece is assimilated to the 1–12 NM of the other countries.

2.4 Calculation of reference surface area values per region

The total surface area (in km^2) of the European regional seas and of the regions within the MPA assessment areas was calculated so as to indicate the spatial extent of the EU portion of sea with respect to the overall regional sea extension at regional and subregional level. Subsequently, the surface area of each buffer zone lying at regional/subregional level was calculated. Results of the spatial extents of each marine component are listed in Table 2.2. All results will be updated as and when a formal map is published.

Readers may observe that while the shapefiles used for the European regional seas and MSFD implementation area pertaining to the Bay of Biscay and the Iberian Coast (BBIC) are identical in shape, the resulting surface areas are different. This is likely due to a minor shift between the two shapefiles, resulting in a 13 km^2 difference. QA for the shapefiles in future should consider realigning the two areas so as to prevent the reoccurrence of such marginal shifts.

Map 2.2 Buffer zones (0–1 NM, 1–12 NM and 12 NM–END) of MPA assessment areas

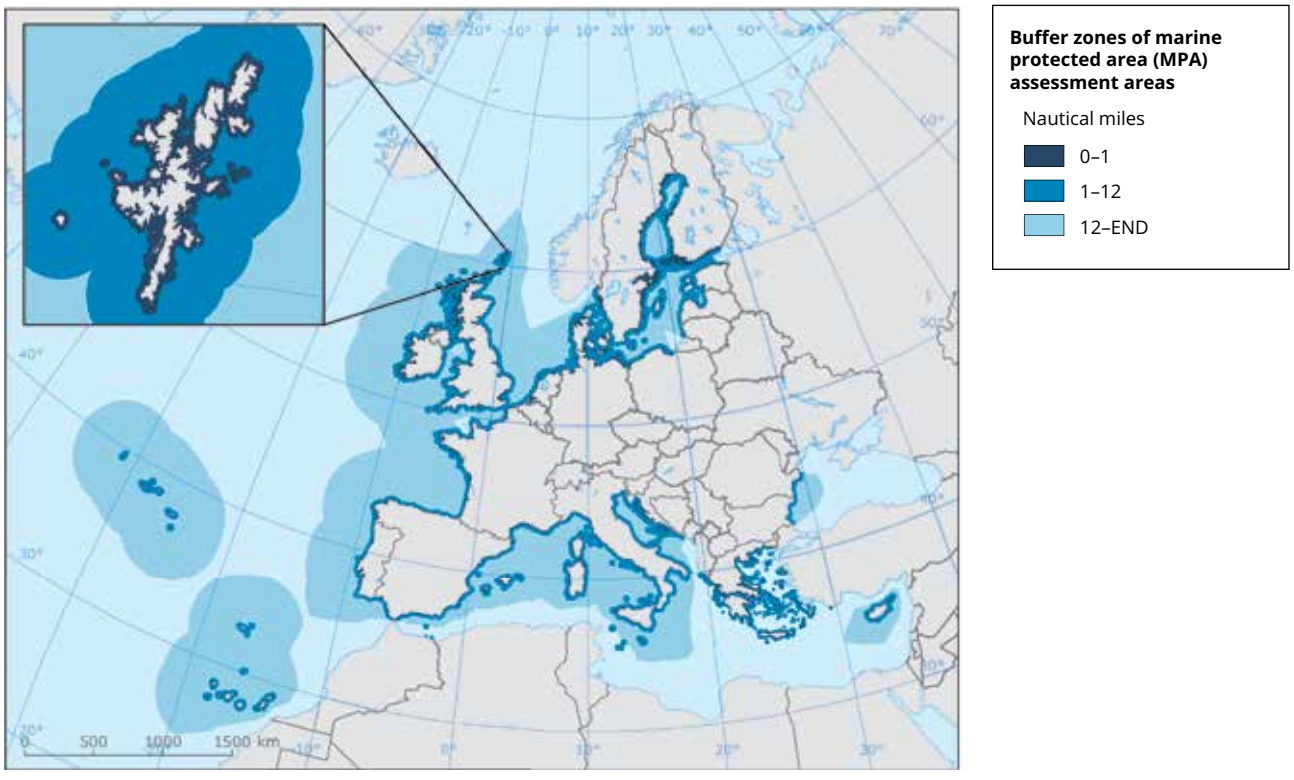


Table 2.2 Surface area (km²) of regional seas, EU part of the sea, and area of nearshore, coastal and offshore waters in EU part of the sea

European regional seas and subregions (*sensu* MSFD)	Sea surface area (km²)	EU part of sea (km²)	EU area of 0–1 NM zone	EU area of 1–12 NM zone	EU area of 12 NM–END zone
Baltic Sea	393 529	370 176	52 289	151 450	166 437
North-east Atlantic Ocean (NEAO)	7 926 835	4 075 640	57 536	352 491	3 665 614
Celtic Sea	920 041	916 049	24 402	124 196	767 452
Greater North Sea incl. Kattegat and English Channel	670 215	503 047	20 720	108 266	374 062
Bay of Biscay and the Iberian Coast	803 731	803 744	8 426	57 552	737 767
Macaronesia	1 852 800	1 852 800	3 989	62 477	1 786 334
Mediterranean Sea	2 516 635	1 210 552	54 191	332 089	824 272
Western Mediterranean Sea	846 255	660 051	15 699	145 900	498 451
Ionian Sea and Central Mediterranean Sea	772 768	239 995	8 311	49 762	181 922
Adriatic Sea	139 795	120 080	10 469	48 511	61 100
Aegean-Levantine Sea	757 816	190 444	19 726	87 920	82 799
Black Sea	473 894	55 000	1 278	9 785	53 291
Total	**11 310 892**	**5 720 723**	**165 294**	**845 814**	**4 709 615**

2.5 Calculation of country marine waters per buffer distance belts

The country marine waters spatial layer elaborated by ICES under ETC/ICM Work programme 1.6.1.a in 2014 was used as a reference for defining and computing each country's marine surface area and respective buffer belt extensions per marine region/subregion. This was a necessary step in order to obtain relative N2K coverage estimates. Country borders of the spatial layer obtained from the ETC/ICM contain information on Member States' marine waters as submitted under the 2012–2013 MSFD reporting. In cases where Member States did not submit spatial data on their marine waters, the information was compiled from the Exclusive Economic Zone (EEZ) boundaries from marine regions.

An estimate was carried out of possible shapefile inconsistency between the marine region/subregion and buffer zones described in Sections 2.2 and 2.3 above, and the surface extension of EU Member States-declared marine waters. This allowed for detection of spatial differences generated from bias error when intersecting the 2014 MS marine waters with the buffer distance belts constructed through reference layers available in 2013 (European coastline and marine region/subregion boundaries). Due to this inconsistency, country division of buffer zones and relative surface area computation could not be obtained through simple intersection of these layers, but rather called for specific solutions involving manual division of reference layers. These solutions are presented in Annex 1.

2.6 Preparation of the marine Natura 2000 shapefile

In the present application, the decision was taken to rely on the availability of the entire complete N2K database (land and sea) first. It seemed more straightforward to use the tabular data associated with each site (tabular data in the mdb database containing information listed in the Standard Data Form (SDF)), and therefore select the proper marine sites by filtering a specific set of marine data present in the reported tabular data. The databases used for the purpose of the present analysis contain information reported to the EU by Member States at the end of 2012, and made publicly available in July 2013.

The filtering procedure was therefore based on the tabular data first, and the spatial selection was performed subsequently. This way of operating appeared to allow for better evaluation of the effect of spatial selection, determined by the accuracy of the coastline.

The mdb (PublicNatura2000End2012.mdb) was queried so as to create a new table containing only those N2K sites archived as having one or more of the following marine features (hereafter referred to as query features):

1) sites with coverage of habitat belonging to codes N01 and/or N02 and/or N03 and/or N24 indicated in the field HABITATCODE of the HABITATCLASS table;

2) sites with a value in the percentage marine cover field in the table NATURA2000SITES;

3) sites with the presence of marine habitats/species listed in the annexes of the Habitats Directive, indicated in the SPECIES and HABITATS tables, respectively (see Annex 2 for a complete list of the marine species and habitats considered when querying the database).

The purpose of this query was to select any available information contained in the tabular database that could allow sites with a marine component to be intercepted. Habitat codes N01, N02 and N24 were deemed indicative of marine sites, whether SCIs or SPAs. Habitat code N03 was also deemed indicative of marine SPA distribution, since together with N01, N02, and N24, all these habitat classes are covered (continuously or intermittently) by the sea:

- N01 — Marine areas and sea inlets;
- N02 — Tidal rivers, estuaries, mud flats, sand flats and lagoons (including saltworks basins);
- N03 — Salt marshes, salt pastures and salt steppes;
- N24 — Marine and coastal habitats (general).

This reasoning also partially rests on the basis of the argumentation by the United Kingdom's Joint Nature Conservation Committee (JNCC), related to the definition of SPAs having a marine extension ([4]).

Readers should bear in mind that habitat codes N02 and N03 regard transitional waters which could potentially contain marine features lying seaward of the coastline. As such they were retained in the tabular screening so that they could be considered in the case in which the site extended marginally at sea. If there are no projection shift errors of the sites, and if the coastline data are accurate, then theoretically, no non-marine N2K site containing habitat codes N02 and N03 should have been retained in the spatial selection process. It is therefore unlikely that consideration of such habitat codes in the selection procedure could lead to an overestimation of marine sites.

Because the database reporting system allows for 'null' values (i.e. empty fields) to be expressed for the presence of percentage of marine habitat codes or marine percentage cover, as opposed to the simple declaration of 0%, sites with empty fields for marine habitats or percentage cover were filtered, so as to quantify the potential number of marine sites with null values in the chosen fields. Annex 3 contains the query used to filter marine N2K sites, in line with the steps mentioned earlier.

The result of this first filter on the entire mdb data based on the query features listed above yielded a total of 10 575 records. The resulting query records were used to generate a table which was then associated with the complete N2K shapefile (Natura2000_end2012.shp). The shapefile was subsequently intersected with the marine assessment area regions so as to retain only the sites falling seaward of the coastline (sites lying seaward of the MPA assessment boundary were screened and are treated in Section 2.5.1). The total number of sites resulting from this filtering was 2 991, of which 324 were sites with null values in all of the query features, albeit located in the marine portion of the subregions. These sites were removed from the shapefile in order to produce a final, tabular and spatially queried shapefile of marine N2K sites, totalling 2 667 records/sites.

The resulting filtered marine N2K sites were then sorted into marine SCIs and SPAs based on the following characteristics of the site code:

- SCIs, i.e. sites declared as belonging to typology B and C;
- SPAs, i.e. sites declared as belonging to typology A and C.

Two distinct spatial data sets, besides the original one containing all the records, were then created for SCIs and SPAs per subregion, and these were used to run the general statistical elaborations.

2.7 Preparation of the Regional Sea Conventions MPA shapefile

Details of the spatial and tabular databases of the MPAs recognised by the RSCs were obtained through the respective secretariats, and are reported in Table 2.1. RSC site inclusion into the three databases does not follow the same calendar timing, and as such, it was not possible to guarantee consideration of databases reflecting MPA scenarios at a specific given date. The OSPAR database version is dated 2013, but

([4]) See http://jncc.defra.gov.uk/page-4559-theme=textonly.

refers to sites included up until the end of 2012. The Barcelona Convention database obtained during mid 2013 is related to the latest approval of the database occurring on a biannual basis (in this case, at the end of 2011). The HELCOM database version is dated March 2013. Therefore, the state of the art of the considered RSC networks is approximately synchronous with that regarding N2K and CDDA data examined in the present report, but cannot be considered precisely coincident in terms of time, since reporting and dates of public availability of the data do not respect the same calendar deadlines.

While the OSPAR and Baltic Sea MPA (BSPAs) shapefiles were obtained from the secretariat or downloaded from the Regional Convention's website respectively, the Barcelona Convention MPA spatial data set was constructed first by obtaining the updated official list of established Specially Protected Areas of Mediterranean Importance (SPAMIs) from the Regional Activity Centre for Specially Protected Areas secretariat (RAC/SPA, Tunis), and then by downloading the shapefiles of each single SPAMI from the MPAs in the Mediterranean (MAPAMED) GIS database. The individual shapefiles were then merged to create a unique spatial layer for this specific network. No tabular or cartographic data were found for a specific network of MPAs of relevance for the Convention on the Protection of the Black Sea against Pollution.

Each polygon belonging to the MPAs established under the framework of each of the three RSCs was then assigned to an MPA assessment area region/subregion, so that only the sites occurring in these regions were considered for subsequent analysis. Polygons lying beyond the MPA assessment area boundary, albeit situated within European regional seas, were assigned the attribute of their respective European regional sea.

2.8 Preparation of the marine national designated sites shapefile

Section 2.8 describes the methodology used to analyse the distribution of MPAs in European seas with respect to the existing network of NDSs. First, version 11 of the CDDA was queried; version 11 contains information on protected sites as reported at the end of 2012 by EEA member countries.

As with previous CDDA database versions, the 2013 mdb database did not contain information capable of filtering true marine from non-marine sites, based on specific fields. The present analysis was therefore run considering only the spatial database (shapefile). Version 11 of the CDDA spatial database was downloaded from the EEA website (see Table 2.1). CDDA polygons falling seawards of the EEA coastline shapefile (see Section 2.6) were filtered so as to retain the polygons pertaining to presumed MPAs. Since some polygons might contain terrestrial portions of the protected area accidentally falling seaward of the coastline, due to projection errors or differences in scale resolution between the site and coastline shapefiles, a method had to be devised that would filter out potential 'non-marine polygons' lying seaward of the coastline. A preliminary analysis of the 'Designate' field for features referring to marine habitats or species indicated that some of these polygons were assorted into designation categories that could be ascribed to MPAs. Many others belonged to designation typologies that did not specifically refer to marine attributes, even when the polygon may have contained a marine portion lying seaward of the coastline. Since there appeared to be no apparent method to univocally filter out 'true marine' polygons based on tabular data, it was decided to filter the polygons from a spatial point of view only, using a dimensional cut-off value.

Polygons lying at sea and having a surface area larger than 5% of the total declared surface area for the site were therefore considered to be 'true marine' areas, and those with smaller surface area values were filtered out. The 5% threshold limit was used for the CDDA data set, in compliance with the arbitrary limit used to analogously detect marine N2K sites in the 2013 Barometer file ([5]). This filtering procedure led to the removal of 1 798 records from the initial list of polygons, thereby leaving 4 558 records to be considered for the analysis of MPA distribution for the CDDA data set. A crucial point is that employing the 5% threshold limit was considered to be an arbitrary solution for identifying marine sites; moreover, changes to the reporting CDDA format as of 2014, in the form of data fields indicating if a site is partly or fully covering marine ecosystems, will allow marine CDDA sites to be adequately intercepted (EEA, 2013b). This will lead to more precise computations of marine CDDA sites in future iterations on MPA assessments.

After carrying out this 'clean-up' procedure from the GIS CDDA database, each MPA polygon identified in the CDDA database was assigned to the relative MPA assessment region/subregion, so that only sites grouped under the MPA assessment areas umbrella were considered for subsequent analysis. Any

([5]) See http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm.

site located between two or three subregions was consequently divided and assigned, for each respective part, to the proper subregion under which it falls. MPAs considered in the network of NDSs listed in the CDDA database are henceforth referred to as NDSs.

2.9 Extraction and calculation of statistical information from MPA databases

An automated procedure carried out using ArcGIS and developed in Python language was set up in order to estimate and extract statistical information from the spatial databases. Several statistical parameters were calculated: total number; total surface area; total area coverage; minimum, maximum and average (+/– s.d.; standard deviation) size; and minimum, maximum and average nearest distance (+/– s.d.). All parameters were considered according to each buffer zone per marine region/subregion. Some considerations were also carried out at country level (N2K and CDDA databases only).

Counts of total number or total area of sites per buffer zone refer to any site or part of any given site lying within the buffer. The grand total per buffer may therefore contain sites whose extension spans across more than one buffer zone. The total number of sites always refers to the spatially distinct sites present in a given area, so as to avoid duplicating the count of sites lying exactly over one another. The total area coverage (in km^2) accurately represents the spatial extent of a network, considering the areas of overlap between overlapping sites as a unique value, so as to prevent duplication of surface area counts for such areas.

The country surface area computation of each of the three N2K components was computed against marine country water and buffer zone extension areas, so as to obtain relative percentage cover of each network type in each spatial zone.

Minimum, maximum and average size values of the networks were calculated by considering the surface area extents of all sites attributable to each MPA assessment area region. The statistic values were obtained by measuring the extent of any polygon, regardless of whether the polygon and a polygon from other categories overlap.

The nearest distance function of ArcGIS was used to calculate the nearest distances lying between each site contained in each network, according to each buffer distance zone. Distance is always calculated to the boundary of a polygon feature (site). The distance between two sites is zero whenever there is at least one x,y coordinate that is shared between them; likewise, when one site contains or is within another site, the distance between them is zero. Thus, the average nearest distance (+/– s.d.) and minimum and maximum nearest distances were calculated considering only those sites that have distance values greater than zero. Minimum, maximum and average distance values were calculated by considering the distance values greater than zero of all sites attributable to any given MPA assessment area region.

3 Results

This chapter presents the overall statistics calculated for each of the MPA networks (N2K, RSC MPAs and NDSs) considered in the analysis, and for the MPAs overall. The values reported refer to the following aspects: surface area coverage of the network with respect to the MPA assessment area and the buffer distance belts, and spatial overlap within each network as well as across networks. The surface area coverage of the N2K network per country, per marine region/ subregion and according to buffer distance belts are presented.

The final part of this chapter evaluates aspects such as surface area and minimum distance values of all the networks combined. Specific paragraphs introduce each table or figure, allowing readers to follow how the statistical extrapolation was carried out.

3.1 Natura 2000 network

The total number of N2K site polygons present in the base shapefiles at subregional/regional level are reported in Table 3.1. The total number refers to the spatially distinct sites present in a given area, so as to avoid duplicating the count of sites lying exactly over one other (as in the case of site category C, which represents an SCI and an SPA overlapping exactly). The total number of SCIs and SPAs refers to the site polygons defined by the procedure as marine SCIs or as

Table 3.1 Total number, surface area, percentage cover and percentage overlap of marine N2K sites (SCIs, SPAs) in European marine regions

MPA assessment area regions	Total no of N2K sites	Number of SCIs	Number of SPAs	Area covered by N2K (km²)	% covered by N2K	Area of SCIs	Area of SPAs	% of overlap
Baltic Sea	770	660	292	45 688	12.3	36 604	36 602	60.1
North-east Atlantic Ocean (NOEA)	1 005	651	399	151 041	3.7	124 787	72 046	30.2
Celtic Sea	373	222	152	34 836	3.8	31 362	7 179	10.5
Greater North Sea incl. Kattegat and English Channel	401	264	166	88 323	17.6	77 338	42 716	35.8
Bay of Biscay and the Iberian Coast	183	122	73	25 676	3.2	14 012	21 810	39.5
Macaronesia	58	49	12	2 205	0.1	2 074	341	9.6
Mediterranean Sea (a)	855	694	264	29 331	2.4	25 963	15 627	41.6
Western Mediterranean Sea	490	405	150	19 680	3.0	17 123	12 361	49.5
Ionian Sea and Central Mediterranean Sea	149	131	29	3 303	1.4	3 034	955	20.8
Adriatic Sea	80	66	30	1 525	1.3	1 378	1 007	56.4
Aegean-Levantine Sea	144	97	58	4 823	2.5	4 427	1 304	18.8
Black Sea	40	25	18	2 875	4.5	2 317	2 180	56.4
Total	**2 667 (a)**	**2 027**	**972**	**228 935**	**4.0**	**189 671**	**126 455**	**38.0**

Note: (a) The total number of site polygons is lower than the sum of sites at regional/subregional level, because the distribution of 19 marine N2K sites span different regions and subregions: two sites across the Baltic and NEAO, eight sites across two subregions of NEAO, one across three subregions of NEAO, and eight sites across two subregions of the Mediterranean Sea.

marine SPAs; the sum of these two will therefore always be bigger than the total number of N2K sites in a given region/subregion.

The total area coverage (in km^2) actually represents the spatial extent of both networks combined (SPAs and SCIs), considering the areas of overlap between SPAs and SCIs as a unique value, so as to prevent duplication of surface area counts for such areas. The percentage of surface area extent of this combined network was calculated with respect to the surface area measurement at the MPA assessment area subregion/region (provided in Table 3.2). The total area of the respective SCIs and of the SPAs was obtained by measuring the extent of any polygon with SCI or SPA attributes, regardless of whether a polygon overlapped a polygon belonging to another category. Because of this, the sum of the total area of SCIs and that of SPAs will always be bigger than the value calculated for total N2K coverage. The percentage of overlap is obtained by calculating the surface area overlap with respect to the total area coverage of the N2K network.

It is also important to note that in the present report, a N2K site is considered marine in a different way to the approach developed within the European Barometer on marine N2K sites (see Annex 1, Section A1.4 for explanation of methods and interpretations of results obtained through the two different approaches). As such, comparing the results provided in the present report with figures in the Barometer report is conceptually not feasible.

Table 3.2 illustrates the surface area and percentage cover of the N2K sites with respect to distance from the coast. The total area coverage of the N2K network at regional/subregional level, as defined in Table 3.1 above, was evaluated with the three buffer distance belts, to yield total area coverage of N2K in the 0–1 NM, 1–12 NM and 12 NM–END buffer distance belts. The percentage cover was obtained by relating the resulting coverage values with the surface area of the buffer belts, as defined in Table 2.2.

The overall distribution of N2K sites throughout all the MPA assessment areas is represented in Map 3.1. Sites are graphically reported as SCIs, SPAs and SCIs combined with SPAs (typology C).

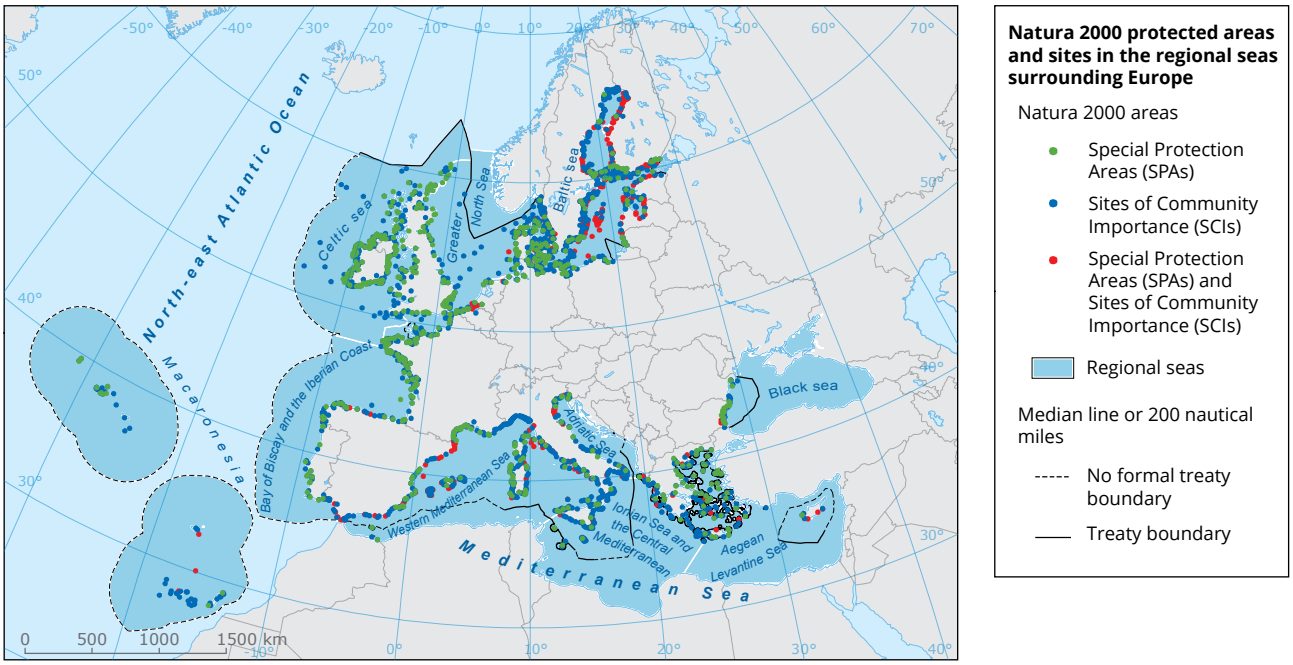
3.2 Natura 2000 network country profiles

The country profile statistics calculated for N2K network (SCIs, SPAs and combined) are listed in Tables 3.3a to 3.3w. Results were calculated per country and respective buffer belt, allowing a general overview of the distribution of the N2K network. Fields recorded as N/A refer to situations in which a buffer zone is not

Table 3.2 Surface area and percentage cover of N2K sites in nearshore, coastal and offshore waters in European marine regions

MPA assessment area regions	Area of 0–1 NM zone covered by N2K	Area of 1–12 NM zone covered by N2K	Area of 12 NM–END covered by N2K	% of 0–1 NM zone covered by N2K	% of 1–12 NM zone covered by N2K	% of 12 NM–END covered by N2K
Baltic Sea	16 157	23 109	6 423	30.9	15.3	3.9
North-east Atlantic Ocean (NOEA)	24 694	54 286	72 060	42.9	15.4	2.0
Celtic Sea	7 793	9 677	17 366	31.9	7.8	2.3
Greater North Sea incl. Kattegat and English Channel	12 233	34 107	41 982	59.0	31.5	11.2
Bay of Biscay and the Iberian Coast	4 017	9 000	12 659	47.7	15.6	1.7
Macaronesia	651	1 502	52	16.3	2.4	< 0.1
Mediterranean Sea	13 266	15 941	124	24.5	4.8	< 0.1
Western Mediterranean Sea	7 177	12 380	124	45.7	8.5	< 0.1
Ionian Sea and Central Mediterranean Sea	2 245	1 057	0	27.0	2.1	0.0
Adriatic Sea	1 059	466	0	10.1	1.0	0.0
Aegean-Levantine Sea	2 785	2038	0	14.1	2.3	0.0
Black Sea	996	1 880	0	77.9	19.2	0.0
Total	**55 113**	**95 216**	**78 606**	**33.3**	**11.3**	**1.7**

Map 3.1 N2K areas (SCIs and SPAs) in European marine regions



considered because the surface area has not been claimed by the MS as its own marine waters. For the sake of clearer reading, MSFD regions are reported in the tables with the following acronyms: Adriatic (ADRI), Aegean-Levantine Sea (AELE), Baltic Sea (BALT), Bay of Biscay and the Iberian Coast (BBIC), Black Sea (BLAC), Celtic Sea (CELT), Greater North Sea, Kattegat and the English Channel (GNKE), Ionian and Central Mediterranean Sea (ICME), Macaronesia (MACA), Western Mediterranean Sea (WMED).

