

D.27 - Analysis and methodological guidance on sharing data and information



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1 Introduction

The overall objective of the MSPMED project is to facilitate the Marine Spatial Planning (MSP) Directive's processes in the Member States (MS) facing the Mediterranean Sea, by supporting the establishment of coherent and coordinated maritime spatial plans across the Mediterranean Region, in line with the MSP Directive objectives.

Article 10 of the MSP Directive requires to make use of the best available data and organise the sharing of information necessary for the maritime spatial plans by using relevant mechanisms and tools. This is fundamental for the setting up of national plans but also for supporting coherence and coordination across marine regions.

For these reasons, in the MSPMED project an entire work package—WP3 Data use and sharing—is dedicated to improving and facilitating the sharing of data and information among Member States at the Mediterranean level.

1.1 Work Package 3 - Data use and sharing

The main objective of WP3 is making use of the best available data and organising the sharing of information using and applying international and European rules and standards so that a common language and information basis is shared among Member States; on the other hand, it is fundamental that a customised approach is applied on how to tailor this common framework to specific national needs, considering variable advancement levels in the implementation of MSPD and different strategic goals.

Therefore, the WP3 was structured in six main tasks, organised in two blocks: one (3.1) supporting a common framework for cross-border data sharing, and the second (3.2–3.6) tackling national-specific needs.

Task 3.1 (described in the following sections) focused on building a common knowledge base and supporting sharing and compatibility of MSP-relevant data at the Mediterranean scale by sharing and consolidating data and information needs, implementing a common knowledge catalogue of metadata on MSP-relevant information, and analysing the current data gaps and weaknesses.

Tasks 3.2, 3.3, 3.4, 3.5, 3.6 developed specific activities to support the implementation of MSPD at national level in Italy, Malta, France, Greece and Slovenia, respectively.

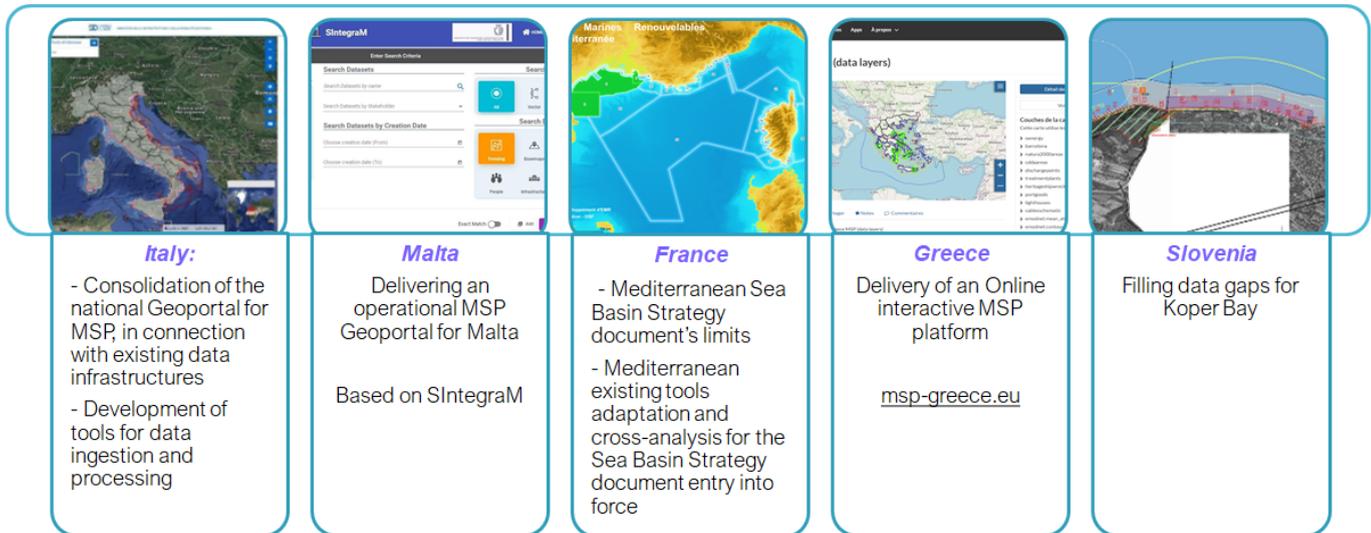


Figure 1: the different activities developed by the partners at national level during WP3

This dual approach has the aim to support collaboration between MSs to achieve data gathering and homogenization both at National and basin scales in order to have a common dataset and information framework to achieve a coherent implementation of MSP in the Mediterranean.

The activities related to the task 3.1, with some perspectives and lessons learned, are presented in this deliverable “D.27 - Analysis and methodological guidance on sharing data and information”, while the deliverable “D26 MSP knowledge catalogue implementation”, describes the implementation and content of the MSP knowledge catalogue.

2 MSP-MED approach and contribution to data use and sharing

The issue of collecting and organising relevant information to support Maritime Spatial Planning is by no means new and has been addressed in several contexts. Each Member State has developed its own perspective, tools and processes in relation to data use and sharing over the previous years.

Therefore, the MSPMED project gathered together representatives of each partner in a working group dedicated to discuss organisational and technical issues related to the sharing of knowledge and information about collection and use of data supporting the implementation of MSP Directive at national level. Various meetings were organised to discuss a common road to the accomplishment of task 3.1, share experiences, prepare and compile a survey to assess

data use approached across national processes (described in the following [section 2.1](#)) and then collect information to fill the MSP Knowledge Catalogue (see [section 2.2](#)) with relevant information from each participating country.

2.1 Sharing and consolidation of data and information needs

During the first months of the MSPMED project, activities in the WP3 focused on the collection of the data and information needs guiding the implementation of the maritime spatial plans of the Member States, with the aim to create a common harmonised definition of the types and categories of data to be considered as least common denominators.

This phase was implemented through the preparation and compilation of a questionnaire (available for reference and completeness in the [annex 1](#)), containing a series of 16 structured questions, grouped in 4 sections: National MSP portal (with information on implementation