Readers should bear in mind that the present report identifies MPAs across European seas based on a methodology which intersects spatial and tabular data reported by Member States through European reporting processes (N2K, CDDA and the RSCs) and the EEA European coastline. This implies that the resulting outcomes may be different from those reported on a single basis by Member State for MPAs in their waters, because Member States use different approaches to define their MPAs and because a high-resolution coastline is not available for all Member States. Discrepancies between national reports on MPAs and outcomes of the present analysis at national level must not be interpreted as errors, but should rather be considered as having been determined by different selection approaches. Such differences are likely to be generated until all reporting procedures are harmonised across European countries, and databases are filled using a common procedure that will prevent spatial and tabular misinterpretations (i.e. projection shifts, empty field values for habitat codes, different national coastline resolutions in the EEA coastline shapefile, etc.).

The country profiles of relative surface area coverage indicate that, in general, surface area coverage of overall N2K sites is highest in the 0–1 NM belt, followed by the 1–12 NM and 12 NM–END buffer belts. As far as the 0–1 NM belt is concerned, most countries surpass 10% coverage in all marine regions (the only exception being Cyprus in the Aegean Sea, with 9.4%). The GNKE, Baltic and Black Seas are the marine regions where, in general, most countries have a N2K coverage exceeding 50% of their national 0–1 NM belt (exceptions being Sweden and the United Kingdom in the GNKE, with 33% and 48.7% coverage respectively, and Sweden, Finland and Latvia in the Baltic with 13%, 22.9% and 33% coverage, respectively).

Only half of the countries considered have a N2K network coverage of 10% or more in the 1–12 NM buffer belt of at least one region in which they are found. Only 5 countries have a N2K coverage reaching 10% or more of their 12 NM–END buffer belt (Belgium, Denmark, Germany, the Netherlands and Sweden); this occurs mostly in the GNKE region and a smaller part of the Baltic Sea. The decreasing percentage cover trend observed from the nearshore buffer to the more offshore one for the N2K overall network is also generally observed in the SCI and SPA networks separately. SPA cover is, however, almost always smaller than that of the SCIs in the respective buffer belt for most countries.

Particular care was taken in transposing the distance buffer belts defined in 2013 into the country marine surface water delimitation provided by MS MSFD 2013 submissions. This allowed the country profiles on network coverage to be completed. Analysis of the spatial layers (i.e. marine waters of MSFD regions and European coastline) and of those resulting from the MSFD 2013 submissions clearly indicate, however, that there are differences in the consideration of marine versus non-marine waters. Plans for future iterations of similar analysis should include finding solutions to apply in case of shifting baseline reference layers when calculating network coverage. To this effect, careful consideration is required both when deciding which reference layers must remain fixed for the benefit of recurrent statistical runs, and in terms of the interpretations that will need to be formulated when analysing future iterations of statistics based on different but possibly obligatory reference layers.

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone

a) Belgium

Marine regions		Buffer zones	N2K		SCIs		SPAs	
GNKE	Number of sites	0–1 NM	7		3		4	
		1–12 NM	5		2		3	
		12 NM–END	1		1			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	80.7	59.6%	50.6	37.4%	48.8	36.1%
		1–12 NM	719.0	55.2%	605.7	46.5%	267.1	20.5%
		12 NM–END	470.9	23.0%	470.9	23.0%		

b) Bulgaria

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BLAC	Number of sites	0–1 NM	29		16		16	
		1–12 NM	13		9		4	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	423.0	63.4%	287.1	43.1%	321.6	48.2%
		1–12 NM	566.8	10.3%	334.7	6.1%	234.0	4.3%
		12 NM–END						

c) Cyprus

Marine regions		Buffer zones	N2K		SCIs		SPAs	
AELE	Number of sites	0–1 NM	9		8		5	
		1–12 NM	4		3		2	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	120.2	9.4%	120.2	9.4%	101.0	7.9%
		1–12 NM	11.2	0.1%	11.2	0.1%	9.7	0.1%
		12 NM–END						

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone (cont.)

d) Germany

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BALT	Number of sites	0–1 NM	65		49		19	
		1–12 NM	40		26		15	
		12 NM–END	7		4		3	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	1 983.2	78.4%	1 757.3	69.5%	1 880.6	74.4%
		1–12 NM	4 089.2	43.3%	2 793.2	29.6%	3 364.6	35.6%
		12 NM–END	1 872.6	52.7%	1 176.3	33.1%	1 786.5	50.2%
GNKE	Number of sites	0–1 NM	26		18		9	
		1–12 NM	18		11		8	
		12 NM–END	8		5		3	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 325.5	96.0%	2 298.4	94.8%	2 232.7	92.1%
		1–12 NM	7 342.1	70.7%	5 259.7	50.6%	7 250.7	69.8%
		12 NM–END	7 992.2	27.7%	7 655.2	26.5%	3 211.8	11.1%

e) Denmark

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BALT	Number of sites	0–1 NM	79		57		27	
		1–12 NM	52		34		20	
		12 NM–END	1		1			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 664.3	51.3%	2 658.4	51.2%	2 161.4	41.6%
		1–12 NM	2 386.8	14.6%	2 386.7	14.6%	1 140.4	7.0%
		12 NM–END	223.5	3.1%	223.5	3.1%		
GNKE	Number of sites	0–1 NM	78		49		34	
		1–12 NM	48		30		21	
		12 NM–END	12		9		4	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 165.0	52.6%	2 079.3	50.5%	1 944.7	47.3%
		1–12 NM	6 343.2	30.2%	4 195.8	20.0%	4 187.1	19.9%
		12 NM–END	5 277.7	10.3%	4 957.3	9.6%	2 757.5	5.4%

f) Estonia

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BALT	Number of sites	0–1 NM	48		41		26	
		1–12 NM	32		28		19	
		12 NM–END	1				1	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 715.1	66.7%	2 288.0	56.2%	2 675.8	65.8%
		1–12 NM	4 027.8	19.3%	1 592.5	7.6%	3 796.0	18.1%
		12 NM–END	11.1	0.1%			11.1	0.1%

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone (cont.)

g) Spain

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BBIC	Number of sites	0–1 NM	72		58		26	
		1–12 NM	12		11		4	
		12 NM–END	1		1			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	780.7	23.4%	689.3	20.7%	471.4	14.2%
		1–12 NM	82.5	0.4%	82.5	0.4%	0.3	< 0.1%
		12 NM–END	2 350.1	0.8%	2 350.1	0.8%		
MACA	Number of sites	0–1 NM	29		27		3	
		1–12 NM	23		21		3	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	431.6	22.1%	405.2	20.7%	31.2	1.6%
		1–12 NM	1 448.5	5.0%	1 344.4	4.6%	106.4	0.4%
		12 NM–END						
WMED	Number of sites	0–1 NM	136		115		58	
		1–12 NM	59		52		26	
		12 NM–END	1		1			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 285.5	46.8%	2 263.9	46.4%	1 359.7	27.8%
		1–12 NM	3 028.8	6.1%	3 027.4	6.1%	888.1	1.8%
		12 NM–END	48.4	0.0%	48.4	0.0%		

h) Finland

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BALT	Number of sites	0–1 NM	154		129		89	
		1–12 NM	48		43		30	
		12 NM–END	2		2			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	4 330.4	22.9%	4 056.3	21.4%	4 070.7	21.5%
		1–12 NM	2 731.3	8.7%	2 664.5	8.4%	2 350.1	7.4%
		12 NM–END	48.3	0.2%	48.3	0.2%		

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone (cont.)

i) France

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BBIC	Number of sites	0–1 NM	81		48		33	
		1–12 NM	49		27		22	
		12 NM–END	10		5		5	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 173.1	73.8%	2000.7	67.9%	1 765.3	60.0%
		1–12 NM	7 970.9	44.3%	6 115.8	34.0%	7 498.8	41.7%
		12 NM–END	10 029.4	6.0%	2034.4	1.2%	10 003.7	6.0%
CELT	Number of sites	0–1 NM	2		1		1	
		1–12 NM	3		2		1	
		12 NM–END	1		1			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	69.8	100.0%	69.7	99.9%	69.8	100.0%
		1–12 NM	368.0	23.9%	368.0	23.9%	265.0	17.2%
		12 NM–END	83.9	0.3%	83.9	0.3%		
GNKE	Number of sites	0–1 NM	77		49		28	
		1–12 NM	52		30		22	
		12 NM–END	7		3		4	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	1 973.8	63.2%	1 825.9	58.5%	1 471.0	47.1%
		1–12 NM	8 000.0	43.3%	6 210.2	33.6%	6 801.6	36.8%
		12 NM–END	726.7	3.9%	686.3	3.7%	290.1	1.6%
WMED	Number of sites	0–1 NM	85		59		26	
		1–12 NM	43		30		13	
		12 NM–END	8		3		5	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 540.9	75.3%	2 430.2	72.0%	1 778.5	52.7%
		1–12 NM	7 488.7	34.7%	5 819.1	27.0%	5 503.8	25.5%
		12 NM–END	70.3	0.1%	56.6	0.1%	65.6	0.1%

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone (cont.)

j) Greece

Marine regions		Buffer zones	N2K		SCIs		SPAs	
ADRI	Number of sites	0–1 NM	2		1		2	
		1–12 NM	1				1	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	71.1	39.0%	0.0	< 0.1%	71.1	39.0%
		1–12 NM	3.0	0.3%			3.0	0.3%
		12 NM–END						
AELE	Number of sites	0–1 NM	135		89		53	
		1–12 NM	31		24		9	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 664.7	14.4%	2 275.1	12.3%	996.6	5.4%
		1–12 NM	2027.1	2.7%	2020.7	2.7%	197.2	0.3%
		12 NM–END						
ICME	Number of sites	0–1 NM	45		36		13	
		1–12 NM	16		13		4	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	1 504.3	27.7%	1 485.2	27.3%	519.6	9.6%
		1–12 NM	658.4	4.1%	655.4	4.1%	73.1	0.5%
		12 NM–END						

k) Ireland

Marine regions		Buffer zones	N2K		SCIs		SPAs	
CELT	Number of sites	0–1 NM	206		117		90	
		1–12 NM	46		33		13	
		12 NM–END	4		4			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	3 082.9	42.8%	2 780.1	38.6%	1 310.8	18.2%
		1–12 NM	1 189.8	3.7%	1 053.4	3.3%	166.9	0.5%
		12 NM–END	2 543.1	0.6%	2 543.1	0.6%		

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone (cont.)

l) Italy

Marine regions		Buffer zones	N2K		SCIs		SPAs	
ADRI	Number of sites	0–1 NM	66		54		27	
		1–12 NM	22		20		6	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	979.7	32.9%	915.7	30.8%	754.1	25.4%
		1–12 NM	462.9	2.0%	458.9	2.0%	171.0	0.7%
		12 NM–END						
ICME	Number of sites	0–1 NM	87		79		14	
		1–12 NM	27		20		8	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	631.4	24.2%	420.9	16.1%	307.5	11.8%
		1–12 NM	316.9	0.9%	280.9	0.8%	54.7	0.2%
		12 NM–END						
WMED	Number of sites	0–1 NM	264		227		64	
		1–12 NM	56		46		20	
		12 NM–END	1		1			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 350.2	31.6%	1 836.7	24.7%	1 568.1	21.1%
		1–12 NM	1 862.3	2.5%	1 581.3	2.1%	1 142.4	1.5%
		12 NM–END	4.7	< 0.1%	4.7	< 0.1%		

m) Latvia

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BALT	Number of sites	0–1 NM	17		16		12	
		1–12 NM	10		9		7	
		12 NM–END	2		1		1	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	529.4	57.2%	529.3	57.2%	339.3	36.7%
		1–12 NM	3 655.4	37.9%	3 076.2	31.9%	2 053.4	21.3%
		12 NM–END	196.7	1.1%	189.6	1.0%	7.1	0.0%

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone (cont.)

n) Lithuania

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BALT	Number of sites	0–1 NM	12		6		6	
		1–12 NM	6		3		3	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	310.8	89.1%	235.5	67.5%	249.3	71.5%
		1–12 NM	357.7	19.1%	287.7	15.4%	168.7	9.0%
		12 NM–END						

o) Malta

Marine regions		Buffer zones	N2K		SCIs		SPAs	
ICME	Number of sites	0–1 NM	15		14		2	
		1–12 NM	2		2			
		12 NM–END	N/A					
	Area of sites (km²) and % coverage in marine waters	0–1 NM	109.8	41.2%	109.8	41.2%	0.1	0.0%
		1–12 NM	82.0	2.2%	82.0	2.2%		
		12 NM–END	N/A					

p) Netherlands

Marine regions		Buffer zones	N2K		SCIs		SPAs	
GNKE	Number of sites	0–1 NM	20		14		11	
		1–12 NM	8		7		5	
		12 NM–END	2		2			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	1 863.7	84.4%	1 863.6	84.3%	1 858.9	84.1%
		1–12 NM	3 921.5	40.9%	3 921.5	40.9%	3 750.5	39.1%
		12 NM–END	5 884.5	11.6%	5 884.5	11.6%		

q) Poland

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BALT	Number of sites	0–1 NM	18		14		4	
		1–12 NM	10		7		4	
		12 NM–END	3		2		2	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	1 154.8	84.8%	744.7	54.7%	730.5	53.6%
		1–12 NM	4 462.8	44.8%	1 976.1	19.8%	4 113.9	41.3%
		12 NM–END	1 617.6	7.4%	1 617.6	7.4%	1 617.6	7.4%

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone (cont.)

r) Portugal

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BBIC	Number of sites	0–1 NM	25		12		13	
		1–12 NM	13		6		7	
		12 NM–END	1				1	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	1 063.7	49.4%	649.6	30.2%	854.3	39.7%
		1–12 NM	946.8	5.4%	88.9	0.5%	936.9	5.4%
		12 NM–END	279.2	0.1%			279.2	0.1%
MACA	Number of sites	0–1 NM	26		19		9	
		1–12 NM	4		4		2	
		12 NM–END	2		2			
	Area of sites (km²) and % coverage in marine waters	0–1 NM	219.2	10.8%	219.2	10.8%	155.2	7.6%
		1–12 NM	53.0	0.2%	53.0	0.2%	48.5	0.1%
		12 NM–END	52.4	< 0.1%	52.4	< 0.1%		

s) Romania

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BLAC	Number of sites	0–1 NM	10		8		2	
		1–12 NM	9		7		2	
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	572.8	93.7%	482.5	78.9%	572.1	93.6%
		1–12 NM	1 312.8	30.3%	1 212.6	28.0%	1 051.8	24.2%
		12 NM–END						

t) Slovenia

Marine regions		Buffer zones	N2K		SCIs		SPAs	
ADRI	Number of sites	0–1 NM	10		9		1	
		1–12 NM						
		12 NM–END						
	Area of sites (km²) and % coverage in marine waters	0–1 NM	7.9	13.8%	3.8	6.7%	7.5	12.9%
		1–12 NM						
		12 NM - END						

Table 3.3a–w Country profile statistics of overall N2K sites, SCIs and SPAs reported in terms of number of sites, surface area and relative surface area percentage of each buffer zone (cont.)

u) Sweden

Marine regions		Buffer zones	N2K		SCIs		SPAs	
BALT	Number of sites	0–1 NM	339		311		105	
		1–12 NM	46		44		22	
		12 NM–END	6		6		2	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 469.3	13.0%	2 411.3	12.7%	1 387.1	7.3%
		1–12 NM	1 400.1	2.7%	1 400.1	2.7%	575.4	1.1%
		12 NM–END	2 453.0	3.4%	2 453.0	3.4%	2 102.4	2.9%
GNKE	Number of sites	0–1 NM	65		56		25	
		1–12 NM	14		13		5	
		12 NM–END	4		4		1	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	904.7	33.8%	892.0	33.3%	347.0	13.0%
		1–12 NM	535.1	6.4%	535.1	6.4%	108.7	1.3%
		12 NM–END	1 359.3	40.3%	1 359.3	40.3%	91.2	2.7%

W) United Kingdom

Marine regions		Buffer zones	N2K		SCIs		SPAs	
CELT	Number of sites	0–1 NM	146		85		61	
		1–12 NM	71		33		38	
		12 NM–END	13		12		1	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	4 640.0	27.1%	3 474.0	20.3%	2 349.4	13.7%
		1–12 NM	8 119.6	8.9%	6 241.5	6.9%	2 993.3	3.3%
		12 NM–END	14 739.5	4.2%	14 738.3	4.2%	1.3	< 0.1%
GNKE	Number of sites	0–1 NM	94		42		52	
		1–12 NM	36		17		19	
		12 NM–END	11		10		1	
	Area of sites (km²) and % coverage in marine waters	0–1 NM	2 942.7	48.7%	1 933.8	32.0%	1 820.9	30.2%
		1–12 NM	7 271.8	18.3%	5 072.1	12.8%	3 374.3	8.5%
		12 NM–END	20 272.9	9.2%	19 562.4	8.9%	899.0	0.4%
WMED	Number of sites	0–1 NM	1		1		1	
		1–12 NM	1		1		1	
		12 NM–END	N/A					
	Area of sites (km²) and % coverage in marine waters	0–1 NM	12.7	45.5%	12.7	45.5%	12.7	45.5%
		1–12 NM	42.1	70.1%	42.1	70.1%	42.1	70.1%
		12 NM–END	N/A					

3.3 MPA networks established under the Regional Sea Conventions

The overall number of MPAs recognised under the framework of the RSCs amounts to 527 (333 OSPAR sites, 162 BSPAs and 32 SPAMIs). MPAs lying outside the MPA assessment area boundaries number 44, and 10 of these are located externally to the European regional seas. A few RSC MPAs span the MPA assessment regions/subregions: 8 are OSPAR sites, 2 are BSPAs and 1 is a SPAMI.

The total surface area of the RSC site polygons, considering those lying within the European regional sea boundaries and in the MPA assessment area regions (considered as being the EU waters of the EU Regional Seas) are reported in Table 3.4. The total area coverage (in km^2) actually represents the spatial extent of the networks, considering the eventual areas of MPA overlap inside each RSC network as a unique value so as to prevent duplication of surface area counts for such areas. More specifically, the percentage of polygon overlap within each RSC MPA network is as follows: 33.6% for the HELCOM BSPAs, 8.0% for the OSPAR RSC sites and 0.9% for the Barcelona Convention SPAMIs.

The percentage of surface area extent of each RSC network was then calculated with respect to the surface area measurement of the respective EU Regional Seas and MPA assessment marine regions (both provided in Table 2.2). The percentage of RSC network overlapping the N2K network was also calculated for each MPA assessment marine region.

The distribution of RSC MPAs within and outside the MPA assessment area regions and the European seas is represented in Map 3.2.

3.4 National designated sites

Table 3.5 reports information on the total number of sites and total surface area coverage (in km^2) of the marine NDSs in each of the MPA assessment area regions/subregions. The percentage cover of the network per assessment area and per buffer zone distance belt is calculated in reference to the respective surface area coverage indicated in Table 2.2. The percentage of the NDSs network overlapping the marine N2K network was also calculated for each MPA assessment marine region.

The compounded information of marine NDSs established by each EU country is reported in Table 3.6 in terms of number of sites, total surface area and the percentage overlap of the network with respect to the national surface area extent of the RSC and N2K networks.

Table 3.4 Total surface area, percentage cover of RSC sites in European regional seas and MPA assessment area regions, and overlap with EU N2K network

RSC name	Regional sea name	Area of RSC network in European seas	Area of RSC network in MPA assessment area regions	% cover of RSC network in European seas	% cover of RSC networks in MPA assessment area regions	RSC network % overlap with N2K in MPA assessment area regions
Helsinki	Baltic Sea	52 199	45 826	13.3	12.4	94.3
OSPAR	North-east Atlantic Ocean	219 656	132 204	2.8	3.2	93.9
Barcelona	Mediterranean Sea	90 425	88 602	9.8	9.7	9.9

Table 3.5 Surface area and percentage cover of marine NDSs in MPA assessment areas, and percentage overlap with EU N2K network

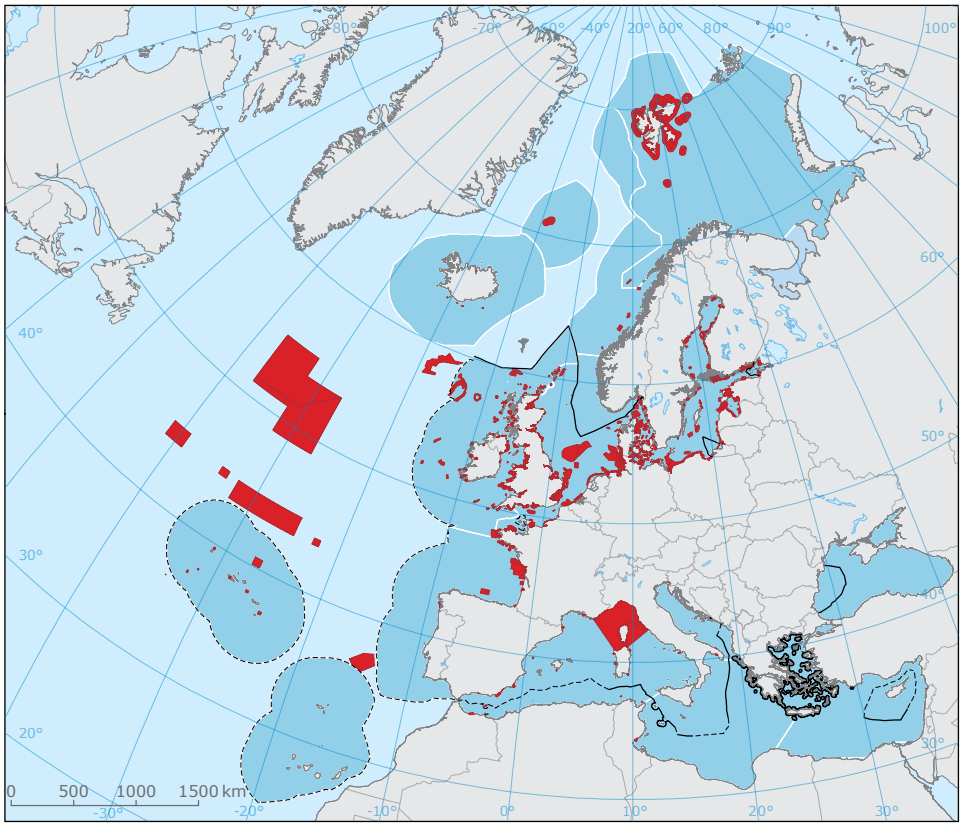
MPA assessment area regions	Total no of sites	Area covered (km²)	% covered by NDSs	% of 0–1 NM zone cover NDSs	% of 1–12 NM zone covered NDSs	% of 12 NM-END covered NDSs	% area overlap with N2K
Baltic Sea	2 151	22 748	6.1	18.2	7.5	1.2	91.1
North-east Atlantic Ocean (inside EEZ) ([a])	1 858	49 609	1.2	28.2	4.7	0.5	60.0
Celtic Sea	691	8 943	1.0	25.0	1.9	0.1	37.3
Greater North Sea incl. Kattegat and English Channel	951	23 966	4.8	39.5	11.7	0.8	92.6
Bay of Biscay and the Iberian Coast	130	3 944	0.5	14.6	0.6	0.3	95.5
Macaronesia	98	12 755	0.7	17.8	1.9	0.6	3.6
Mediterranean Sea ([a])	531	37 742	3.1	12.6	8.0	0.5	24.2
Western Mediterranean Sea	214	33 020	5.0	28.1	16.7	0.9	18.2
Ionian Sea and Central Mediterranean Sea	123	1 419	0.6	11.4	0.9	---	59.7
Adriatic Sea	117	1 082	0.9	8.2	0.5	---	15.3
Aegean-Levantine Sea	77	2 221	1.2	3.2	1.8	---	94.3
Black Sea	22	1 438	2.2	36.0	10.0	---	99.5
Total	**4 558 ([a])**	**111 537**	**1.9**	**6.0**	**1.5**	**< 0.1**	**54.7**

Note: ([a]) The total number of site polygons is lower than the sum of sites at regional/subregional level, because the distribution of 14 marine NDSs span different regions and subregions: 3 sites across the Baltic and NEAO, 10 sites across 2 subregions of NEAO, and 1 across 3 subregions of NEAO.

Table 3.6 Number of sites and surface area (km²) of NDSs, and overlap with N2K and RSC networks

Country	No of sites	Area of NDSs	% overlap between NDSs and RSC sites	% overlap between NDSs and N2K
Belgium (BE)	7	5.6	1.0	59.4
Bulgaria (BG)	16	13.8	0.0	59.8
Croatia (HR)	62	666.1	---	---
Cyprus (CY)	1	0.5	0.0	100
Germany (DE)	107	14 794.3	86.7	99.8
Denmark (DK)	270	1 275.6	95.0	97.9
Estonia (EE)	248	6 735.4	88.7	99.9
Greece (EL)	97	3 056.9	0.0	84.1
Spain (ES)	197	5 667.5	52.7	83.1
Finland (FI)	768	3 041.1	60.9	70.1
France (FR)	204	8 955.9	49.6	37.4
Ireland (IE)	8	19.6	0.0	98.3
Italy (IT)	88	26 644.9	94.0	11.1
Lithuania (LT)	6	531.9	41.9	99.0
Latvia (LV)	19	4 381.0	99.6	100
Malta (MT)	87	193.3	0.0	99.2
Netherlands (NL)	30	5 944.3	40.3	97.3
Poland (PL)	4	110.5	99.4	99.9
Portugal (PT)	61	12 561.7	45.0	7.8
Romania (RO)	6	1 424.1	---	99.8
Sweden (SE)	1 178	5 427.7	50.4	75.7
Slovenia (SI)	32	229.9	0.0	3.5
United Kingdom (UK)	1 062	9 898.3	49.0	51.3
Total	**4 490**	**109 489.7**	**68.2**	**54.5**

Map 3.2 MPA areas established under the RSCs, within and outside MPA assessment areas



Marine protected areas (MPAs)*

- Regional Sea Convention (RSC)
- Regional seas

Median line or 200 nautical miles

- No formal treaty boundary
- Treaty boundary

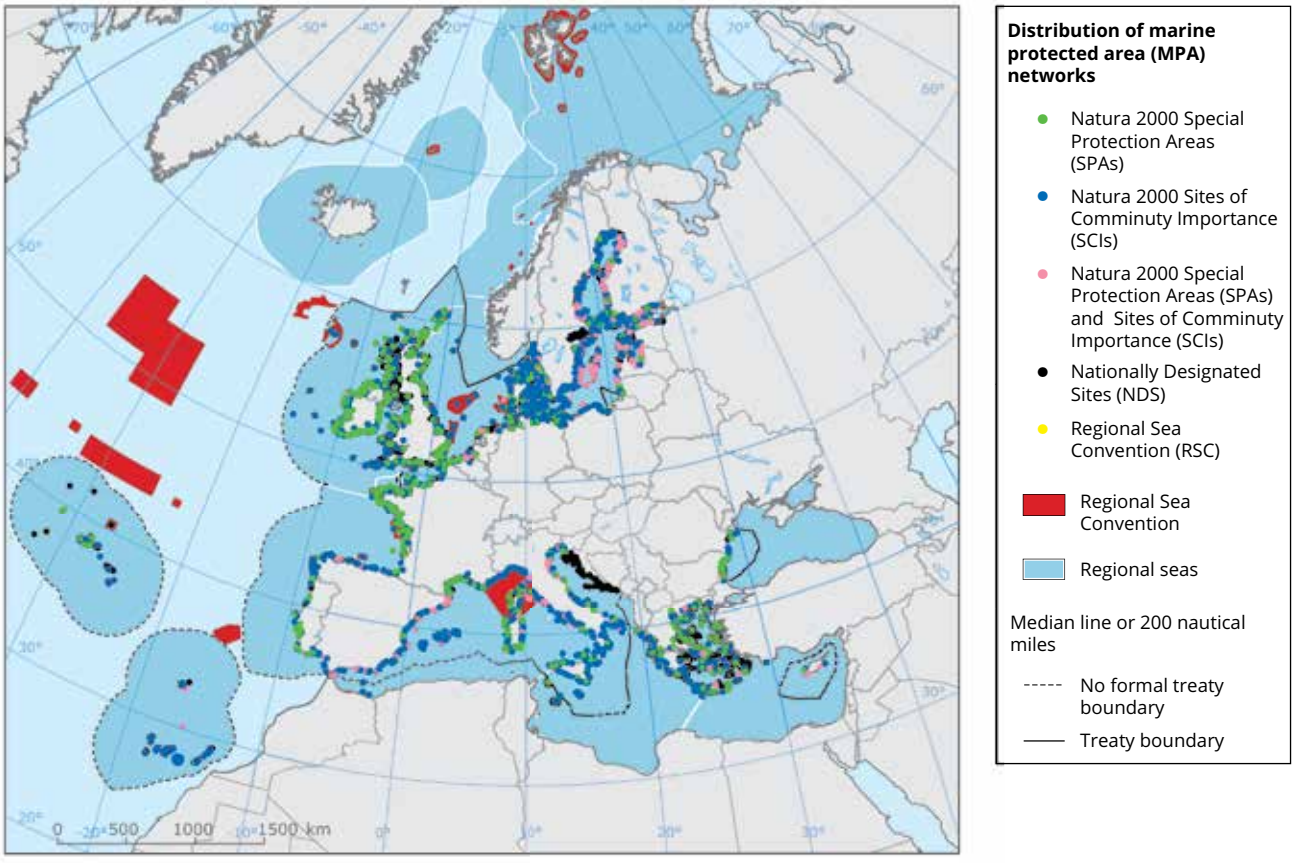
** Established under the Regional Sea Convention (RSC) within and outside the MPA assessment areas*

3.5 European MPA networks

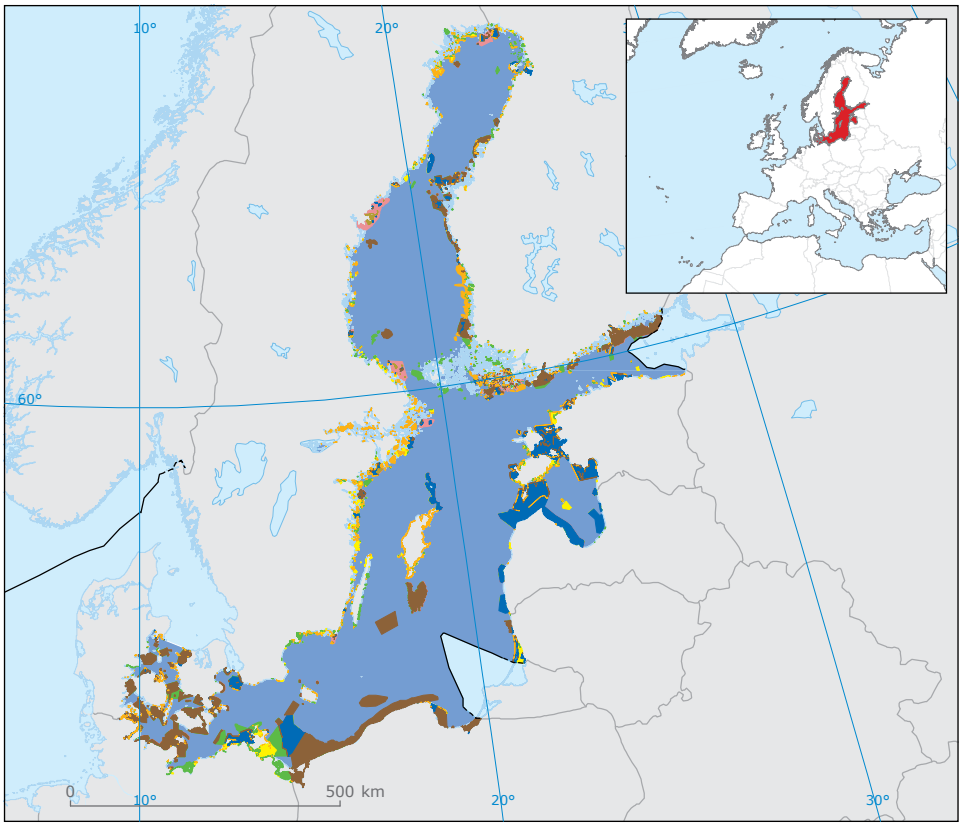
In this section, the MPAs established in the context of all the different considered networks (N2K, NDSs and RSC) are considered as a unique network, and are hereafter referred to as MPAs. Map 3.3 presents the distribution of the N2K network in European seas overall and also separately in terms of SPAs and SCIs. It also portrays the distribution of NDSs (referred to as NDS in the legend) and those established under the regional sea conventions (referred to as RSC in the legend). To facilitate viewing, regional and subregional maps are reported subsequently in Maps 3.4 to 3.13. The latter maps allow for visual portrayal of the distribution of sites belonging to the different networks, and in particular those situations in which sites belonging to one network overlap sites established under another network (i.e. N2K and NDS or N2K and RSC sites, etc.).

The logic behind Table 3.7 is identical to that guiding the production of statistics for the single networks in the preceding chapters: surface area coverage refers to the spatial extent of all the networks, considering the eventual areas of MPA overlap between networks as a unique value so as to avoid duplication of surface area counts for such areas. The per cent surface area coverage for the entire network is calculated with respect to the surface extent of the MPA assessment area region/subregion, and the per cent overlap indicates how much of the overall network extension is affected by the overlap of two or more networks. Likewise, Table 3.8 indicates the surface area cover of the combined network per buffer distance belt in each of the MPA assessment area regions, and relates the percentage cover to the original buffer distance belt extension values indicated in Table 2.2.

Map 3.3 Distribution of MPA networks in MPA assessment areas of the European regional seas



Map 3.4 Distribution of MPA networks in the Baltic Sea marine region



Distribution of marine protected areas (MPAs) networks in the Baltic Sea

MPAs

- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles

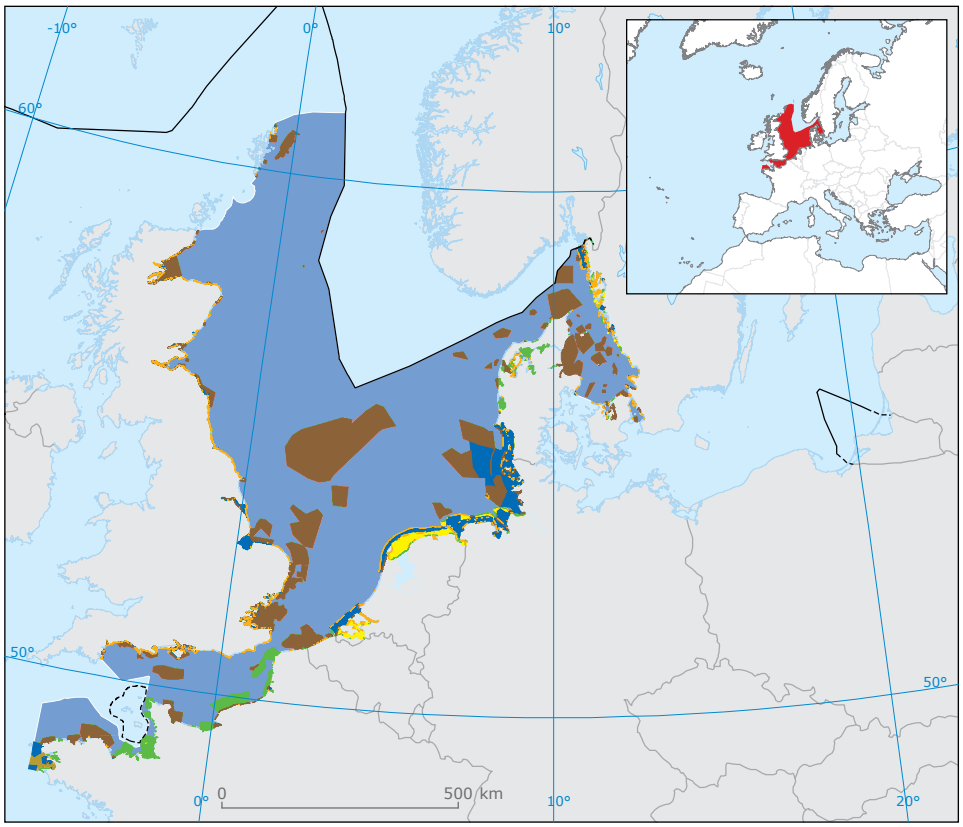
- ----- No formal treaty boundary
- —— Treaty boundary

Notes

NDS: Nationally Designated Sites

RSC: Regional Sea Convention

Map 3.5 Distribution of MPAs in the Greater North Sea including the Kattegat and English Channel marine subregion



Distribution of marine protected areas (MPAs) networks in the Greater North Sea

MPAs

- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles

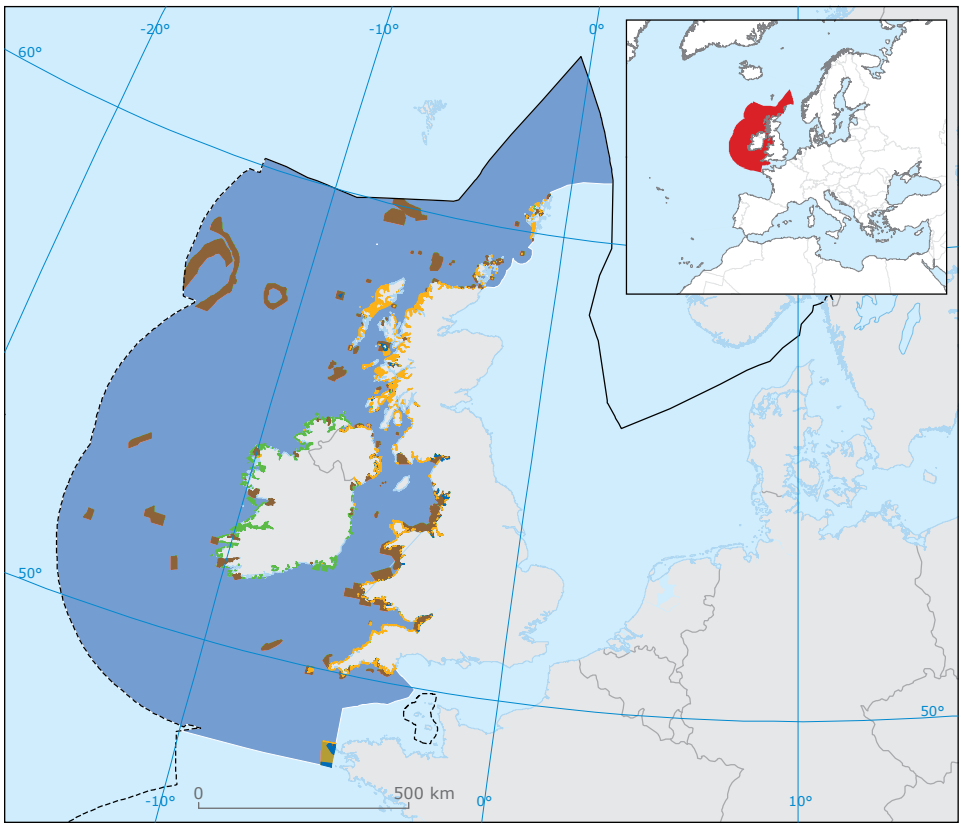
- ----- No formal treaty boundary
- —— Treaty boundary

Notes

NDS: Nationally Designated Sites

RSC: Regional Sea Convention

Map 3.6 Distribution of MPAs in the Celtic Sea marine subregion



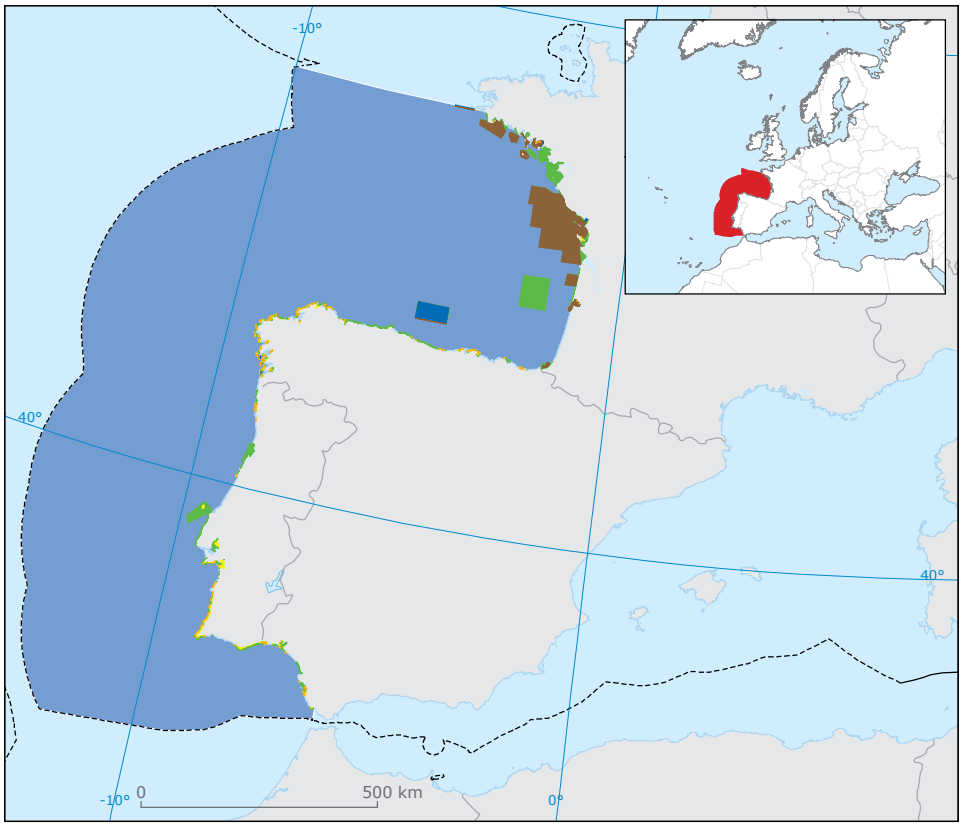
Distribution of marine protected areas (MPAs) networks in the Celtic Sea

MPAs
- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles
- ----- No formal treaty boundary
- —— Treaty boundary

Notes
NDS: Nationally Designated Sites
RSC: Regional Sea Convention

Map 3.7 Distribution of MPAs in the BBIC marine subregion



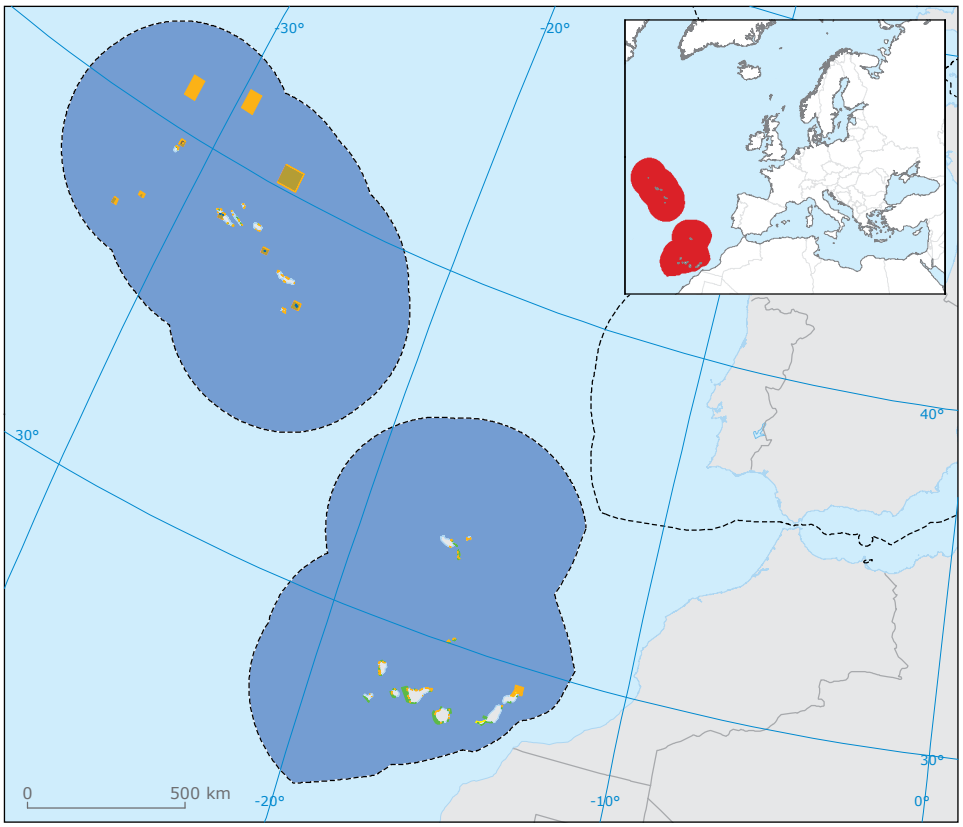
Distribution of marine protected areas (MPAs) networks in the Bay of Biscay and the Iberian coast

MPAs
- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles
- ----- No formal treaty boundary
- —— Treaty boundary

Notes
NDS: Nationally Designated Sites
RSC: Regional Sea Convention

Map 3.8 Distribution of MPAs in the Macaronesia marine subregion



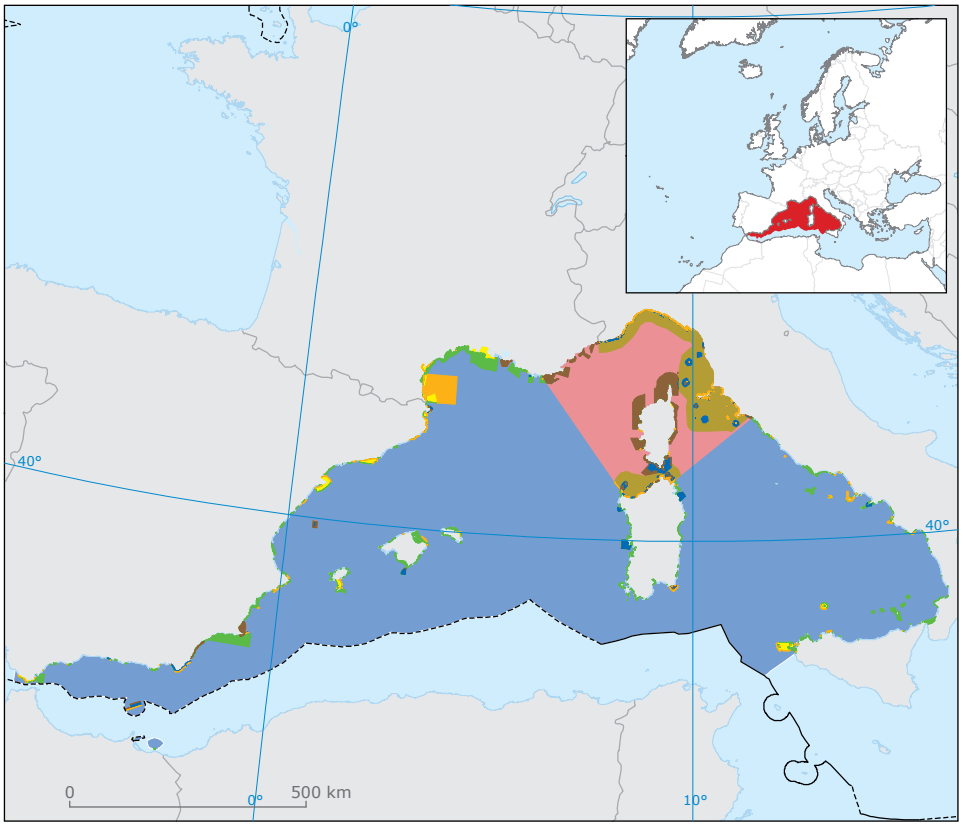
Distribution of marine protected areas (MPAs) networks in the Macaronesia Sea

MPAs
- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles
- ----- No formal treaty boundary
- —— Treaty boundary

Notes
NDS: Nationally Designated Sites
RSC: Regional Sea Convention

Map 3.9 Distribution of MPAs in the Western Mediterranean marine subregion



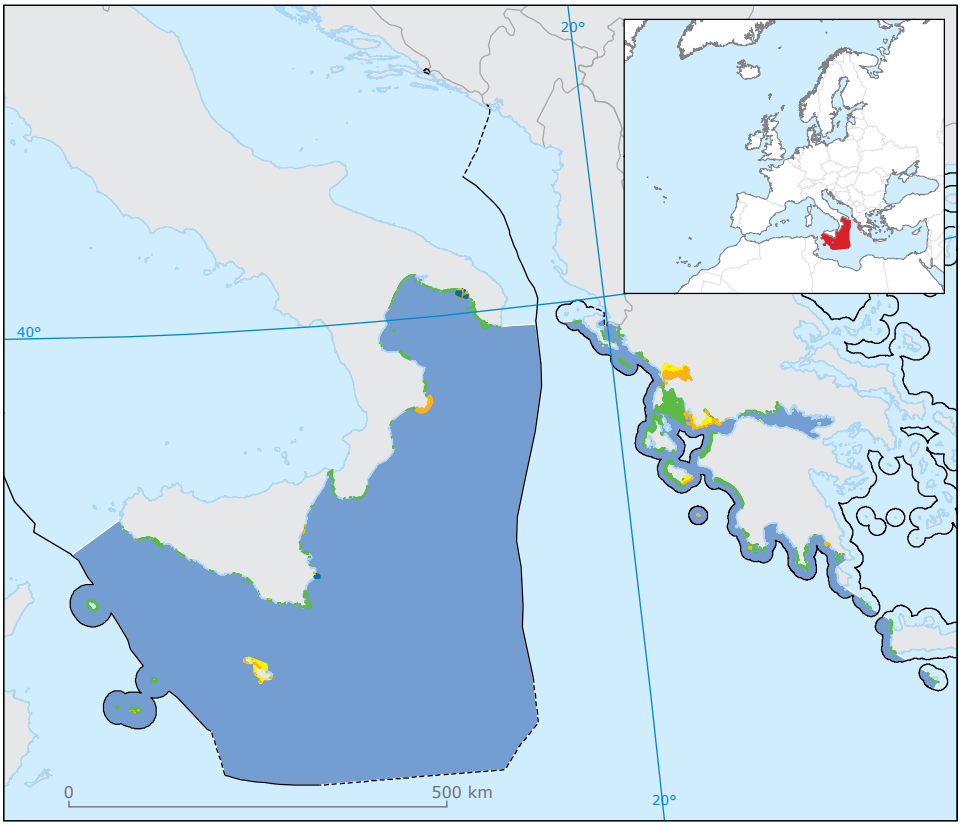
Distribution of marine protected areas (MPAs) networks in the Western Mediterranean Sea

MPAs
- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles
- ----- No formal treaty boundary
- —— Treaty boundary

Notes
NDS: Nationally Designated Sites
RSC: Regional Sea Convention

Map 3.10 Distribution of MPAs in the Ionian Sea and Central Mediterranean Sea marine subregion



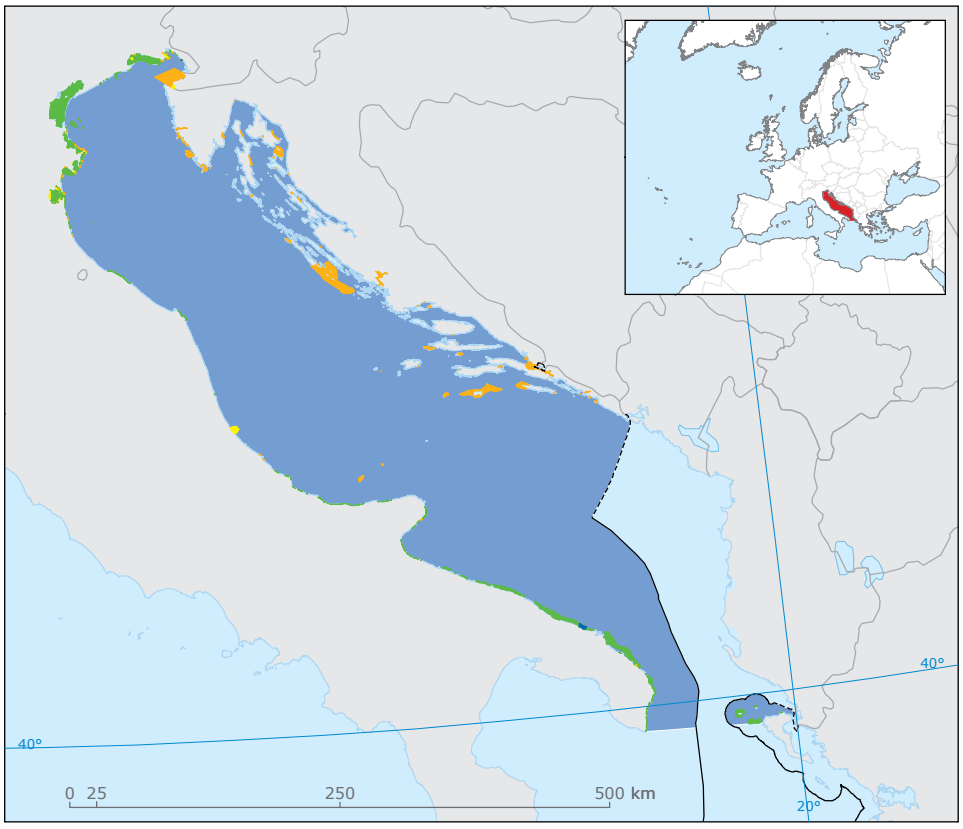
Distribution of marine protected areas (MPAs) networks in the Ionian Sea

MPAs
- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles
- ----- No formal treaty boundary
- —— Treaty boundary

Notes
NDS: Nationally Designated Sites
RSC: Regional Sea Convention

Map 3.11 Distribution of MPAs in the Adriatic Sea marine subregion



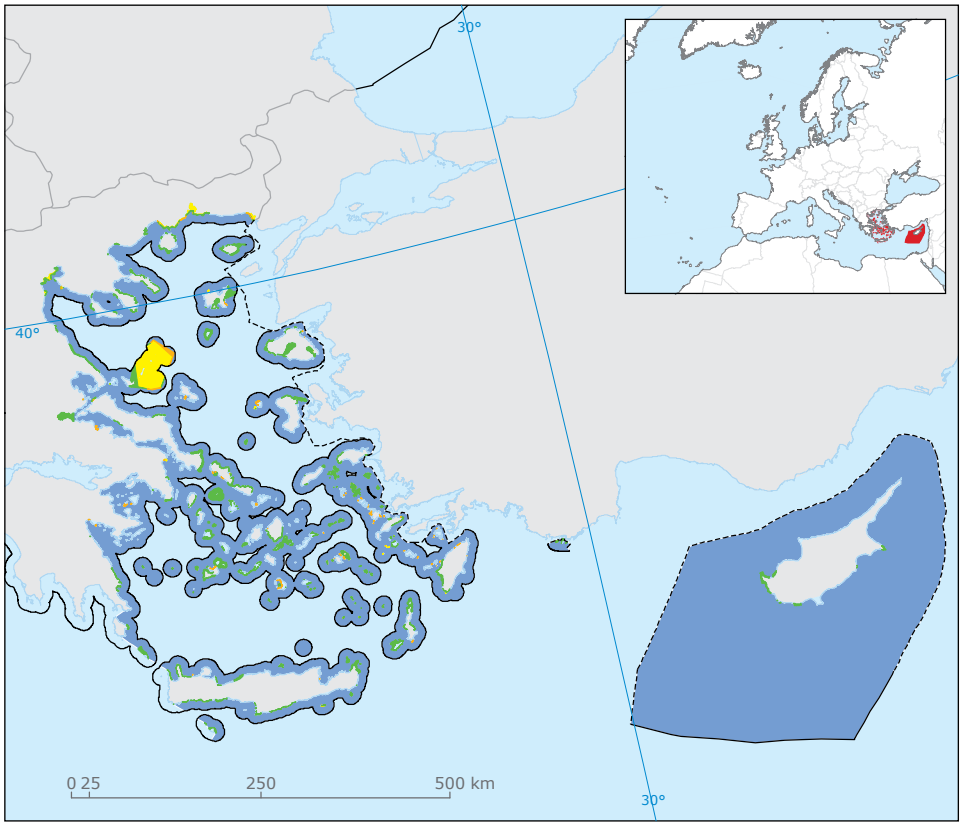
Distribution of marine protected areas (MPAs) networks in the Adriatic Sea

MPAs
- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles
- ----- No formal treaty boundary
- —— Treaty boundary

Notes
NDS: Nationally Designated Sites
RSC: Regional Sea Convention

Map 3.12 Distribution of MPAs in the Aegean-Levantine Sea marine subregion



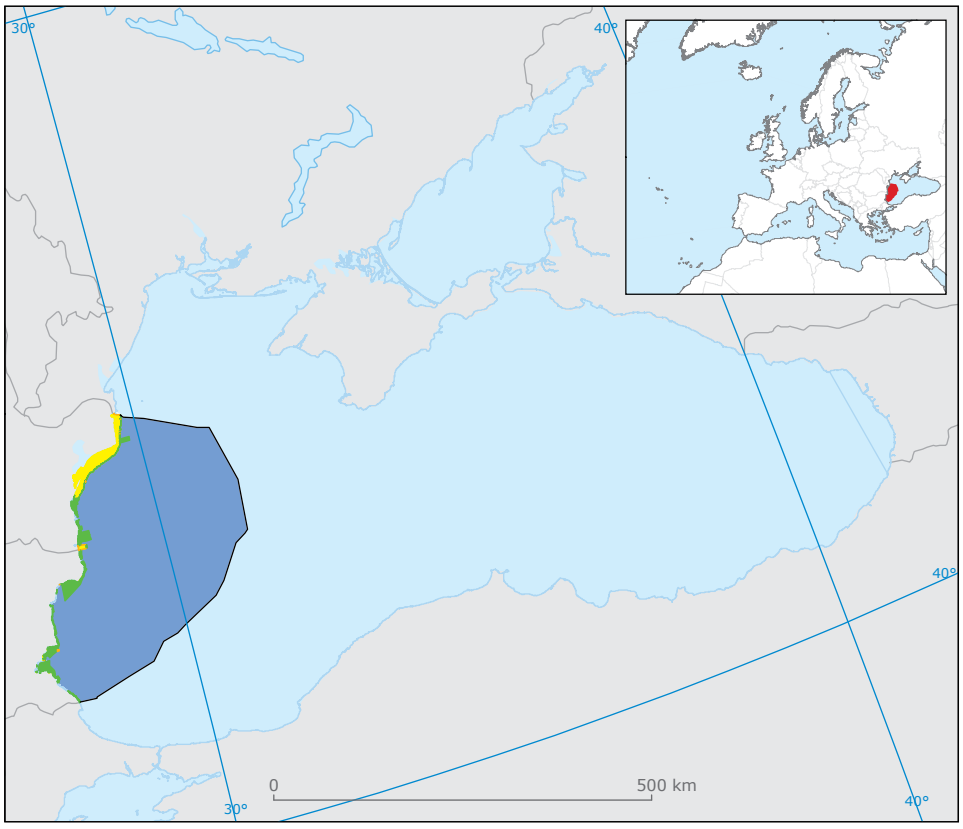
Distribution of marine protected areas (MPAs) networks in the Aegean-Levantine Sea

MPAs
- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles
- ----- No formal treaty boundary
- —— Treaty boundary

Notes
NDS: Nationally Designated Sites
RSC: Regional Sea Convention

Map 3.13 Distribution of MPAs in the Black Sea marine region



Distribution of marine protected areas (MPAs) networks in the Black Sea

MPAs
- Natura 2000
- Natura 2000 and NDS
- NDS and RSC
- NDS
- Natura 2000 and RSC
- RSC
- Natura 2000, NDS, RSC
- MPA assessment area

Median line or 200 nautical miles
- ----- No formal treaty boundary
- —— Treaty boundary

Notes
NDS: Nationally Designated Sites
RSC: Regional Sea Convention

Table 3.7 Surface area and percentage cover of MPA networks in MPA assessment area regions (N2K, NDSs and RSC sites)

MPA assessment area regions and subregions	Area covered by MPAs (km²)	% covered by MPAs	Total no of sites	% area overlap of networks
Baltic Sea	50 105	13.5	3 050	82.6
North-east Atlantic Ocean	171 174	4.2	3 203	81.2
Celtic Sea	40 457	4.4	1 194	82.0
Greater North Sea incl. Kattegat and English Channel	90 257	17.9	1 534	90.9
Bay of Biscay and the Iberian Coast	25 930	3.2	334	68.6
Macaronesia	14 530	0.8	163	41.6
Mediterranean Sea	114 461	9.5	1 410	33.3
Western Mediterranean Sea	103 196	15.6	724	33.9
Ionian Sea and Central Mediterranean Sea	3 875	1.6	274	24.4
Adriatic Sea	2 441	2.0	199	7.0
Aegean-Levantine Sea	4 949	2.6	221	42.3
Black Sea	2 883	4.5	62	49.6
Total	**338 623**	**5.9**	**7 725**	**65.0**

Table 3.8 Surface area and percentage cover of MPAs in nearshore, coastal and offshore waters in European marine regions

MPA assessment area regions and subregions	Area of 0–1 NM zone covered by MPAs	Area of 1–12 NM zone covered by MPAs	Area of 12 NM–END covered by MPAs	% of 0–1 NM zone covered by MPAs	% of 1–12 NM zone covered by MPAs	% of 12 NM-END covered by MPAs
Baltic Sea	18 899	24 766	6 439	36.1	16.4	3.9
North-east Atlantic Ocean (inside 200 NM)	29 962	57 691	83 521	52.1	16.4	2.3
Celtic Sea	11 583	11 047	17 826	47.5	8.9	2.3
Greater North Sea incl. Kattegat and English Channel	13 143	35 057	42 056	63.4	32.4	11.2
Bay of Biscay and the Iberian Coast	4 119	9 077	12 734	48.9	15.8	1.7
Macaronesia	1 117	2 509	10 904	28.0	4.0	0.6
Mediterranean Sea	16 600	47 301	50 560	30.6	14.2	6.1
Western Mediterranean Sea	9 479	43 157	50 560	60.4	29.6	10.1
Ionian Sea and Central Mediterranean Sea	2 532	1 344	---	30.5	2.7	---
Adriatic Sea	1 783	658	---	17.0	1.4	---
Aegean-Levantine Sea	2 807	2 142	---	14.2	2.4	---
Black Sea	996	1 887	---	77.9	19.3	---
Total	**66 458**	**131 645**	**140 520**	**40.2**	**15.6**	**3.0**

Figure 3.1 summarises the distribution of the overall MPA average size values in the different buffer zones (0–1 NM, 1–12 NM, 12 NM–END) per MPA assessment areas region and subregion. It should be noted that the average size increases from the coast to the open sea buffer, and that this is also likely influenced by the different spatial extension of the buffer belts.

Table 3.9 illustrates the size values of the different MPA networks across the marine regions and subregions with respect to the distance from the coast. Minimum, maximum and average size values were calculated by considering the surface area extents of all sites attributable to each MPA assessment area region. Statistical values were obtained by measuring the extent of any polygon, regardless of whether a polygon overlapped a polygon belonging to other categories. This implies that the obtained values includes the evaluation of surface area extents of MPAs that may be totally or partially juxtaposed with other MPAs. Instead, the overall N2K measurement of size takes into account the size values of all A, B and C category sites without duplicating values for C sites.

Table 3.10 illustrates the distance values of the different MPA networks across the MPA assessment area marine regions and with respect to the distance from the coast. This type of data allows us to identify eventual trends in proximity of sites to each other with respect to different distance ranges from the coast, and is useful for identifying how close an eventual network component is with respect to distance optimal values which could be set when analysing network coherence.

Table 3.11 illustrates the same statistical analysis for size values and distances of the different MPA networks across MPA assessment regions, without considering their distance from the coast. Minimum, maximum and average size values were calculated by considering the surface area extents of all sites attributable to any given region, and distance was calculated by considering only those sites that have distance values different from zero.

Figure 3.1 Size distribution of MPAs in distance to shore, per marine region/subregion

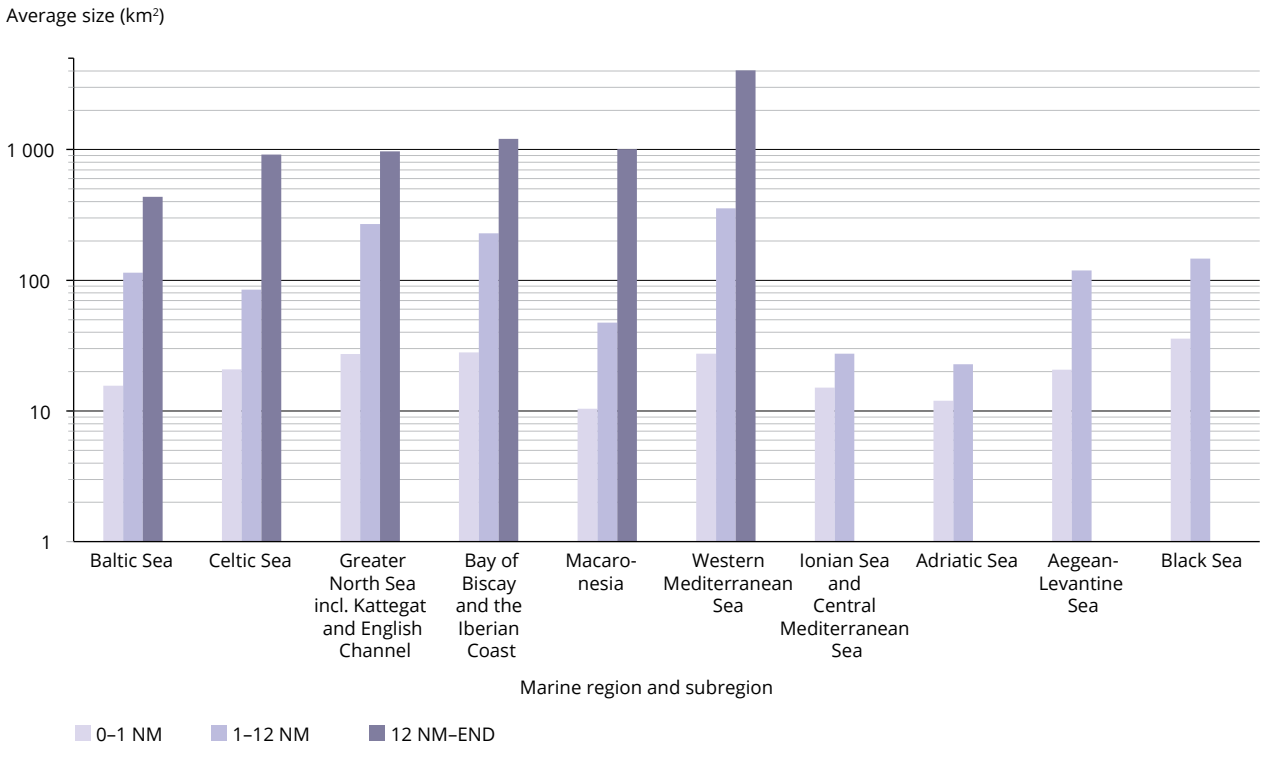


Table 3.9 Size (km²) of MPAs across the marine regions and distance to coastline

Marine region	Network	0–1 NM				1–12 NM				12 NM–END			
		Aver. size		Min. size	Max. size	Aver. size	S.D.	Min. size	Max. size	Aver. size	S.D.	Min. size	Max. size
BALT	SCI	23.6	74.0	< 0.1	1 041.1	83.4	204.8	< 0.1	1 495.9	356.8	401.1	12.9	1 118.6
	SPA	46.9	111.3	< 0.1	1 181.9	146.4	336.9	< 0.1	2 053.8	613.9	631.1	7.1	1 746.3
	N2K	30.6	89.0	< 0.1	1 181.9	121.5	285.4	< 0.1	2 053.8	378.6	488.6	7.1	1 746.3
	NDS	4.9	22.7	< 0.1	344.4	62.2	207.1	< 0.1	1 687.9	488.5	842.8	7.1	1 746.3
	RSC	122.4	170.3	< 0.1	1 181.9	187.8	361.5	< 0.1	2 054.3	520.0	586.6	< 0.1	1 832.2
	MPA	**15.6**	**62.9**	**< 0.1**	**1 181.9**	**114.5**	**282.6**	**< 0.1**	**2 054.3**	**434.8**	**547.7**	**< 0.1**	**1 832.2**
CELT	SCI	31.2	60.8	< 0.1	399.4	112.7	213.0	< 0.1	1 112.9	1 021.5	1 225.0	< 0.1	4 187.8
	SPA	24.7	41.9	< 0.1	283.6	65.9	215.8	< 0.1	1 510.0	1.3	0.0	1.3	1.3
	N2K	28.5	53.6	< 0.1	399.4	92.4	214.6	< 0.1	1 510.0	964.8	1 212.5	< 0.1	4 187.8
	NDS	10.4	42.3	< 0.1	794.0	28.6	120.2	< 0.1	1 090.3	177.8	307.9	< 0.1	533.3
	RSC	59.0	67.1	0.8	319.7	135.1	277.6	< 0.1	1 509.9	989.9	1 198.1	< 0.1	4 188.5
	MPA	**20.8**	**51.1**	**< 0.1**	**794.0**	**85.0**	**215.6**	**< 0.1**	**1 510.0**	**915.8**	**1 162.6**	**< 0.1**	**4 188.5**
GNKE	SCI	47.4	122.5	< 0.1	1 152.6	234.6	438.2	< 0.1	3 184.5	1 193.4	2 365.1	3.4	12 340.2
	SPA	59.7	141.7	< 0.1	1 173.7	310.1	622.4	< 0.1	3 184.7	557.7	1 027.5	1.5	3 135.2
	N2K	52.3	133.3	< 0.1	1 173.7	273.2	535.3	< 0.1	3 184.7	1 006.6	2 122.3	1.5	12 340.2
	NDS	10.8	65.7	< 0.1	1 112.6	209.2	563.3	< 0.1	3 183.3	1 575.4	2 206.0	15.5	3 135.2
	RSC	73.2	142.2	< 0.1	1 180.7	297.9	523.7	< 0.1	3 164.8	907.9	2 078.2	1.5	12 337.0
	MPA	**27.3**	**98.8**	**< 0.1**	**1 180.7**	**269.1**	**536.3**	**< 0.1**	**3 184.7**	**969.4**	**2 080.9**	**1.5**	**12 340.2**
BBIC	SCI	28.3	48.2	< 0.1	380.8	142.9	417.4	< 0.1	2 674.3	730.8	974.4	7.1	2 350.1
	SPA	42.9	63.9	< 0.1	381.6	255.6	540.4	< 0.1	2 674.5	1 713.8	2 142.7	7.1	5 132.5
	N2K	34.9	56.5	< 0.1	381.6	199.0	482.0	< 0.1	2 674.5	1 222.3	1 668.0	7.1	5 132.5
	NDS	9.6	27.7	< 0.1	265.5	17.9	18.5	< 0.1	54.0	1 187.1	1 644.7	24.1	2 350.1
	RSC	89.4	111.3	< 0.1	381.5	574.7	848.7	2.4	2 674.3	1 187.5	1 682.5	7.1	5 133.6
	MPA	**28.1**	**55.8**	**< 0.1**	**381.6**	**228.9**	**541.7**	**< 0.1**	**2 674.5**	**1 205.6**	**1 594.9**	**7.1**	**5 133.6**
MACA	SCI	13.6	20.1	< 0.1	92.0	55.9	130.4	< 0.1	624.9	26.2	13.7	16.5	35.9
	SPA	15.5	30.3	< 0.1	92.0	31.0	35.4	< 0.1	91.5	---	---	---	---
	N2K	11.9	18.9	< 0.1	92.0	55.7	125.8	< 0.1	624.9	26.2	13.7	16.5	35.9
	NDS	8.3	15.1	< 0.1	87.3	34.1	86.6	< 0.1	354.9	1 211.1	1 504.9	16.2	4 096.3
	RSC	61.1	23.7	44.3	77.8	126.2	109.6	3.1	213.1	1 035.4	1 673.9	95.0	4 015.7
	MPA	**10.4**	**17.8**	**< 0.1**	**92.0**	**47.5**	**106.1**	**< 0.1**	**624.9**	**1 008.1**	**1 452.1**	**16.2**	**4 096.3**

Table 3.9 Size (km²) of MPAs across the marine regions and distance to coastline (cont.)

Marine region	Network	0–1 NM				1–12 NM				12 NM–END			
		Aver. size		Min. size	Max. size	Aver. size	S.D.	Min. size	Max. size	Aver. size	S.D.	Min. size	Max. size
WMED	SCI	16.3	35.0	< 0.1	335.9	81.2	217.1	< 0.1	1 679.6	22.0	25.7	0.2	51.5
	SPA	31.7	55.8	< 0.1	349.0	126.3	247.8	< 0.1	1 288.7	13.1	22.0	0.2	51.4
	N2K	20.0	42.8	< 0.1	349.0	106.4	245.3	< 0.1	1 679.6	17.5	23.0	0.2	51.5
	NDS	23.8	150.0	< 0.1	2 140.2	511.0	2 932.1	< 0.1	20 560.7	2 140.3	606.5	1 711.5	2 569.2
	RSC	247.2	852.7	2.7	3 861.6	2 800.4	9 664.1	< 0.1	34 960.0	---	---	47 930.6	47 930.6
	ALL	**27.4**	**168.9**	**< 0.1**	**3 861.6**	**354.5**	**2 723.4**	**< 0.1**	**34 960.0**	**4 029.7**	**13 215.4**	**0.2**	**47 930.6**
ICME	SCI	15.6	47.5	< 0.1	420.6	29.1	75.4	< 0.1	448.0	---	---	---	---
	SPA	28.5	50.4	< 0.1	215.2	10.7	15.7	< 0.1	56.9	---	---	---	---
	N2K	18.1	49.0	< 0.1	420.6	23.8	67.1	< 0.1	448.0	---	---	---	---
	NDS	11.2	37.8	< 0.1	215.6	33.9	48.4	< 0.1	145.1	---	---	---	---
	RSC	32.1	13.2	22.8	41.4	62.4	86.2	< 0.1	123.4	---	---	---	---
	MPA	**15.1**	**44.2**	**< 0.1**	**420.6**	**27.5**	**63.0**	**< 0.1**	**448.0**	**---**	**---**	**---**	**---**
ADRI	SCI	14.4	34.7	< 0.1	154.2	22.9	22.9	0.6	95.1	---	---	---	---
	SPA	27.8	65.6	< 0.1	318.8	24.9	38.7	0.7	106.7	---	---	---	---
	N2K	18.7	48.7	< 0.1	318.8	24.8	28.4	0.6	106.7	---	---	---	---
	NDS	7.6	22.9	< 0.1	168.9	20.0	47.5	< 0.1	160.9	---	---	---	---
	RSC	7.0	9.4	0.3	13.6	---	---	8.2	8.2	---	---	---	---
	MPA	**12.0**	**35.7**	**< 0.1**	**318.8**	**22.8**	**34.6**	**< 0.1**	**160.9**	**---**	**---**	**---**	**---**
AELE	SCI	24.7	52.4	< 0.1	471.0	75.3	311.5	< 0.1	1 623.1	---	---	---	---
	SPA	18.9	28.0	< 0.1	96.7	18.8	54.0	< 0.1	181.7	---	---	---	---
	N2K	23.1	46.1	< 0.1	471.0	58.7	274.2	< 0.1	1 623.1	---	---	---	---
	NDS	16.3	56.9	< 0.1	418.3	354.7	573.6	0.1	1 595.0	---	---	---	---
	RSC	---	---	---	---	---	---	---	---	---	---	---	---
	MPA	**20.7**	**50.1**	**< 0.1**	**471.0**	**119.2**	**367.7**	**< 0.1**	**1 623.1**	**---**	**---**	**---**	**---**
BLAC	SCI	32.1	67.2	0.1	319.0	96.7	227.9	< 0.1	899.4	---	---	---	---
	SPA	49.6	105.8	0.1	450.7	214.3	399.5	< 0.1	1 022.1	---	---	---	---
	N2K	42.6	87.8	0.1	450.7	128.8	279.2	< 0.1	1 022.1	---	---	---	---
	NDS	23.4	95.8	< 0.1	440.8	244.5	456.5	0.3	928.6	---	---	---	---
	RSC	---	---	---	---	---	---	---	---	---	---	---	---
	MPA	**35.8**	**90.3**	**< 0.1**	**450.7**	**146.6**	**303.8**	**< 0.1**	**1 022.1**	**---**	**---**	**---**	**---**

Table 3.10 Distance (km) between sites across marine regions and distance to shore

Marine Region	Network	0–1 NM				1–12 NM				12 NM–END			
		Aver. Dist	S.D.	Min. Dist	Max. Dist	Aver. Dist	S.D.	Min. Dist	Max. Dist	Aver. Dist	S.D.	Min. Dist	Max. Dist
BALT	SCI	4.3	4.8	< 0.1	34.5	12.3	14.7	< 0.1	104.0	92.3	127.3	0.1	382.0
	SPA	7.7	8.8	< 0.1	60.4	13.1	18.2	0.1	147.4	65.8	30.7	27.5	99.6
	N2K	4.1	4.6	< 0.1	34.5	13.3	15.5	0.3	104.0	81.5	121.2	0.1	382.0
	NDS	2.1	3.4	< 0.1	51.7	17.2	26.0	< 0.1	164.0	153.1	253.9	0.5	529.6
	RSC	14.1	17.6	< 0.1	82.3	17.3	20.4	< 0.1	121.5	70.4	67.5	0.1	157.8
	MPA	**1.9**	**2.4**	**< 0.1**	**19.2**	**12.7**	**12.0**	**< 0.1**	**49.7**	**162.1**	**166.4**	**3.5**	**382.0**
CELT	SCI	10.1	17.9	0.1	161.1	23.4	26.5	0.7	128.3	89.8	69.5	0.6	255.6
	SPA	15.4	26.4	0.1	215.7	44.1	51.7	1.1	330.9	---	---	---	---
	N2K	8.9	11.9	0.1	51.1	20.9	18.9	0.7	88.6	91.4	67.8	0.6	255.6
	NDS	5.9	14.6	< 0.1	108.1	22.7	28.9	0.1	158.6	516.1	274.2	357.8	832.7
	RSC	22.6	25.8	0.6	161.1	30.0	27.2	4.7	153.8	88.5	61.2	0.6	203.7
	MPA	**2.9**	**2.9**	**< 0.1**	**15.1**	**14.7**	**13.7**	**0.7**	**69.6**	**---**	**---**	**27.7**	**27.7**
GNKE	SCI	7.3	12.7	< 0.1	82.0	16.5	35.2	< 0.1	293.4	50.3	54.2	0.5	185.1
	SPA	12.4	14.1	< 0.1	77.8	16.9	11.7	1.2	47.8	57.3	83.8	6.6	271.1
	N2K	5.0	7.1	< 0.1	34.9	14.1	11.2	1.2	44.5	36.1	41.6	0.5	176.6
	NDS	2.8	5.3	< 0.1	44.6	44.4	60.9	0.4	203.5	---	---	< 0.1	< 0.1
	RSC	12.3	14.4	< 0.1	73.0	16.8	18.6	< 0.1	90.6	48.5	49.4	< 0.1	176.6
	MPA	**1.4**	**2.0**	**< 0.1**	**19.2**	**9.7**	**8.0**	**0.4**	**24.0**	**---**	**---**	**32.5**	**32.5**
BBIC	SCI	6.5	13.1	< 0.1	89.7	27.7	37.6	2.3	183.5	142.6	139.1	20.6	275.4
	SPA	16.3	20.2	0.1	110.7	61.0	74.1	4.3	324.3	291.4	454.3	24.2	815.9
	N2K	5.7	7.8	< 0.1	37.3	24.3	28.6	2.3	115.4	257.6	256.9	34.0	624.8
	NDS	9.1	13.4	< 0.1	68.2	85.2	100.5	4.5	330.7	---	---	421.3	421.3
	RSC	76.4	179.4	< 0.1	576.7	102.2	203.1	1.4	596.9	226.4	3.5	223.9	228.9
	MPA	**6.8**	**9.4**	**0.1**	**37.3**	**30.2**	**25.2**	**3.0**	**67.9**	**329.4**	**417.8**	**34.0**	**624.8**
MACA	SCI	22.2	32.6	< 0.1	161.8	84.1	265.3	4.1	1 262.4	---	---	192.8	192.8
	SPA	87.2	82.4	15.8	252.1	183.0	42.7	145.5	249.8	---	---	---	---
	N2K	22.5	36.0	< 0.1	161.8	83.6	265.4	4.1	1 262.4	---	---	192.8	192.8
	NDS	11.1	19.7	0.3	155.7	32.3	33.9	1.7	153.1	307.1	473.4	64.4	1 374.9
	RSC	---	---	249.7	249.7	279.7	63.2	243.2	352.7	137.3	61.1	71.9	202.3
	MPA	**6.5**	**7.2**	**< 0.1**	**36.2**	**12.6**	**10.0**	**1.7**	**49.8**	**552.6**	**712.2**	**141.4**	**1 374.9**
WMED	SCI	6.1	9.5	< 0.1	66.5	16.8	21.4	< 0.1	106.3	218.3	388.0	3.5	904.2
	SPA	15.6	17.9	< 0.1	100.1	26.4	28.3	1.7	129.8	102.6	26.0	83.9	147.1
	N2K	5.5	8.4	< 0.1	48.0	16.4	19.5	< 0.1	106.3	213.9	296.7	3.5	653.7
	NDS	13.1	17.8	< 0.1	99.6	50.8	41.0	5.1	157.4	---	---	351.6	351.6
	RSC	84.1	87.4	0.1	303.3	102.3	65.6	25.9	200.8	---	---	---	---
	MPA	**5.5**	**7.7**	**< 0.1**	**48.0**	**14.6**	**17.7**	**< 0.1**	**76.0**	**346.0**	**429.5**	**42.3**	**649.6**
ICME	SCI	8.3	14.5	< 0.1	100.3	37.5	50.2	2.9	161.5	---	---	---	---
	SPA	46.1	47.2	8.3	169.7	93.8	21.6	67.5	120.4	---	---	---	---
	N2K	7.5	10.1	< 0.1	47.9	32.6	39.9	2.2	133.0	---	---	---	---
	NDS	20.2	28.8	< 0.1	91.9	115.0	56.8	16.0	161.9	---	---	---	---
	RSC	---	---	414.8	414.8	---	---	410.7	410.7	---	---	---	---
	MPA	**6.9**	**9.0**	**< 0.1**	**47.9**	**37.6**	**42.9**	**2.2**	**133.0**	**---**	**---**	**---**	**---**

Table 3.10 Distance (km) between sites across marine regions and distance to shore (cont.)

Marine Region	Network	0–1 NM				1–12 NM				12 NM–END			
		Aver. Dist	S.D.	Min. Dist	Max. Dist	Aver. Dist	S.D.	Min. Dist	Max. Dist	Aver. Dist	S.D.	Min. Dist	Max. Dist
ADRI	SCI	6.4	17.7	< 0.1	117.3	34.6	64.5	8.3	227.4	---	---	---	---
	SPA	13.9	18.2	< 0.1	72.4	57.2	55.5	8.3	135.0	---	---	---	---
	N2K	4.6	7.3	< 0.1	33.5	48.2	70.9	8.3	227.4	---	---	---	---
	NDS	9.5	14.1	< 0.1	61.0	74.8	78.5	5.8	229.2	---	---	---	---
	RSC	---	---	638.7	638.7	---	---	---	---	---	---	---	---
	MPA	**6.9**	**9.0**	**< 0.1**	**47.9**	**37.6**	**42.9**	**2.2**	**133.0**	**---**	**---**	**---**	**---**
AELE	SCI	19.0	18.9	0.6	150.5	52.6	25.1	4.6	99.9	---	---	---	---
	SPA	22.8	17.5	0.1	67.8	105.5	81.5	29.1	289.9	---	---	---	---
	N2K	17.7	20.8	0.1	150.5	47.0	20.4	4.6	99.9	---	---	---	---
	NDS	26.8	60.9	< 0.1	429.3	---	---	---	---	---	---	---	---
	RSC	---	---	---	---	---	---	---	---	---	---	---	---
	MPA	**12.5**	**11.5**	**< 0.1**	**48.3**	**47.3**	**20.5**	**4.6**	**99.9**	**---**	**---**	**---**	**---**
BLAC	SCI	3.9	4.1	< 0.1	16.0	4.0	3.9	< 0.1	9.4	---	---	---	---
	SPA	1.8	2.2	0.3	8.1	7.6	6.7	2.7	16.3	---	---	---	---
	N2K	5.3	5.9	0.4	16.0	5.9	6.2	< 0.1	16.3	---	---	---	---
	NDS	9.4	9.5	1.0	34.0	98.7	50.7	62.8	134.5	---	---	---	---
	RSC	---	---	---	---	---	---	---	---	---	---	---	---
	MPA	**4.9**	**6.0**	**0.4**	**16.0**	**5.9**	**6.2**	**< 0.1**	**16.3**	**---**	**---**	**---**	**---**

Table 3.11 Size (km²) and distance (km) between sites across marine regions

Marine region	Size (km²)				Distance (km)			
	Aver. size	S.D.	Min. size	Max. size	Aver. Dist	S.D.	Min. Dist	Max. Dist
Baltic Sea	40.9	198.2	< 0.1	3 117.5	1.9	2.4	< 0.1	18.3
Celtic Sea	70.3	300.9	< 0.1	4 188.5	3.0	3.3	< 0.1	27.7
Greater North Sea incl. Kattegat and English Channel	148.2	677.7	< 0.1	12 340.2	1.4	1.9	< 0.1	19.2
Bay of Biscay and the Iberian Coast	186.4	805.3	< 0.1	8 189.5	8.5	11.3	0.1	37.3
Macaronesia	126.8	535.7	< 0.1	4 096.3	11.8	27.9	< 0.1	141.4
Western Mediterranean Sea	207.8	3 352.6	< 0.1	86 752.2	5.4	7.7	< 0.1	48.0
Ionian Sea and Central Mediterranean Sea	21.2	70.0	< 0.1	868.6	7.1	9.1	< 0.1	47.9
Adriatic Sea	15.9	46.8	< 0.1	425.4	6.5	7.1	< 0.1	29.0
Aegean-Levantine Sea	44.4	214.4	< 0.1	2 094.1	12.4	11.5	< 0.1	48.3
Black Sea	96.2	294.1	< 0.1	1 472.8	4.6	6.1	0.4	16.0

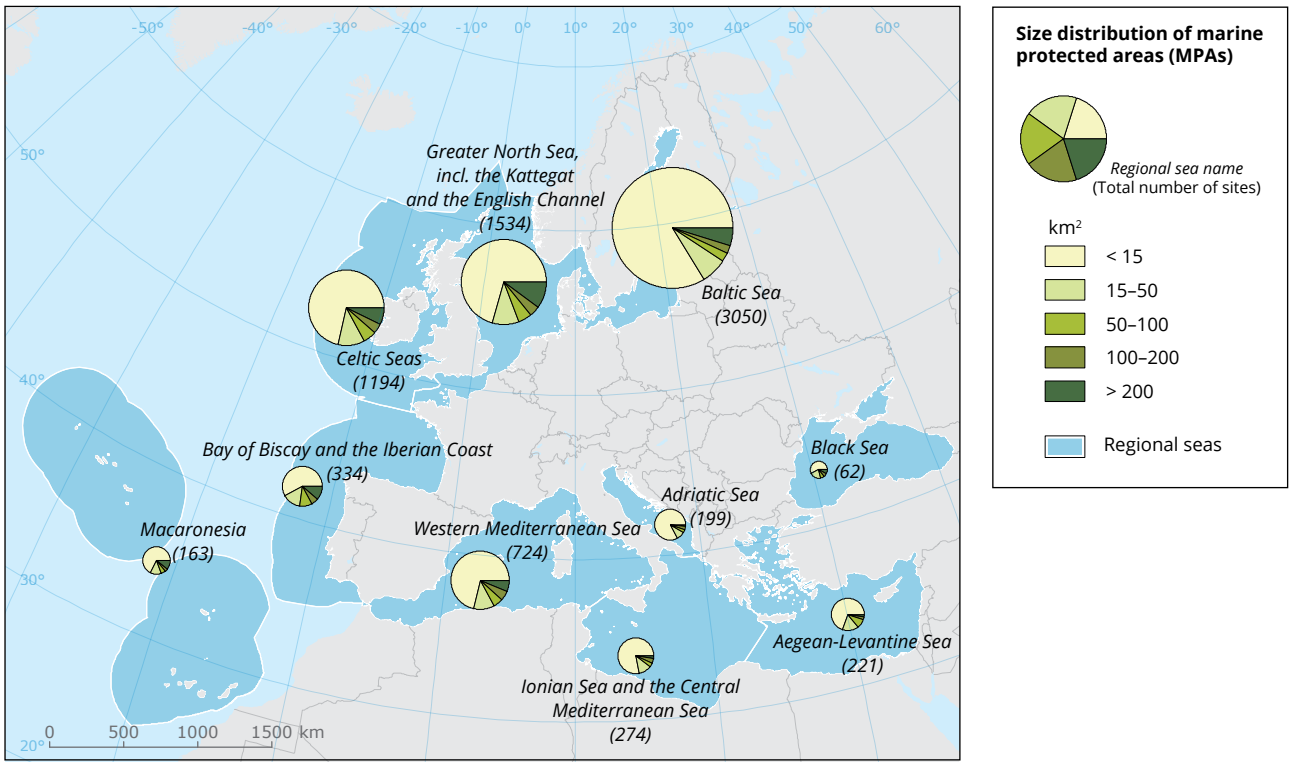
The construction of maps reporting on aspects such as size classes calls for accurate identification of value intervals, which, however should be maintained over time if the long-term objective is to compare differences in data sets across different years. Choosing arbitrary classes can lead to poor cartographic products and be misleading overall. The following statistical procedure was used to attempt to find a solution for the identification of five size classes. The frequency histogram of MPA size and distance values highlights a log-normal distribution. The normal probability plot graph did not provide any significant breaks and/or slope variation suitable for identifying aggregation of data for identification of the size and distance classes. For this reason, after removing the outliers and extreme values, a Jenks natural breaks classification method was run under ArcGIS. This led to an acceptable five-class category repartitioning for the distance value data. The Jenks natural breaks on the size classes revealed that the first class category comprised 94% of the data. For this reason, the upper limit of this class was used to identify the lower limit of the fifth class (which therefore represents 6% of the data set). Subsequently, another Jenks natural breaks classification was rerun on the 94% of the data, so as to obtain the break cuts for the remaining 4 classes.

It is important to emphasise that the large data set available for this elaboration is a guarantee that the same size classes can be used in the future, when new sites are established and iterations of the analysis run.

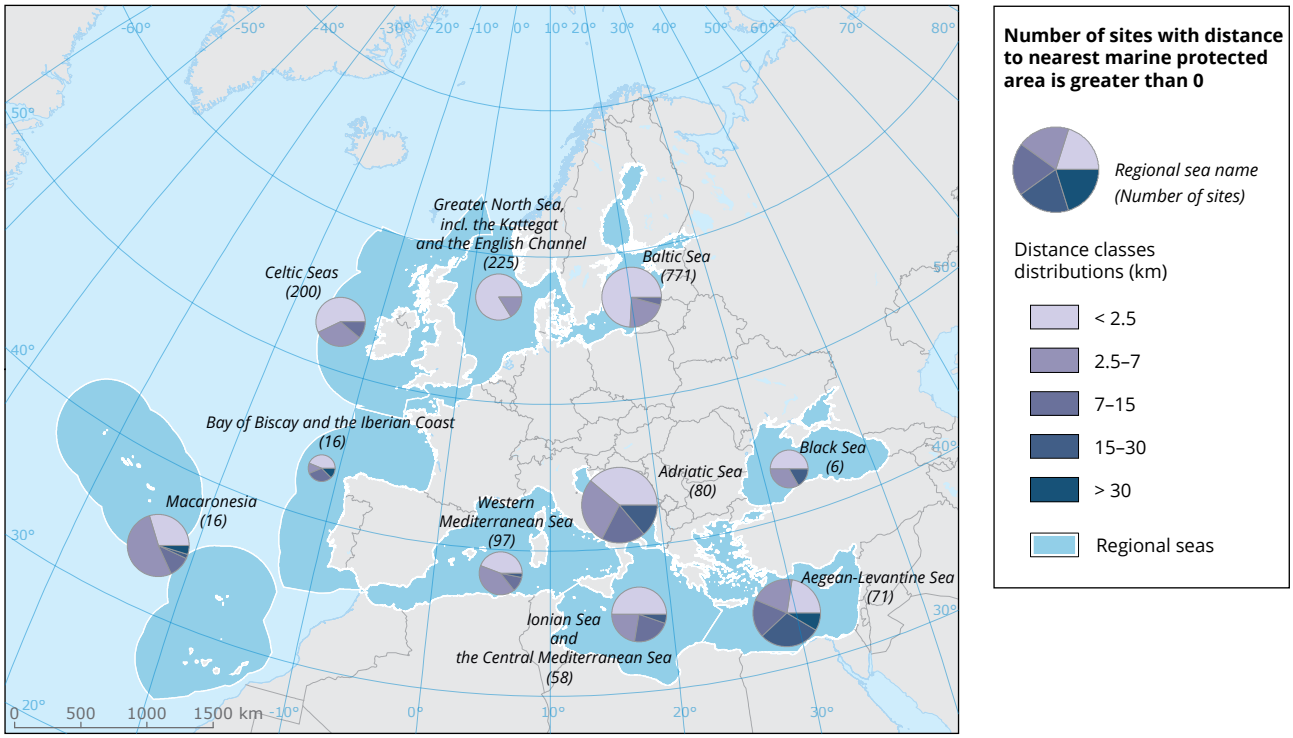
Map 3.14 visualise the size distribution of MPAs within the European marine regions according to 5 size classes. Map 3.16 allows for visualisation of the spatial repartitioning of the distances of each site across the MPA assessment areas, according to the five distance value classes described for Map 3.15. In order to visualise all the MPAs present in the assessment area, sites that were adjoining were incorporated into the first size class (< 2.5 km).

Map 3.17 shows the distance from the 10% protection coverage indicated in Aichi target 11. The colour of the subregion represents this distance, covering all the MPAs occurring in the respective subregion. The superimposed bar charts provide the same information estimated according to buffer distance belts, with the 10% value indicated with a dashed line.

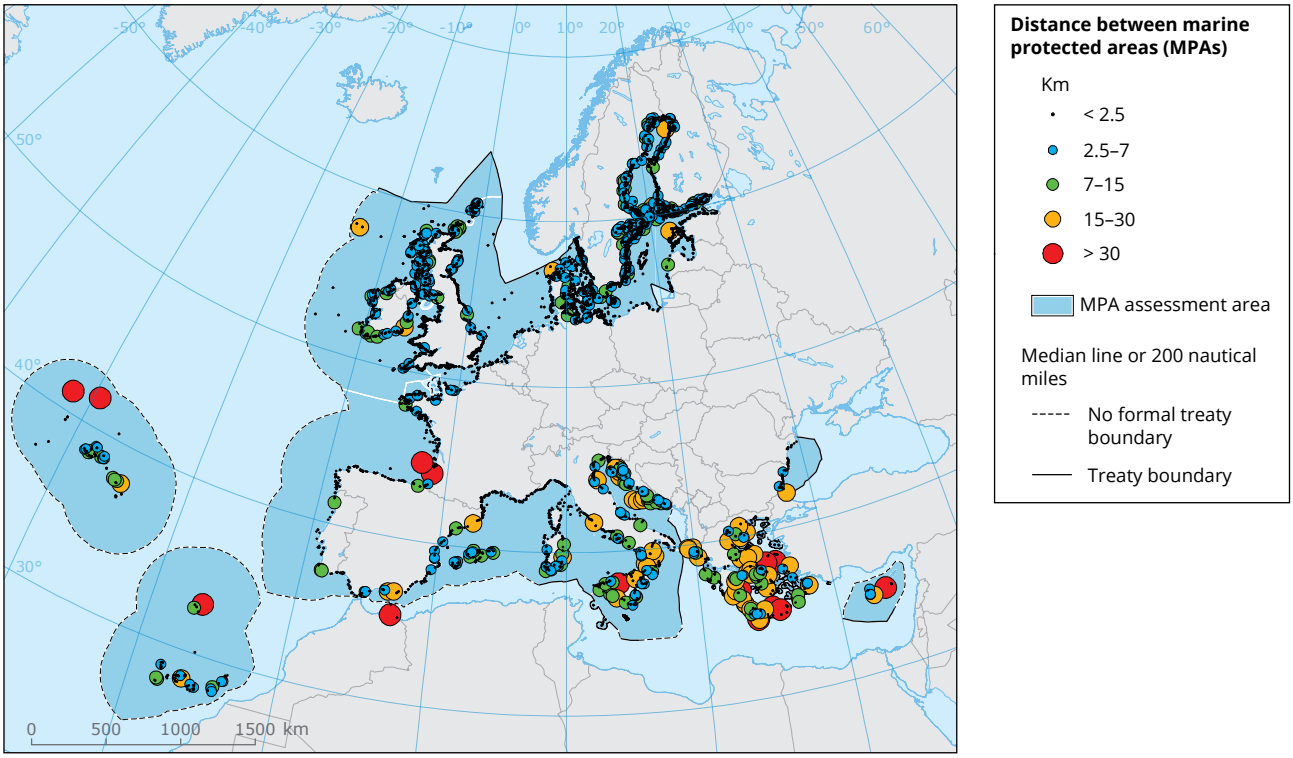
Map 3.14 Size distribution of MPAs within European marine regions in five size classes



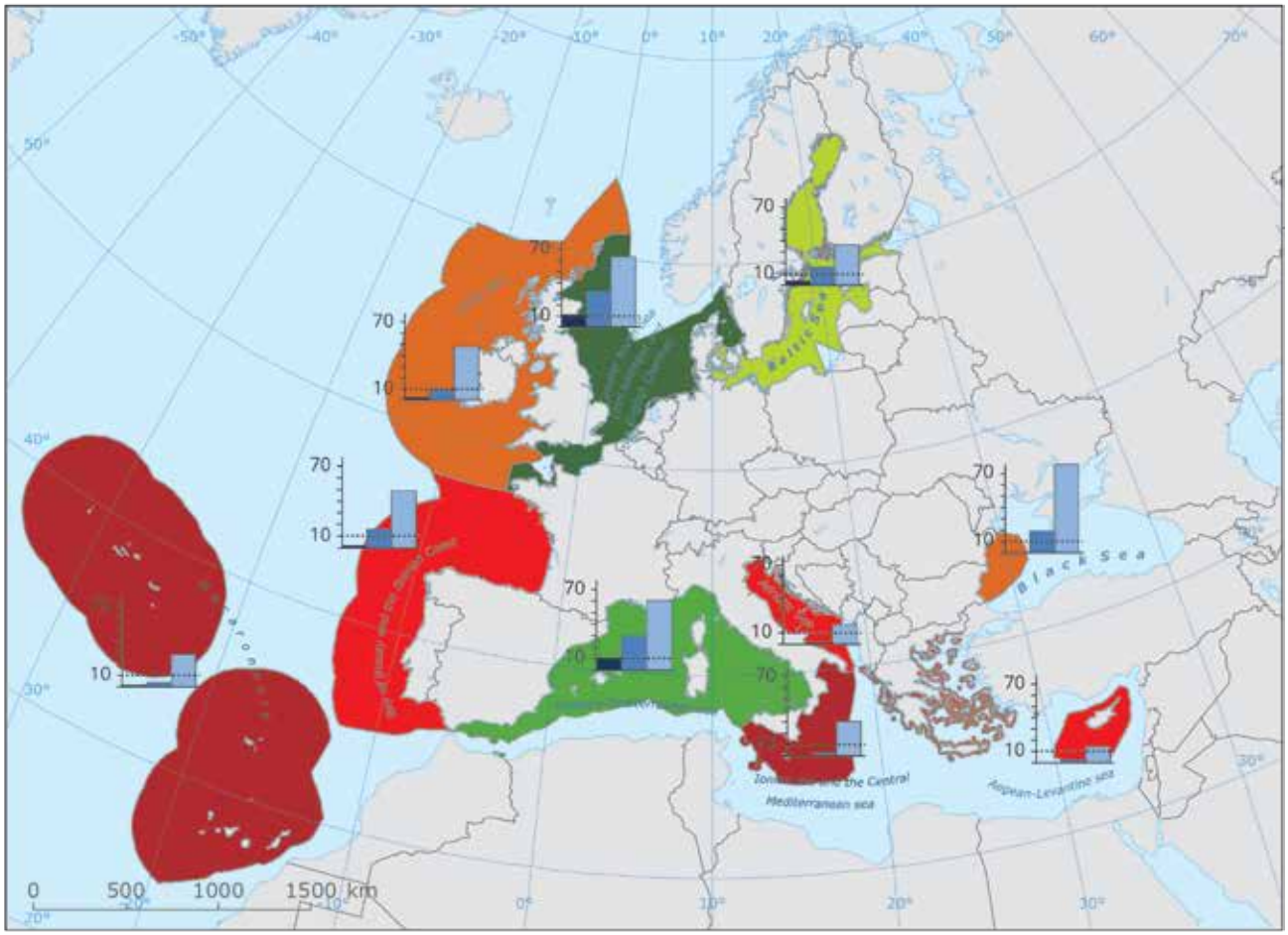
Map 3.15 **Distance classes distributions in European marine regions; percentage of MPAs within distance classes to nearest MPA neighbour**



Map 3.16 **Distance between MPAs in European marine regions (colour graded according to distance to nearest neighbour)**



Map 3.17 **Distance to 10% coverage target for each marine region and for each buffer distance belt, per region**



Distance to Aichi target 11 of 10% coverage

% of MPA coverage per EEA assessment area

0–2	6–8	12–14
2–4	8–10	14–16
4–6	10–12	16–18

Difference to 10% target in near shore, coastal and offshore distance

10

- 0–1 nautical miles
- 1–12 nautical miles
- 12 nautical miles to END

References

EEA, 2013a, 'Marine protected areas under the Marine Strategy Framework Directive 2008/56/EC, 25.01.2013', (http://www.eea.europa.eu/themes/biodiversity/document-library/nationally-designated-areas-cdda/mpas-under-the-msfd/view) accessed October 2014.

EEA, 2013b, 'Explanatory notes for the nationally designated marine areas', Notes for marine sites of CDDA 2014 call (http://www.eea.europa.eu/themes/biodiversity/document-library/nationally-designated-areas-cdda/explanatory-notes-for-the-nationally/view) accessed October 2014.

ETC/ICM, 2014, 'Justification for the delineation of the MSFD Article 4 marine regions and subregions', Compilers Jensen H. M, Periklis P. and Reker J., Version 1.2, 28 May 2014. pp. 23 (http://forum.eionet.europa.eu/etc-icm-consortium/library/subvention-2014/tasks-and-milestones-2014/1.6.1.-spatial-reference-layers/milestone-1-spatial-reference-layers-msfd/justification-delineation-msfd-article-4-marine-regions-and-subregions-internal/download/2/MSFD%20Marine%20regions%20and%20subregions_metadata_20140528.docx).

Annex 1 Methodological issues and problems encountered during data preparation

Annex 1 provides an in-depth description of the methodological steps taken and issues handled during the process of data handling, for each section of the report. The specific choices taken to circumvent problems encountered are explained, and issues that remained unresolved but that could be improved through future actions are illustrated. To facilitate comprehension, the same structure, with corresponding sections, is followed as in the body of the report.

A1.1 Creation of distance buffer zones and correction of the coastline

The buffer zone shapefiles were generated using the following process.

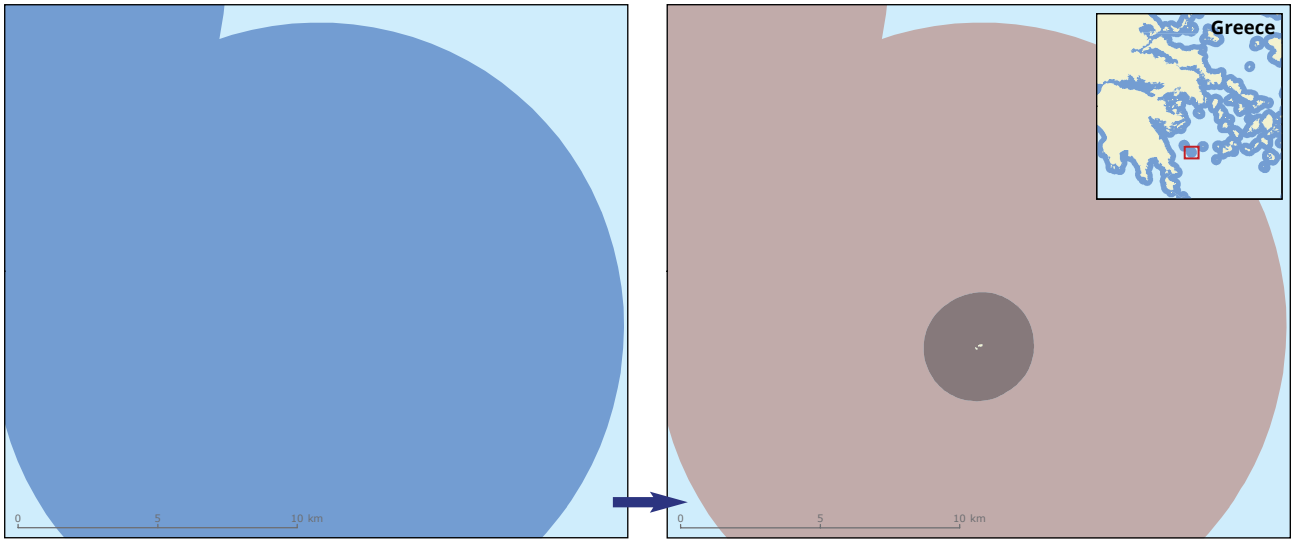
- Two buffer zone shapefiles extending 0–1 NM and 0-12 NM from the coastline were generated using the ArcGIS 'Buffer' tool. Shapefiles were afterwards dissolved and intersected with the marine subregion shapefile. Areas which intersected with the 0–1 NM buffer zone shapefile were filtered out from the 0-12 NM buffer zone shapefile, in order to generate the 1–12 NM shapefile.

- The buffer zone shapefile extending from 12 NM to the end of the MSFD zone (12 NM–END), was generated using the marine region shapefile, from which areas intersecting with the 0–1 NM and 1–12 NM buffer zones were filtered. Due to topological inconsistencies (overlaps) between the marine regions and the coastline shapefiles, areas resulting from the intersection of the 12 NM–END shapefile and coastline shapefile were filtered out of the 12 NM–END buffer zone shapefile.

While creating the external delimitation for the Greek buffer distance belts (a process involving the overlay of the first buffers with the end of the MSFD zone boundary), one polygon in Greek waters emerged as having a portion of sea extending beyond the 6 NM limit. It was assumed that this was an artefact linked to the fact that some islands had not been included in the official EEA coastline layer, having instead been considered for the definition of the spatial extension of the Greek MSFD zone (see Map A1.1). The missing islands (coordinates 23.603478 36.765915) were drawn by hand into the coastline layer, based on the Esri topographic base map as well as the Google Maps map view. In the working coastline layer used in this application, the new polygons were assigned the object IDs 52329 and 52330.

Once the buffer distance belts were generated, the polygons belonging to each buffer belt were analysed for coherence in distribution and to pick up possible errors. What emerged is that very small-sized polygons attributed to the 1–12 NM and 12 NM–END buffers were located scattered on the coastline. The reason hypothesised for this artefact is an inconsistency between the coastline boundary of the marine MSFD regions and the EEA coastline layer, which created areas of overlap. The problem was circumvented by filtering out the small polygons from the '12 NM–END' shapefile that intersected the coastline shapefile (see Map A1.2, where the small-sized polygons are identified in red against the white background area representing the 0–1 NM and 1–12 NM combined buffer distance belts). Future efforts to harmonise coastline inconsistencies across EU shapefiles through the use of univocal and best-resolution coastlines would help preclude such artefacts.

Map A1.1 Correction for missing islands in the coastline layer



Correction for missing islands

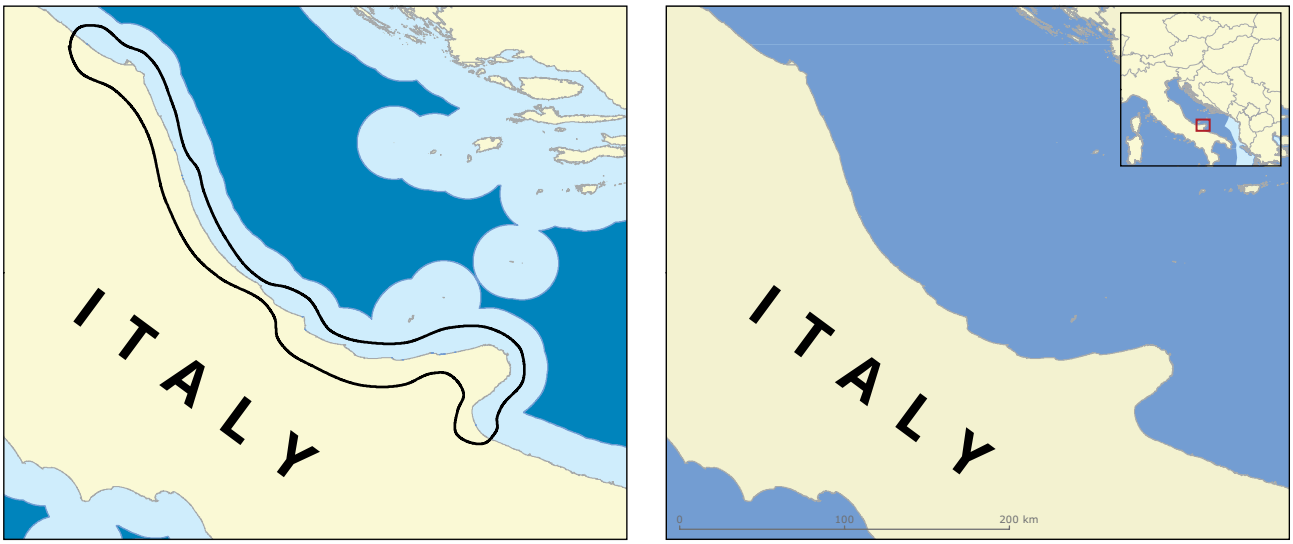
- Marine protected area (MPA) assesment areas

Buffer zones in the marine protected area (MPA) assesment areas

- Buffer zone 0–1 nautical miles
- Buffer zone 1–12 nautical miles

Note: Left: the territorial water delimitation in grey indicates that a terrestrial feature is missing in the coastline layer; right: the missing islands are drawn and the two buffer distance belts around them are generated accordingly.

Map A1.2 Inconsistencies between the European coastline and MPA assessment areas shapefiles generate small polygons near the coastline (left) which are corrected for (right)



Inconsistencies between coastlines

- Buffer zone 12 nautical miles–END
- Marine protected area (MPA) assesment areas
- Belonging to 0–1 and 1–12 nautical miles buffer zones
- Line circeling the issues (small sliver polygons) which occured due to topological inconsistencies between coastline and subregion spatial datasets

A1.2 Calculation of country marine waters per buffer distance belts

Calculation of the country 1 NM buffer zone marine waters

The extension of the marine country waters reported by Member States under the MSFD in 2014 was analysed with respect to the extension of the 1 NM buffer zone constructed by using the 2013 EEA coastline and marine regions/subregions. Map A1.3 highlights how the innermost sea/landward boundary present in the 2014 reported MSFD marine waters and that of the 1 NM buffer zone calculated in 2013 are not aligned (represented by the white gaps between the coastal and marine parts). This is attributed to the fact that transitional and marine waters lying between the coast and the baselines are not included in the 2014 declared MSFD marine waters. Due to this inconsistency, country division of the 0–1 NM buffer zone and its relative national surface area computation could not be obtained through the simple intersection of the two layers, but rather called for non-automatic, manual division of the buffer belts along the country marine and coastal borders.

Country marine areas for the 1 NM buffer zone were therefore obtained by carrying out the following manual procedure.

1. The 1 NM buffer zone shapefile was manually split in correspondence with each country's marine borders using the *MSFD_marine_waters_VLIZ_20140513_raw,* and *CNTR_RG_01M_2010_Europe* reference layers.

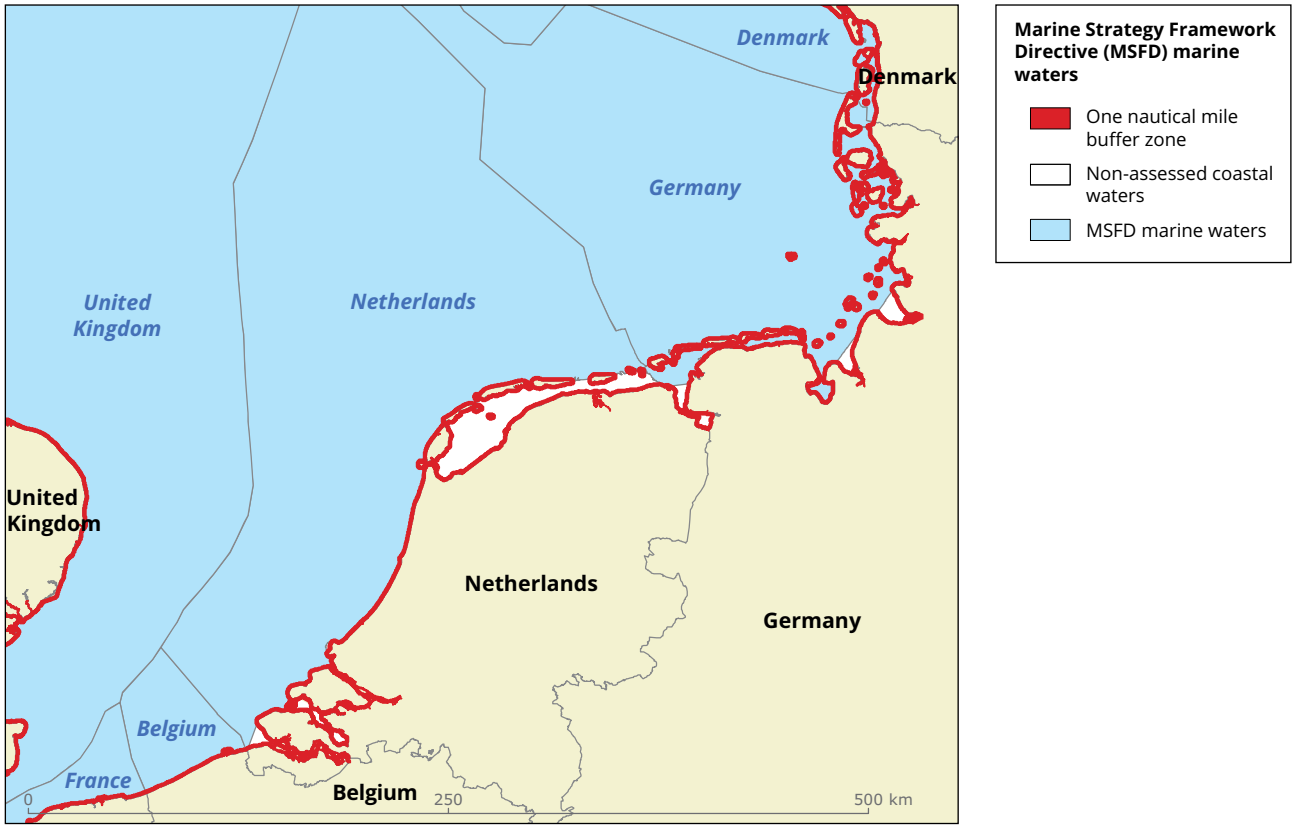
   Map A1.4 provides an example of the places of division used to split the buffer (the areas marked with green circles).

2. The portions of the 1 NM buffer zone which lay between the most coastal boundary of the *MSFD_marine_waters_VLIZ_20140513_raw* layer and the coastline were assigned to the country sharing the same stretch of coastal/marine border.

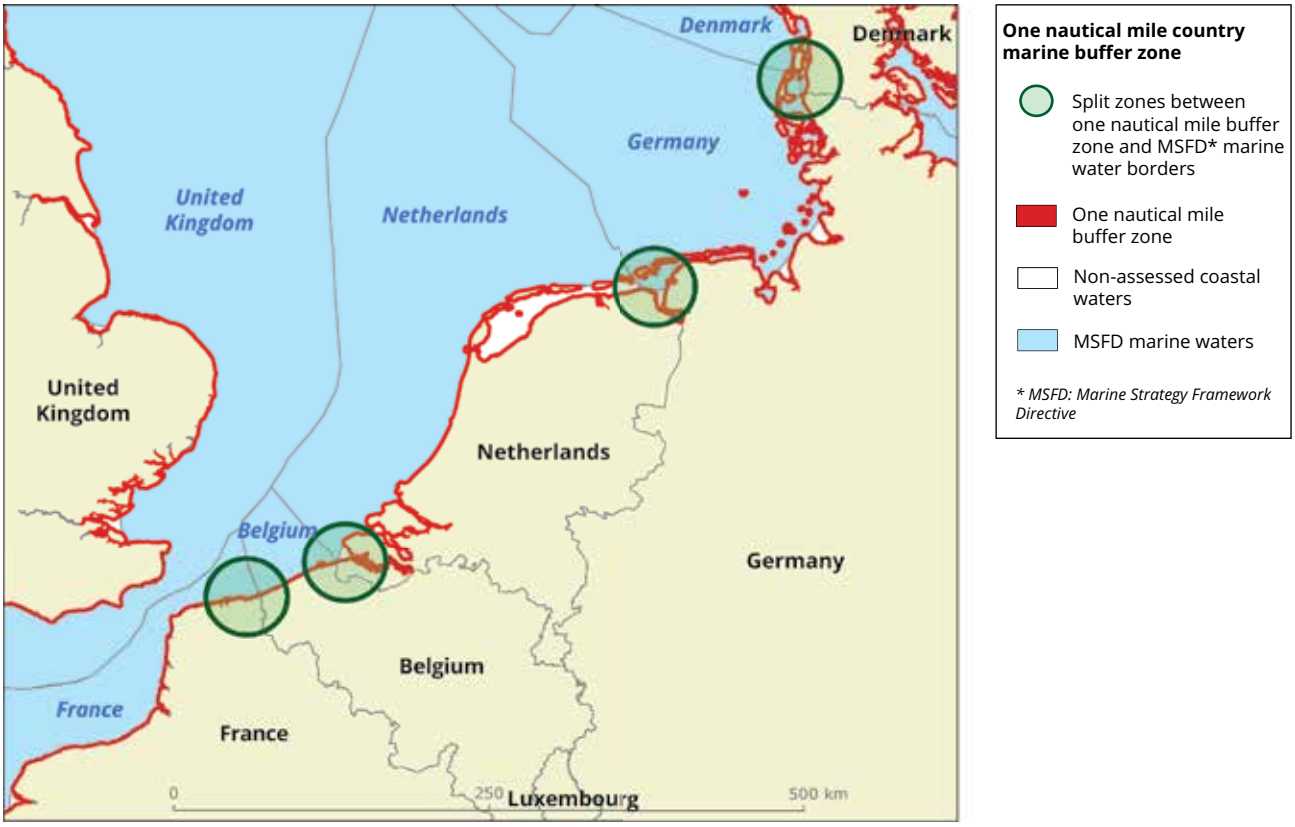
3. The derived spatial data set was used for surface area calculation of each country's 1 NM zone extension.

Map A1.5 shows the spatial extent of each of the resulting 1 NM country marine buffer zones in the

Map A1.3 MSFD marine waters and country borders



Map A1.4 1 NM country marine buffer belt extension resulting from manual geoprocessing



Netherlands and neighbouring countries, resulting from the manual geoprocessing procedure explained above.

Calculation of the country 12 NM buffer belt marine waters

The 12 NM buffer zone extends from the outer line of the 1 NM buffer zone and seawards for 11 NM. Country marine areas for the 12 NM buffer were obtained by carrying out the following procedure.

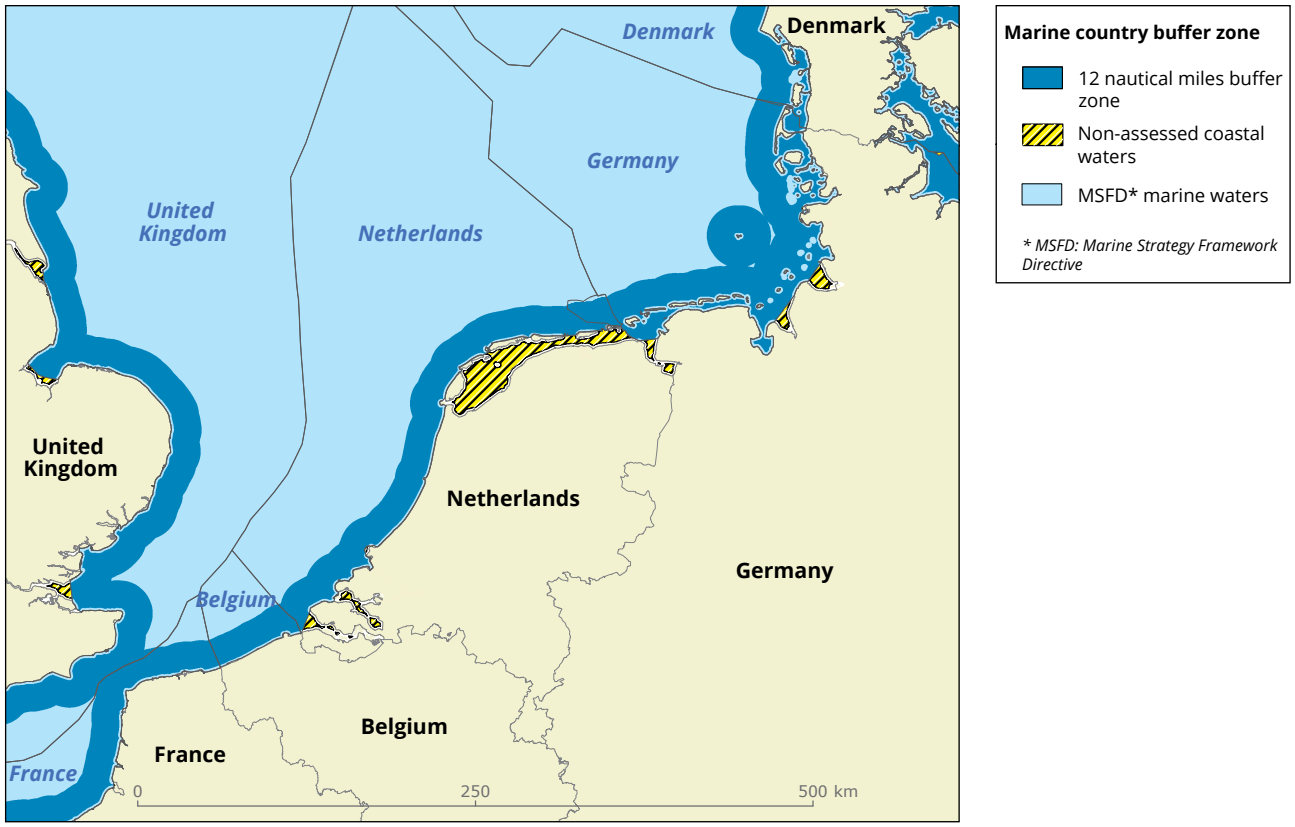
1. Intersection of the dissolved *Buffer_12nm_Coastline_MR_LAEA_20131001* with the *MSFD_marine_waters_VLIZ_20140513_raw* shapefile.

2. Identification of the *Buffer_12nm_Coastline_MR_LAEA_20131001* spatial areas (more or less tiny 'polygon slivers' evident in Map A1.5), which are located beyond the *MSFD_marine_waters_VLIZ_20140513_raw* most coastal boundary and the coastline.

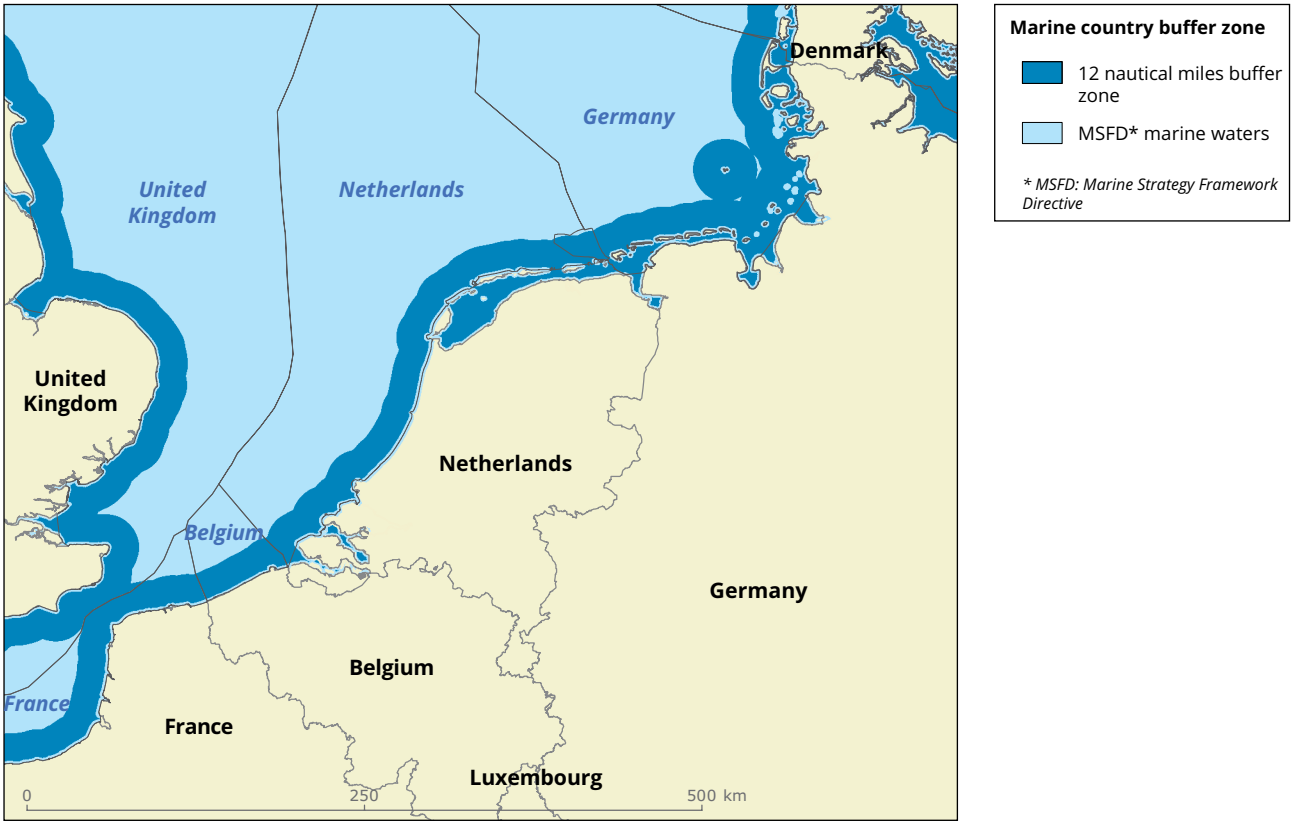
3. Merging of the identified 'polygon slivers' and the 12 NM buffer zone marine waters spatial data obtained by intersection. Merges were performed using the CNTR_RG_01M_2010_XK, *CNTR_RG_100K_2010_XK* and *MSFD_marine_waters_VLIZ_20140513*_raw reference layers.

Map A1.6 shows the spatial extent of each of the resulting 12 NM country marine buffer zones in the Netherlands and neighbouring countries, resulting from the geoprocessing procedure explained above.

Map A1.5 The 12 NM buffer zones located externally to reported marine waters in the Netherlands and surrounding countries, and the 12 NM marine country buffer obtained through intersection



Map A1.6 The 12 NM country marine buffer zone extension resulting from geoprocessing



Calculation of the country 12 NM–END buffer zone marine waters

The 12 NM–END buffer zone extends from the outer line of the 12 NM buffer zone up to the marine subregion border on the sea. Country marine areas for the 12 NM–END buffer were obtained by carrying out the following procedure.

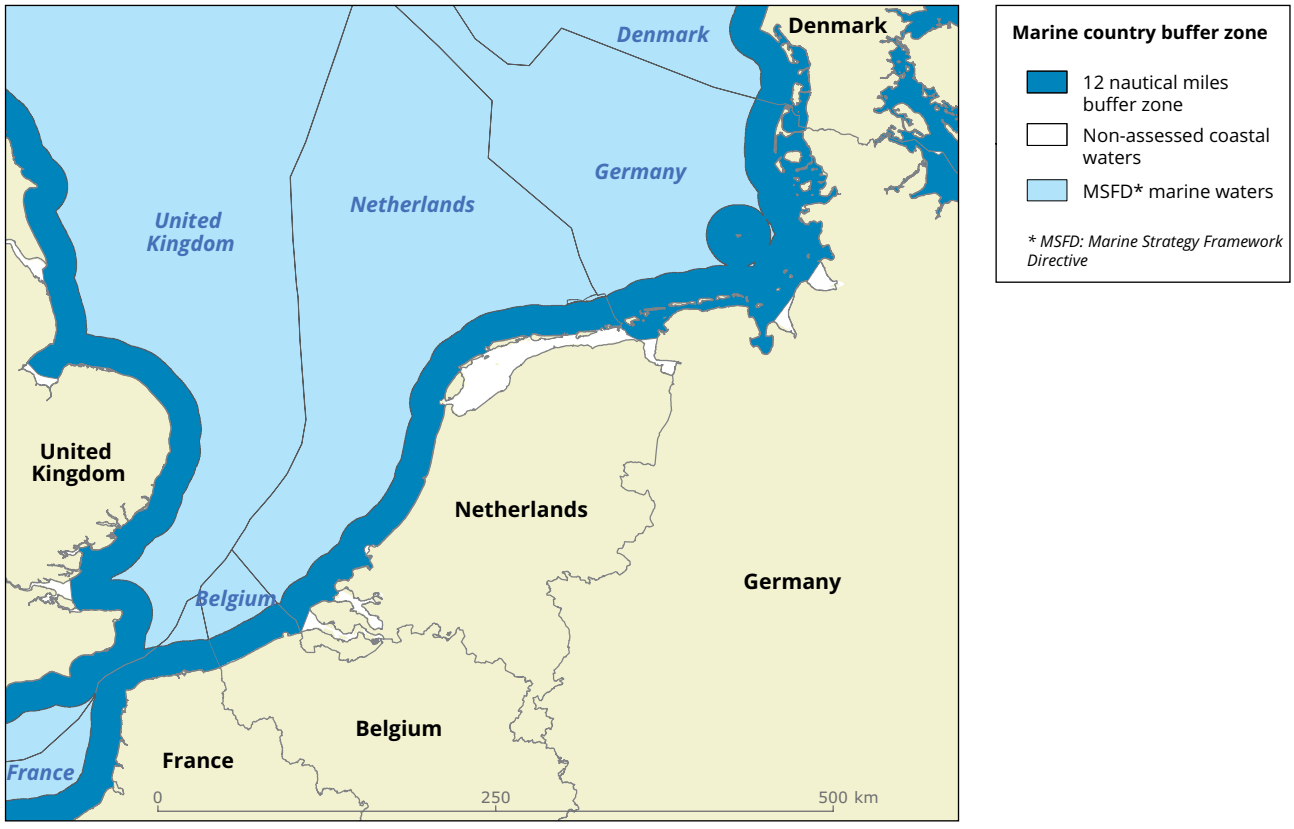
1. The 1 NM and 12 NM buffer zones were erased from the marine water spatial data set. The resulting areas consisted of marine and coastal slivers which emerged due to inconsistencies between the *MSFD_marine_waters_VLIZ_20140513_raw* and the *Buffer_1nm_Coastline_MR_LAE_20131001* layers.

2. Polygons resulting from the intersection between the 12 NM–END buffer zone and *Buffer200_Coastline_MS* and the *Coastline20130708* spatial data sets were deleted from the layer obtained in the step 1. The derived spatial data sets were used for country area calculations for this third buffer.

Map A1.7 shows the spatial extent of the 12 NM–END country marine buffer zone in the Netherlands and neighbouring countries, after the geoprocessing process explained above.

It is important to note that in some cases, the MS-declared marine waters can overlap between neighbouring countries. In these cases, the buffer zones per marine waters were built according to the above-mentioned procedure, also taking into account each country's declared waters in the country computation. This implies that if the total country-declared marine waters computed in this procedure were to be summed up, the total would in some cases exceed the total surface area measured at regions/subregions in the general statistics tables set out at the beginning of the present report. However, since the purpose of this exercise was to compute national relative coverage of the N2K network, this inconsistency with the remaining part of the statistics is considered negligible.

Map A1.7 The country 12 NM–END marine buffer zone



A1.3 Calculation of reference surface area values per region

Table 2.2 in the report indicates an unexpected discrepancy regarding the surface area values elaborated for the 'BBIC' subregion. More specifically, the surface area obtained for the MPA assessment area of this subregion is 12.6 km^2 larger than the total surface area calculated for the European regional sea delimitation in which it falls. The discrepancy is due to differences in coverage of two small polygons located in the mid-part of the 'BBIC'/'Celtic Sea' boundary and along the whole 'BBIC'/'Western Mediterranean Sea' boundary. As it is not possible to detect which of the original cartographic shapefiles is potentially incorrect, the values obtained by calculating the surface areas of each of the shapefiles was retained and reported in the table. It seems advisable to consider as the most appropriate value that obtained from the calculation of the surface area determined by the MSFD shapefile boundary, as this is the data set on the basis of which the buffer distance belts were built. Since all subsequent calculations refer to this value, the degree of error is imperceptible. A key point for future reference is that corrections in this spatial discrepancy could also lead to differences in surface area estimations for the nearby subregions that border with this subregion (i.e. 'Celtic Sea' and 'Western Mediterranean Sea').

A1.4 Preparation of the marine Natura 2000 shapefile

Observations on selection of marine N2K sites based on a tabular + spatial query vs a uniquely spatial filtering procedure

N2K sites selected on the basis of a tabular database query followed by spatial intersection with the coastline/MPA assessment layer (used in the analysis of marine N2K distribution in the present report and hereafter referred to as the 'tabular' method) amount to 2 667. However, sites selected using a threshold of > 5% marine surface area: total site surface area (used in the Barometer ([6]) approach and hereafter referred to as the 'spatial' method) number 2 680. This points to an apparently marginal difference between the two selection approaches (13 site records).

In reality however, the two resulting query data sets are rather different. The tabular data set has 2 300 records that are identical to the spatial one. This means that the remaining 367 'marine tabular sites' (13.8% of total) are not selected by the 'spatial' query approach. The spatial data set instead amounts to 2 299 sites that are identical to the tabular one. This means that 381 sites (14.2% of total) are not selected with the tabular selection approach. The two resulting query data sets have site selection differences involving approximately 14% of the total data records.

Since the tabular data set contains sites which have been deliberately declared as hosting specific marine features, the possible 'non-selection' of a given marine site is to be attributed to errors in the compilation of the site record at the point of origin (i.e. during the reporting process phases). Underestimated counts of marine sites will occur only in such circumstances.

The situation is different in the case of sites selected with the spatial method, and whose identification of their marine distribution are more influenced by cartographic 'errors' (i.e. projection, scale, heterogeneity of base layers used for the perimeter rendering of sites or coastline, etc.). In order to measure the presence of possible 'false positive' marine sites obtained through spatial selection and not considered in the tabular selection process, a subset of 60 site records was extracted and their respective cartographies and SDF data were analysed. The subset was created by ordering the 381 sites according to decreasing size, and extracting 10 sites of every 70. The analysis of this subset indicated that in 54 cases (90% of subset), the spatial selection identified false positive marine sites; 2 cases (3.33% of subset) represent doubtful records (i.e. no marine Habitats Directive habitats/species or generic marine habitat typologies present in the tabular data, but the SDF cartography indicates existence of a distinct marine zone). The remaining 4 sites (6.67% of subset) refer to definite marine sites whose respective tabular records in the mdb are erroneously compiled in terms of the percentage marine cover or generic marine habitat categories. With this in mind, it is apparent that the selection of marine N2K sites based on a procedure which considers combined tabular data and spatial data provides higher accuracy in selecting true marine sites.

Problems encountered and lessons learned

The 324 marine sites having null values for the query features represent potential marine sites which could not be considered due to the presence of empty fields

([6]) See http://ec.europa.eu/environment/nature/info/pubs/docs/nat2000newsl/nat34_en.pdf.

(as opposed to a 0% coverage declaration) for habitat code or marine percentage cover declared in the SDF. Future efforts to ensure obligatory compilation by MSs of habitat code/marine percentage fields either as integers or absolute 0 values (as opposed to empty fields) would allow a more thorough filtering.

The results of the first query on the mdb (null values included) indicated 34 sites (see list directly below) of the mdb which could not be joined with the N2K spatial data. The discrepancy could lie in the fact that spatial data for those sites does not exist in the database, or that the site codes in the shapefile are different from those in the mdb. Future database operations could benefit from a mechanism targeting the identification of such discrepancies between the two databases, run automatically prior to running these analyses.

The site codes of the sites mentioned above are as follows below (listed in Table A1.1).

N2K Sites lying outside seaward of the MPA assessment areas

The distribution of the MPA assessment areas was compared against the distribution of the marine N2K sites in order to discern possible spatial inconsistencies between the distribution of the network, the marine regions (MSFD-declared waters) and the European coastline shapefile. The query identified 549 site polygons which were situated (mostly partly, but some also fully) outside the provided MPA assessment area layer boundaries, and whose spatial distribution and extension would therefore not contribute (for the portions that lie outside the assessment area) to the overall statistical analysis on marine N2K distribution. Most of these polygons, lying outside the assessment area, have a surface area which is smaller than 0.1% of the N2K site respective total surface area. They almost always lie between the coastline and the base of the 0 NM–1 NM buffer belt. In these cases, their exclusion from the MPA assessment area can be attributed to inconsistencies between the coastline boundary of the marine MSFD regions and the EEA coastline layer, as indicated in chapter 1. However, the exclusion of polygons representing less than 0.1% of the total site surface area is considered to be negligible with respect to the final result of the overall generated statistics.

The sites located on the external marine perimeter of the MPA assessment area boundary and which have a surface area larger than 0.1% of the total site surface area number 21. An example of how some of these sites extend below the MPA assessment area boundary is provided in Map A1.8. Table A1.2 summarises the information on the 21 N2K sites which fall seawards of the MPA assessment area boundary. The table indicates the distribution of sites per marine region and the surface areas of each site which are not taken into account in the spatial analysis. In cases where the sites have extremely marginal surface areas lying beyond the MPA assessment area boundary, it is likely that this discrepancy is attributed to spatial rendering differences between the N2K and the reported marine country water shapefiles (i.e. different projections, scales map accuracy).

Table A1.1 Site codes (tabular sites which could not be joined with the N2K spatial data)

FI1400030	FI1400080	FI0800110	FI1400089	FI1400037	FI1400086	LV0514100
PTMAZ0001	FI1400083	FI0900082	LV0413300	FI1400038	FI1400087	LV0536500
PTMAZ0002	FI0100086	FI1301319	LV0503000	FI1400046	FI1400088	
FI1400071	FI0100104	FI1400085	LV0506000	FI1400050	FI1400089	
FI1400072	FI0200091	FI1400086	LV0514100	FI1400051	LV0413300	
FI1400073	FI0200119	FI1400087	LV0536500	FI1400060	LV0503000	
FI1400074	LV0507300	FI1400088	FI1400036	FI1400085	LV0506000	

Map A1.8 Example of N2K sites having surfaces larger than 0.1% of the total site surface area lying beyond the MPA assessment area boundary

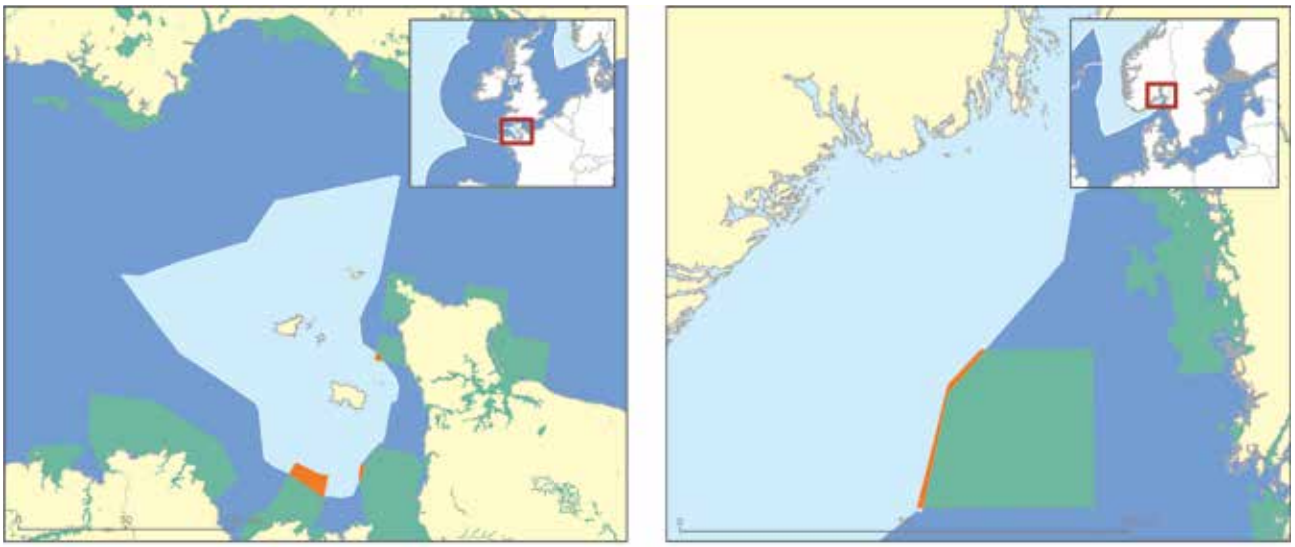


Table A1.2 N2K sites lying outside MPA assessment areas with surfaces greater than 0.1% of the total surface area

N2K site code	Name of site	Region/ subregion involved	Total site surface area (km²)	Surface area excluded from analysis (km²)	% site surface area lying outside assessment area
FI0400002	Luodematalat	BALT	44.4	11.30	25.46
LTSIU0012	Kurðiu marios	BALT	379.0	4.14	1.09
PLH280007	Zalew Wislany I Mierzeja Wislana	BALT	409.2	2.00	0.49
FI0400001	Länsileton alue	BALT	20.4	1.94	9.49
LTKLAB001	Kursiu Nerijos Nacionalinis Parkas	BALT	238.5	1.47	0.62
LTSLUB001	Nemuno Delta	BALT	266.7	0.35	0.13
FR5300011	Cap d'Erquy-Cap Fréhel	GNKE	558.2	133.76	23.96
SE0520189	Bratten	GNKE	1 207.6	35.79	2.96
FR2500079	Chausey	GNKE	828.5	12.63	1.52
FR2510037	Chausey	GNKE	828.5	12.63	1.52
FR2502018	Banc et récifs de Surtainville	GNKE	140.4	8.05	5.73
FR5310095	Cap d'Erquy-Cap Fréhel	GNKE	404.0	3.01	0.74
SE0520172	Idefjorden	GNKE	8.8	0.32	3.67
UK0030388	Hatton Bank	CS	15 690.0	15 690.04	100
UK0030363	North-West Rockall Bank	CS	4 368.1	180.31	4.13
ES6310002	Zona marítimo-terrestre del Monte Hacho	WMED	8.6	7.58	100
GR1430004	Ethniko Thalassio Parko Alonnisou - Voreion Sporadon, Anatoliki Skopelos	AELE	2 493.3	236.39	9.48
GR4110001	Limnos: Chortarolimni — Limni Alyki Kai Thalassia Periochi	AELE	182.4	21.22	11.63
R4210004	Kastellorizo Kai Nisides Ro Kai Strongyli Kai Paraktia Thalassia Zoni	AELE	17.6	0.04	0.25
ROSCI0066	Delta Dunarii — Zona Marina	BLAC	1 231.8	1.54	0.13
ROSPA0076	Marea Neagra	BLAC	1 486.8	1.54	0.10
Total surface excluded from analysis across the MPA assessment areas (km²)				**16 366.05**	

Note: Sites are listed in decreasing order of size lying outside the assessment area, per marine region.

A1.5 Preparation of the Regional Sea Conventions MPA shapefile

The Barcelona Convention MPA databases (SPAMIs) would benefit from being processed through a more detailed GIS interface, allowing for download of tabular and shapefile information on the SPAMIs alongside complementary data sets (mdb and dbf). Otherwise, end users may face difficulties and inevitable confusion over which shapefile to download from the MAPAMED website.

One SPAMI lying in the Western Mediterranean Sea (but outside the MPA assessment zone) did not have a shapefile, so the total surface area extension of the SPAMI network in the Western Mediterranean Regional Sea is underestimated by one site.

A1.6 Preparing the marine national designated sites shapefile

An attempt was made to analyse which designation type (Field = Designate in the CDDA mdb) category of protected areas had been filtered out and which designation type categories had been retained with the threshold of > 5% marine surface area: total site surface area. The information in the 'Designate' field of the NDS site records was therefore sorted in terms of the general conservation features that could be inferred from the designation name given by the MS for any given site.

The conservation features used to categorise the records based on the designation name are as follows.

- **Generic conservation**: This covers any park or reserve or area protected for ecological or scientific reasons or for the protection of specific habitats or species or important natural features, including special areas of conservation (SACs);

- **Landscape-Aesthetic:** This covers any area whose designation name emphasises the importance of the site for its landscape value;

- **Marine:** this covers sites whose designation names directly refer to the marine environment or species;

- **Bird/Wetland/Beaches/Dunes:** This includes designation names making direct reference to bird or habitats representing transitional areas between the coast and the sea (wetlands, beaches and dunes);

- **Terrestrial oriented designation typologies:** This category contains all the sites whose designation name allows us to infer a principally terrestrial protection orientation (i.e. forest, mountain, bogs and streams)

- **Hunting related:** This covers designation names alluding directly to hunting and game.

Table A1.3 reports the frequency of designation categories of the sites that were eliminated from the analysis with the 5% surface area threshold cut. The majority of these sites (81%) are allocated to generic conservation areas (parks, reserves, etc.), which suggests that they may occur in terrestrial coastal polygons lying near the coast and slightly overlapping onto the coastline, thereby being retained in the first part of the process in which they were intersected with the coastline. Only two site polygons belonging to clearly univocal marine (national marine park and marine consultation area) designation categories were removed from the initial list. For the Periferiaki Zoni Ethnikou Thalassiou Parkou (Greece), this was because it is a peripheral and extremely small part of a marine park, lying at an interface with the terrestrial part of the same park system. The second site, The Obbe Marine Consultation Area (Great Britain) is largely a saline lagoon with a greatly limited spatial extension at sea.

On the other hand, the frequency of the sites that were retained from the 5% cut-off (Table A1.4) indicates that 91% of these belong to designation type categories belonging to generic conservation areas (parks, reserves), which in most cases could refer to parks or reserves with partial or complete marine coverage. Sites referring to designation categories involving landscape or bird/wetland/beaches/dunes features could indeed have a true marine extension; approximately 2% of these sites were attributed to marine designation types. A small amount (2%) are attributed to designation typologies having a strictly terrestrial connotation (hunting areas, woodlands, etc.), which indicates that the applied filtering procedure could be improved further with additional information such as tabular data on marine features.

The CDDA marine shapefile (NDSs) was constructed by taking into account the spatial data set alone, with no interpolation with tabular data. As such, the marine sites were filtered using only an arbitrarily chosen 5% surface area threshold (marine vs total surface area). Since it is highly likely that projection errors and differences in spatial resolution between the spatial layers used will still continue to influence selections conducted exclusively on a spatial basis, it is recommended in future to enhance the CDDA database with a specific univocal field in the CDDA database indicating the percentage marine cover of each site. This would allow for differentiation and extrapolation of

Table A1.3 Designation name typologies and attributes of NDSs polygons intersected with the coastline, whose marine surface area is < 5% with respect to the total site surface area

'Designate' category general features	Designation names/*Designation aggregated category attributes* (no of sites)	Total no records
Mostly terrestrial oriented	Aesthetic Forest (5); Forest Biological Reserve (3); Forest Park (3); National Forest Park (3); National Woodland (3); Old Growth Forest Reserve (3); State Forest Protected by Decision of the Forest and Park Service (3); Protected Forest (1); Woodland key habitat (8); protected habitats (all lakes, bogs, streams, heaths and meadows, etc.) (58)	90
Generic conservation (i.e. parks, reserves, ecological importance)	*Park (*99); *Reserve (591); Ecological/Scientific/Habitat/Species importance/Nature or Wilderness Conservation Areas (809); Natural heritage/Monument/Places (18); Special Areas of Conservation/Special Protected Areas (15)*	1 532
Landscape-Aesthetic	Area of Outstanding Natural Beauty (9); Area of Outstanding Natural Beauty (NI) (3); Landscape Park (2); Landscape Protection Area (30); Limited management zone of protected landscape (23); Managed conservation zone of protected landscape (24); National Scenic Area (1); Protected Landscape (20); Protected landscape (nature park) (18); Protected Landscape Area (5); Protected significant natural formation, protected landscape and landscape elements (3); Significant Landscape (2); Wilderness conservation zone of protected landscape (5)	145
Bird/Wetland/Beaches/ Dunes	Bird Sanctuary (4); Protected Wetland (1); Wetland Site (12); Protected Dunes (Flemish Region) (1)	18
Marine	National Marine Park - Peripheral zone (1); Marine Consultation Area (1)	2
Hunting related	Controlled hunting area (1); State Game Husbandries (3)	4
Other	Other Protected Natural Regional Areas (3); Others (3); Limited management zone of natural object protected at municipal level (1)	7
Total		**1 798**

Table A1.4 Designation name typologies and attributes of NDSs polygons intersected with the coastline, whose marine surface area is > 5% with respect to the total site surface area

'Designate' category general features	Designation names/*Designation aggregated category attributes* (no of sites)	Total no records
Generic conservation (i.e. parks, reserves, ecological importance)	*Park* (132); *Reserve* (1681); *Ecological/Scientific/Habitat/Species importance/Nature or Wilderness Conservation Areas* (2195); *Natural heritage/Monument/Places* (89); *Special Areas of Conservation/Special Protected Areas* (69)	4 166
Landscape-Aesthetic	Area of Outstanding Natural Beauty (12); Area of Outstanding Natural Beauty (NI) (3); Landscape Park (3); Landscape Protection Area (30); Limited management zone of protected landscape (21); National Scenic Area (26); Managed conservation zone of protected landscape (16); Protected Landscape (11); Regional Protected Landscape (1); Significant Landscape (23)	146
Marine	Cave (4); Grey Seal Protection Area (7); International significance Natural Marine Area (1); Marine Conservation Zone (1); Marine Consultation Area (28); Marine Nature Park(2); Marine Nature Reserve (2); Marine Protected Area (1); Marine Reserve (10); National Marine Park (2); Natural Marine Reserve and Natural Protected Marine Areas (27); Nature Reserve (Islands) (2); Nature Reserve (Marine) (4); No Berthing Zone/No Entry Zone except for Fisheries (1); Absolute nature reserve zone in National Marine Park (1); Nature reserve zone in National Marine Park (3); Protected Marine Area (7)	103
Bird/ Wetland / Beaches / Dunes	Bird Sanctuary (7); Protected Beaches (10); Protected Dunes (Flemish Region) (1); Protected Wetland (3); Wetland Site (3); Heritage Coast (46)	70
Mostly terrestrial oriented	Protected habitats (all lakes, bogs, streams, heaths and meadows, etc.) (13); Aesthetic Forest (1); Forest Biological Reserve (2); Herb Rich Forest Reserve (1); Horticultural Monument (7); Leisure and Mountain Reserve (1); National Forest Park (1); State Forest Protected by Decision of the Forest and Park Service (1); Tree Protection Area (3); Woodland key habitat (3); Forest Park (10)	43
Hunting related	Controlled hunting area (3); Game breeding station (3); National Hunting and Wildlife Reserve (1)	7
Other	Other (15); Other Protected Natural Regional Areas (8)	23
Total		**4 558**

sites that certainly cover marine areas from those that are strictly and entirely terrestrial. The addition of these new fields to the database, and the request to Member States to complete these fields from 2014 onwards will further refine better suited queries regarding marine sites and benefit future MPA statistic iterations.

Annex 2 Marine habitats and species listed in the Habitats Directive annexes used in querying the N2K mdb database ([7])

Habitat types

1110	Sandbanks which are slightly covered by seawater all the time
1120	Posidonia beds (*Posidonion oceanicae*)
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1160	Large shallow inlets and bays
1170	Reefs
1180	Submarine structures made by leaking gases
1650	Boreal Baltic narrow inlets
8330	Submerged or partially submerged sea caves

Please note that habitat '1150 — Coastal lagoons' is a habitat type that is generally not considered as marine in Habitats Directive evaluations (i.e. Article 17 reporting and marine sufficiency of network assessments; see https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp online). Coastal lagoons which by definition according to the N2K interpretation manual are wholly or partially separated from the sea (see http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf online) were therefore not considered for selecting potential marine N2K sites. Instead, habitat types having terrestrial and transitional waters but that are always open to the sea (i.e. estuaries or large shallow inlets and bays) are considered as marine.

Species

Marine species obtained from the checklist of species for Habitats Directive reporting (source: see http://biodiversity.eionet.europa.eu/activities/Natura_2000/Folder_Reference_Portal/lu_hd_species.mdb).

Mammals

All species of Phocidae except 1913 *Phoca hispida saimensis* (Boreal)

		(Alternative name)
1364	*Halichoerus grypus*	
1365	*Phoca vitulina*	
1366	*Monachus monachus*	
2637	*Cystophora cristata*	
2638	*Erignathus barbatus*	
2639	*Pagophilus groenlandicus*	*Phoca groenlandica*
2640	*Phoca hispida*	*Pusa hispida (6305)*
2641	*Phoca hispida ladogensis*	*Pusa hispida ladogensis (6308)*
5018	*Phoca groenlandica*	*Pagophilus groenlandicus (2639)*
6305	*Pusa hispida*	*Phoca hispida*
6308	*Pusa hispida ladogensis*	*Phoca hispida ladogensis*
6309	*Pusa hispida hispida*	
1938	*Phoca hispida botnica*	*Pusa hispida botnica (6307)*
1365	*Phoca vitulina*	
6306	*Pusa hispida saimensis*	*Phoca hispida saimensis*
6307	*Pusa hispida botnica*	*Phoca hispida botnica*

([7]) ID codes precede names.

All species of Cetacea

		(Alternative name)
1349	*Tursiops truncatus*	Tursiops truncatus
1351	*Phocoena phocoena*	Phocoena phocoena
2027	*Orcinus orca*	
2028	*Pseudorca crassidens*	
2029	*Globicephala melas*	Globicephala melaena
2030	*Grampus griseus*	
2031	*Lagenorhynchus acutus*	
2622	*Kogia breviceps*	
1345	*Megaptera novaeangliae*	
2032	*Lagenorhynchus albirostris*	
2033	*Steno bredanensis*	
2034	*Stenella coeruleoalba*	
2035	*Ziphius cavirostris*	
2036	*Hyperoodon rostratus*	Hyperoodon ampullatus (5033)
2037	*Mesoplodon mirus*	
2038	*Mesoplodon bidens*	
2618	*Balaenoptera acutorostrata*	
2619	*Balaenoptera borealis*	
2620	*Balaenoptera edeni*	
2621	*Balaenoptera physalus*	
1346	*Sibbaldus musculus*	Balaenoptera musculus (5020)
1348	*Eubalaena glacialis*	
1350	*Delphinus delphis*	
2623	*Kogia simus*	
2624	*Physeter macrocephalus*	Physeter catodon
2625	*Mesoplodon densirostris*	
2626	*Monodon monoceros*	
2627	*Globicephala macrorhynchus*	
2628	*Stenella frontalis*	Delphinus fraenatus
5020	*Balaenoptera musculus*	Sibbaldus musculus
5022	*Feresa attenuata*	
5023	*Lagenodelphis hosei*	
5029	*Delphinapterus leucas*	
5031	*Physeter catodon*	Physeter macrocephalus (2624)
5033	*Hyperoodon ampullatus*	Hyperoodon rostratus
5034	*Mesoplodon europaeus*	
5970	*Delphinus fraenatus*	Stenella frontalis (2628)
6114	*Globicephala melaena*	Globicephala melas (2029)
6298	*Peponocephala electra*	

Reptiles

All species of *Cheloniidae* and *Dermochelyidae*

1223	*Dermochelys coriacea*
1224	*Caretta caretta*
1225	*Eretmochelys imbricata*
1226	*Lepidochelys kempii*
1227	*Chelonia mydas*

Molluscs

2578	*Gibbula nivosa*
1012	*Patella ferruginea*
1027	*Lithophaga lithophaga*
1028	*Pinna nobilis*

Echinoderms

1008	*Centrostephanus longispinus*

Algae

1376	*Lithothamnium coralloides*
1377	*Phymatholithon calcareum*

Cnidarians

1001	*Corallium rubrum*

Crustaceans

1090	*Scyllarides latus*

Fish

Fish should not be considered, as most fish species listed in the Habitats Directive are anadromous. Therefore using fish to double-check the existing marine nature of the SCIs could be misleading.

Query for extracting Marine Natura 2000 sites (my SQL), applicable for database available at http://www.eea.europa.eu/data-and-maps/data/natura-4

#Query for extracting and transposing 'Marine habitat classes':

```
DROP table if EXISTS habitatclass_marine;
CREATE TABLE habitatclass_marine
SELECT SITECODE, DESCRIPTION,
MAX(IF(HABITATCODE='N01',PERCENTAGECOVER,NULL)) AS
PERCHC_N01,
MAX(IF(HABITATCODE='N02',PERCENTAGECOVER,NULL)) AS
PERCHC_N02,
MAX(IF(HABITATCODE='N03',PERCENTAGECOVER,NULL)) AS
PERCHC_N03,
MAX(IF(HABITATCODE='N24',PERCENTAGECOVER,NULL)) AS
PERCHC_N24

FROM habitatclass
WHERE HABITATCODE IN ('N01','N02','N03','N24')
GROUP BY SITECODE;

DROP TABLE IF EXISTS habitatclass_marine_ABOVE0;
CREATE TABLE habitatclass_marine_ABOVE0
SELECT*
FROM habitatclass_marine
WHERE PERCHC_N01>0 OR PERCHC_N02>0 OR PERCHC_N03>0
OR PERCHC_N24>0 or PERCHC_N01 is NULL OR PERCHC_N02
is NULL OR PERCHC_N03 is NULL or PERCHC_N24 is NULL;
```

#Query for extracting 'Marine Area Percentages':

```
DROP TABLE IF EXISTS natura_2000sites_marine;
CREATE TABLE natura_2000sites_marine
SELECT SITECODE, Marine_Area_Percentage
FROM natura2000sites
WHERE Marine_Area_Percentage>0 OR Marine_Area_
Percentage IS NULL;
```

#Query for extracting 'Marine Species' in distinctive columns:

```
DROP TABLE IF EXISTS species_marine;
create TABLE species_marine
SELECT SITECODE,
MAX(IF(SPECIESCODE='1364',1,0)) AS S_1364,
MAX(IF(SPECIESCODE='1365',1,0)) AS S_1365,
MAX(IF(SPECIESCODE='1366',1,0)) AS S_1366,
MAX(IF(SPECIESCODE='2637',1,0)) AS S_2637,
MAX(IF(SPECIESCODE='2638',1,0)) AS S_2638,
MAX(IF(SPECIESCODE='2639',1,0)) AS S_2639,
MAX(IF(SPECIESCODE='2640',1,0)) AS S_2640,
MAX(IF(SPECIESCODE='2641',1,0)) AS S_2641,
MAX(IF(SPECIESCODE='5018',1,0)) AS S_5018,
MAX(IF(SPECIESCODE='6305',1,0)) AS S_6305,
MAX(IF(SPECIESCODE='6308',1,0)) AS S_6308,
MAX(IF(SPECIESCODE='6309',1,0)) AS S_6309,
MAX(IF(SPECIESCODE='1938',1,0)) AS S_1938,
MAX(IF(SPECIESCODE='6306',1,0)) AS S_6306,
MAX(IF(SPECIESCODE='6307',1,0)) AS S_6307,
MAX(IF(SPECIESCODE='1349',1,0)) AS S_1349,
MAX(IF(SPECIESCODE='1351',1,0)) AS S_1351,
MAX(IF(SPECIESCODE='2027',1,0)) AS S_2027,
MAX(IF(SPECIESCODE='2028',1,0)) AS S_2028,
MAX(IF(SPECIESCODE='2029',1,0)) AS S_2029,
MAX(IF(SPECIESCODE='2030',1,0)) AS S_2030,
MAX(IF(SPECIESCODE='2031',1,0)) AS S_2031,
MAX(IF(SPECIESCODE='2622',1,0)) AS S_2622,
MAX(IF(SPECIESCODE='1345',1,0)) AS S_1345,
MAX(IF(SPECIESCODE='2032',1,0)) AS S_2032,
MAX(IF(SPECIESCODE='2033',1,0)) AS S_2033,
MAX(IF(SPECIESCODE='2034',1,0)) AS S_2034,
MAX(IF(SPECIESCODE='2035',1,0)) AS S_2035,
MAX(IF(SPECIESCODE='2036',1,0)) AS S_2036,
MAX(IF(SPECIESCODE='2037',1,0)) AS S_2037,
MAX(IF(SPECIESCODE='2038',1,0)) AS S_2038,
MAX(IF(SPECIESCODE='2618',1,0)) AS S_2618,
MAX(IF(SPECIESCODE='2619',1,0)) AS S_2619,
MAX(IF(SPECIESCODE='2620',1,0)) AS S_2620,
MAX(IF(SPECIESCODE='2621',1,0)) AS S_2621,
MAX(IF(SPECIESCODE='1346',1,0)) AS S_1346,
MAX(IF(SPECIESCODE='1348',1,0)) AS S_1348,
MAX(IF(SPECIESCODE='1350',1,0)) AS S_1350,
MAX(IF(SPECIESCODE='2623',1,0)) AS S_2623,
MAX(IF(SPECIESCODE='2624',1,0)) AS S_2624,
MAX(IF(SPECIESCODE='2625',1,0)) AS S_2625,
MAX(IF(SPECIESCODE='2626',1,0)) AS S_2626,
MAX(IF(SPECIESCODE='2627',1,0)) AS S_2627,
MAX(IF(SPECIESCODE='2628',1,0)) AS S_2628,
MAX(IF(SPECIESCODE='5020',1,0)) AS S_5020,
MAX(IF(SPECIESCODE='5022',1,0)) AS S_5022,
MAX(IF(SPECIESCODE='5023',1,0)) AS S_5023,
MAX(IF(SPECIESCODE='5029',1,0)) AS S_5029,
MAX(IF(SPECIESCODE='5031',1,0)) AS S_5031,
MAX(IF(SPECIESCODE='5033',1,0)) AS S_5033,
MAX(IF(SPECIESCODE='5034',1,0)) AS S_5034,
MAX(IF(SPECIESCODE='5970',1,0)) AS S_5970,
MAX(IF(SPECIESCODE='6114',1,0)) AS S_6114,
MAX(IF(SPECIESCODE='6298',1,0)) AS S_6298,
MAX(IF(SPECIESCODE='1223',1,0)) AS S_1223,
MAX(IF(SPECIESCODE='1224',1,0)) AS S_1224,
MAX(IF(SPECIESCODE='1225',1,0)) AS S_1225,
MAX(IF(SPECIESCODE='1226',1,0)) AS S_1226,
MAX(IF(SPECIESCODE='1227',1,0)) AS S_1227,
MAX(IF(SPECIESCODE='2578',1,0)) AS S_2578,
MAX(IF(SPECIESCODE='1012',1,0)) AS S_1012,
MAX(IF(SPECIESCODE='1027',1,0)) AS S_1027,
MAX(IF(SPECIESCODE='1028',1,0)) AS S_1028,
MAX(IF(SPECIESCODE='1008',1,0)) AS S_1008,
```

```
MAX(IF(SPECIESCODE='1376',1,0)) AS S_1376,
MAX(IF(SPECIESCODE='1377',1,0)) AS S_1377,
MAX(IF(SPECIESCODE='1001',1,0)) AS S_1001,
MAX(IF(SPECIESCODE='1090',1,0)) AS S_1090

FROM species

WHERE SPECIESCODE IN ('1364', '1365', '1366','2637' '2638',
'2639', '2640', '2641', '5018', '6305', '6308', '6309', '1938', '6306',
'6307','1349', '1351','2027','2028','2029','2030',
'2031','2622','1345','2032','2033','2034','2035','2036','2037','203
8','2618','2619','2620','2621','1346','1348','1350','2623','2624','26
25','2626','2627','2628','5020','5022','5023','5029',
'5031','5033','5034','5970','6114','6298','1223','1224','1225','12
26','1227','2578','1012','1027','1028','1008','1376','1377','1001',
'1090')

GROUP BY SITECODE
ORDER BY SITECODE;
```

#Query for extracting Marine habitats in distinctive columns:

```
DROP TABLE IF EXISTS habitats_marine;
create TABLE habitats_marine
SELECT SITECODE,
MAX(IF(HABITATCODE='1110',1,0)) AS H_1110,
MAX(IF(HABITATCODE='1120',1,0)) AS H_1120,
MAX(IF(HABITATCODE='1130',1,0)) AS H_1130,
MAX(IF(HABITATCODE='1140',1,0)) AS H_1140,
MAX(IF(HABITATCODE='1160',1,0)) AS H_1160,
MAX(IF(HABITATCODE='1170',1,0)) AS H_1170,
MAX(IF(HABITATCODE='1180',1,0)) AS H_1180,
MAX(IF(HABITATCODE='1650',1,0)) AS H_1650,
MAX(IF(HABITATCODE='8330',1,0)) AS H_8330

FROM habitats
WHERE HABITATCODE IN ('1110','1120','1130','1140','1160','117
0','1180','1650','8330')

GROUP BY SITECODE
ORDER BY SITECODE;
```

#Creation of Table marine_N2K_final:

```
DROP TABLE IF EXISTS marine_N2K;
CREATE TABLE MARINE_N2K
SELECT hs.SITECODE, hs.PERCHC_N01, hs.PERCHC_N02,hs.
PERCHC_N03, hs.PERCHC_N24,s.S_1364, s.S_1365, s.S_1366,
s.S_2637, s.S_2638, s.S_2639, s.S_2640,
 s.S_2641, s.S_5018, s.S_6305, s.S_6308, s.S_6309,
 s.S_1938, s.S_6306, s.S_6307, s.S_1349, s.S_1351, s.S_2027,
s.S_2028, s.S_2029, s.S_2030, s.S_2031, s.S_2622, s.S_1345,
s.S_2032,
 s.S_2033, s.S_2034, s.S_2035, s.S_2036, s.S_2037, s.S_2038,
s.S_2618, s.S_2619, s.S_2620, s.S_2621, s.S_1346, s.S_1348,
s.S_1350,
 s.S_2623, s.S_2624, s.S_2625, s.S_2626, s.S_2627, s.S_2628,
s.S_5020, s.S_5022, s.S_5023, s.S_5029, s.S_5031, s.S_5033,
s.S_5034,
 s.S_5970, s.S_6114, s.S_6298, s.S_1223, s.S_1224, s.S_1225,
s.S_1226, s.S_1227, s.S_2578, s.S_1012, s.S_1027, s.S_1028,
s.S_1008,
 s.S_1376, s.S_1377, s.S_1001, s.S_1090

FROM habitatclass_marine_above0 hs
LEFT join species_marine s ON (hs.SITECODE=s.SITECODE)
UNION
SELECT s.SITECODE, hs.PERCHC_N01, hs.PERCHC_N02,hs.
PERCHC_N03, hs.PERCHC_N24,s.S_1364, s.S_1365, s.S_1366,
s.S_2637, s.S_2638, s.S_2639, s.S_2640,
 s.S_2641, s.S_5018, s.S_6305, s.S_6308, s.S_6309,
 s.S_1938, s.S_6306, s.S_6307, s.S_1349, s.S_1351, s.S_2027,
s.S_2028, s.S_2029, s.S_2030, s.S_2031, s.S_2622, s.S_1345,
s.S_2032,
 s.S_2033, s.S_2034, s.S_2035, s.S_2036, s.S_2037, s.S_2038,
s.S_2618, s.S_2619, s.S_2620, s.S_2621, s.S_1346, s.S_1348,
s.S_1350,
 s.S_2623, s.S_2624, s.S_2625, s.S_2626, s.S_2627, s.S_2628,
s.S_5020, s.S_5022, s.S_5023, s.S_5029, s.S_5031, s.S_5033,
s.S_5034,
 s.S_5970, s.S_6114, s.S_6298, s.S_1223, s.S_1224, s.S_1225,
s.S_1226, s.S_1227, s.S_2578, s.S_1012, s.S_1027, s.S_1028,
s.S_1008,
 s.S_1376, s.S_1377, s.S_1001, s.S_1090
FROM habitatclass_marine_above0 hs
RIGHT join species_marine s ON (hs.SITECODE=s.SITECODE);
```

#Creation of Table marine_N2K_2:

```
DROP TABLE IF EXISTS marine_N2K_2;
CREATE TABLE marine_N2K_2
SELECT s.SITECODE, s.PERCHC_N01, s.PERCHC_N02,s.PERCHC_
N03, s.PERCHC_N24,s.S_1364, s.S_1365, s.S_1366, s.S_2637,
s.S_2638, s.S_2639, s.S_2640,
 s.S_2641, s.S_5018, s.S_6305, s.S_6308, s.S_6309,
 s.S_1938, s.S_6306, s.S_6307, s.S_1349, s.S_1351, s.S_2027,
s.S_2028, s.S_2029, s.S_2030, s.S_2031, s.S_2622, s.S_1345,
s.S_2032,
 s.S_2033, s.S_2034, s.S_2035, s.S_2036, s.S_2037, s.S_2038,
s.S_2618, s.S_2619, s.S_2620, s.S_2621, s.S_1346, s.S_1348,
s.S_1350,
 s.S_2623, s.S_2624, s.S_2625, s.S_2626, s.S_2627, s.S_2628,
s.S_5020, s.S_5022, s.S_5023, s.S_5029, s.S_5031, s.S_5033,
s.S_5034,
 s.S_5970, s.S_6114, s.S_6298, s.S_1223, s.S_1224, s.S_1225,
s.S_1226, s.S_1227, s.S_2578, s.S_1012, s.S_1027, s.S_1028,
s.S_1008,
 s.S_1376, s.S_1377, s.S_1001, s.S_1090, h.H_1110,h.H_1120,h
.H_1130,h.H_1140,h.H_1160,h.H_1170,h.H_1180,h.H_1650,h
.H_8330
```

```
FROM marine_N2K s
LEFT JOIN habitats_marine h ON (s.SITECODE=h.SITECODE)
UNION
SELECT h.SITECODE, s.PERCHC_N01, s.PERCHC_N02,s.PERCHC_
N03, s.PERCHC_N24,s.S_1364, s.S_1365, s.S_1366, s.S_2637,
s.S_2638, s.S_2639, s.S_2640,
 s.S_2641, s.S_5018, s.S_6305, s.S_6308, s.S_6309,
 s.S_1938, s.S_6306, s.S_6307, s.S_1349, s.S_1351, s.S_2027,
s.S_2028, s.S_2029, s.S_2030, s.S_2031, s.S_2622, s.S_1345,
s.S_2032,
 s.S_2033, s.S_2034, s.S_2035, s.S_2036, s.S_2037, s.S_2038,
s.S_2618, s.S_2619, s.S_2620, s.S_2621, s.S_1346, s.S_1348,
s.S_1350,
 s.S_2623, s.S_2624, s.S_2625, s.S_2626, s.S_2627, s.S_2628,
s.S_5020, s.S_5022, s.S_5023, s.S_5029, s.S_5031, s.S_5033,
s.S_5034,
 s.S_5970, s.S_6114, s.S_6298, s.S_1223, s.S_1224, s.S_1225,
s.S_1226, s.S_1227, s.S_2578, s.S_1012, s.S_1027, s.S_1028,
s.S_1008,
 s.S_1376, s.S_1377, s.S_1001, s.S_1090, h.H_1110,h.H_1120,h
.H_1130,h.H_1140,h.H_1160,h.H_1170,h.H_1180,h.H_1650,h
.H_8330
FROM marine_N2K s
RIGHT JOIN habitats_marine h ON (s.SITECODE=h.SITECODE);
```

#Creation of table marine N2K_final (final table used for joining with spatial data):

```
DROP TABLE if EXISTS marine_N2K_final;
CREATE TABLE marine_N2K_final
SELECT s.*,n.Marine_Area_Percentage
FROM marine_N2K_2 s
LEFT JOIN natura_2000sites_marine n ON (s.SITECODE=n.
SITECODE)
UNION
SELECT n.SITECODE,s.PERCHC_N01, s.PERCHC_N02,s.PERCHC_
N03, s.PERCHC_N24,s.S_1364, s.S_1365, s.S_1366, s.S_2637,
s.S_2638, s.S_2639, s.S_2640,
 s.S_2641, s.S_5018, s.S_6305, s.S_6308, s.S_6309,
 s.S_1938, s.S_6306, s.S_6307, s.S_1349, s.S_1351, s.S_2027,
s.S_2028, s.S_2029, s.S_2030, s.S_2031, s.S_2622, s.S_1345,
s.S_2032,
 s.S_2033, s.S_2034, s.S_2035, s.S_2036, s.S_2037, s.S_2038,
s.S_2618, s.S_2619, s.S_2620, s.S_2621, s.S_1346, s.S_1348,
s.S_1350,
 s.S_2623, s.S_2624, s.S_2625, s.S_2626, s.S_2627, s.S_2628,
s.S_5020, s.S_5022, s.S_5023, s.S_5029, s.S_5031, s.S_5033,
s.S_5034,
 s.S_5970, s.S_6114, s.S_6298, s.S_1223, s.S_1224, s.S_1225,
s.S_1226, s.S_1227, s.S_2578, s.S_1012, s.S_1027, s.S_1028,
s.S_1008,
 s.S_1376, s.S_1377, s.S_1001, s.S_1090, s.H_1110,s.H_1120,s.H
_1130,s.H_1140,s.H_1160,s.H_1170,s.H_1180,s.H_1650,s.H_833
0,n.Marine_Area_Percentage
FROM marine_N2K_2 s
RIGHT JOIN natura_2000sites_marine n ON (s.SITECODE=n.
SITECODE);
```

#Updating of marine N2K_final table (fill Habitats and Species 'Null' fields with 0)

```
UPDATE marine_N2K_final
SET S_1364=0
WHERE S_1364 is NULL;
UPDATE marine_N2K_final
SET S_1366=0
WHERE S_1366 is NULL;
UPDATE marine_N2K_final
SET S_2637=0
WHERE S_2637 is NULL;
UPDATE marine_N2K_final
SET S_2638=0
WHERE S_2638 is NULL;
UPDATE marine_N2K_final
SET S_2639=0
WHERE S_2639 is NULL;
UPDATE marine_N2K_final
SET S_2640=0
WHERE S_2640 is NULL;
UPDATE marine_N2K_final
SET S_2641=0
WHERE S_2641 is NULL;
UPDATE marine_N2K_final
SET S_5018=0
WHERE S_5018 is NULL;
UPDATE marine_N2K_final
SET S_6305=0
WHERE S_6305 is NULL;
UPDATE marine_N2K_final
SET S_6308=0
WHERE S_6308 is NULL;
UPDATE marine_N2K_final
SET S_6309=0
WHERE S_6309 is NULL;
UPDATE marine_N2K_final
SET S_1938=0
WHERE S_1938 is NULL;
UPDATE marine_N2K_final
SET S_1365=0
WHERE S_1365 is NULL;
UPDATE marine_N2K_final
SET S_6306=0
WHERE S_6306 is NULL;
UPDATE marine_N2K_final
SET S_6307=0
WHERE S_6307 is NULL;
UPDATE marine_N2K_final
SET S_1349=0
WHERE S_1349 is NULL;
UPDATE marine_N2K_final
SET S_1351=0
```

WHERE S_1351 is NULL;
UPDATE marine_N2K_final
SET S_2027=0
WHERE S_2027 is NULL;
UPDATE marine_N2K_final
SET S_2028=0
WHERE S_2028 is NULL;
UPDATE marine_N2K_final
SET S_2029=0
WHERE S_2029 is NULL;
UPDATE marine_N2K_final
SET S_2030=0
WHERE S_2030 is NULL;
UPDATE marine_N2K_final
SET S_2031=0
WHERE S_2031 is NULL;
UPDATE marine_N2K_final
SET S_2622=0
WHERE S_2622 is NULL;
UPDATE marine_N2K_final
SET S_1345=0
WHERE S_1345 is NULL;
UPDATE marine_N2K_final
SET S_2032=0
where S_2032 is NULL;
UPDATE marine_N2K_final
SET S_2033=0
WHERE S_2033 is NULL;
UPDATE marine_N2K_final
SET S_2034=0
WHERE S_2034 is NULL;
UPDATE marine_N2K_final
SET S_2035=0
WHERE S_2035 is NULL;
UPDATE marine_N2K_final
SET S_2036=0
WHERE S_2036 is NULL;
UPDATE marine_N2K_final
SET S_2037=0
WHERE S_2037 is NULL;
UPDATE marine_N2K_final
SET S_2037=0
WHERE S_2037 is NULL;
UPDATE marine_N2K_final
SET S_2038=0
WHERE S_2038 is NULL;
UPDATE marine_N2K_final
SET S_2618=0
WHERE S_2618 is NULL;
UPDATE marine_N2K_final
SET S_2619=0
WHERE S_2619 is NULL;
UPDATE marine_N2K_final
SET S_2620=0
WHERE S_2620 is NULL;
UPDATE marine_N2K_final
SET S_2621=0
WHERE S_2621 is NULL;
UPDATE marine_N2K_final
SET S_1346=0
WHERE S_1346 is NULL;
UPDATE marine_N2K_final
SET S_1348=0
WHERE S_1348 is NULL;
UPDATE marine_N2K_final
SET S_1350=0
WHERE S_1350 is NULL;
UPDATE marine_N2K_final
SET S_2623=0
WHERE S_2623 is NULL;
UPDATE marine_N2K_final
SET S_2624=0
WHERE S_2624 is NULL;
UPDATE marine_N2K_final
SET S_2625=0
WHERE S_2625 is NULL;
UPDATE marine_N2K_final
SET S_2626=0
WHERE S_2626 is NULL;
UPDATE marine_N2K_final
SET S_2627=0
WHERE S_2627 is NULL;
UPDATE marine_N2K_final
SET S_2628=0
WHERE S_2628 is NULL;
UPDATE marine_N2K_final
SET S_5020=0
WHERE S_5020 is NULL;
UPDATE marine_N2K_final
SET S_5022=0
WHERE S_5022 is NULL;
UPDATE marine_N2K_final
SET S_5023=0
WHERE S_5023 is NULL;
UPDATE marine_N2K_final
SET S_5029=0
WHERE S_5029 is NULL;
UPDATE marine_N2K_final
SET S_5031=0
WHERE S_5031 is NULL;
UPDATE marine_N2K_final
SET S_5033=0
WHERE S_5033 is NULL;
UPDATE marine_N2K_final
SET S_5034=0
WHERE S_5034 is NULL;
UPDATE marine_N2K_final
SET S_5970=0
WHERE S_5970 is NULL;
UPDATE marine_N2K_final
SET S_6114=0
WHERE S_6114 is NULL;
UPDATE marine_N2K_final
SET S_6298=0

```
WHERE S_6298 is NULL;
UPDATE marine_N2K_final
SET S_1223=0
WHERE S_1223 is NULL;
UPDATE marine_N2K_final
SET S_1224=0
WHERE S_1224 is NULL;
UPDATE marine_N2K_final
SET S_1225=0
WHERE S_1225 is NULL;
UPDATE marine_N2K_final
SET S_1226=0
WHERE S_1226 is NULL;
UPDATE marine_N2K_final
SET S_1227=0
where S_1227 is NULL;
UPDATE marine_N2K_final
SET S_2578=0
where S_2578 is NULL;
UPDATE marine_N2K_final
SET S_1012=0
WHERE S_1012 is NULL;
UPDATE marine_N2K_final
SET S_1027=0
where S_1027 is NULL;
UPDATE marine_N2K_final
SET S_1028=0
WHERE S_1028 is NULL;
UPDATE marine_N2K_final
SET S_1008=0
WHERE S_1008 is NULL;
UPDATE marine_N2K_final
SET S_1376=0
where S_1376 is NULL;
UPDATE marine_N2K_final
set S_1377=0
where S_1377 is NULL;
UPDATE marine_N2K_final
SET S_1001=0
WHERE S_1001 is NULL;
UPDATE marine_N2K_final
SET S_1090=0
WHERE S_1090 is NULL;
UPDATE marine_N2K_final
SET H_1110=0
where H_1110 is NULL;
UPDATE marine_N2K_final
SET H_1120=0
WHERE H_1120 is NULL;
UPDATE marine_N2K_final
SET H_1130=0
WHERE H_1130 is NULL;
UPDATE marine_N2K_final
SET H_1140=0
WHERE H_1140 is NULL;
UPDATE marine_N2K_final
SET H_1160=0
WHERE H_1160 is NULL;
UPDATE marine_N2K_final
SET H_1170=0
WHERE H_1170 is NULL;
UPDATE marine_N2K_final
SET H_1180=0
WHERE H_1180 is NULL;
UPDATE marine_N2K_final
SET H_1650=0
WHERE H_1650 is NULL;
UPDATE marine_N2K_final
SET H_8330=0
WHERE H_8330 is NULL;
```

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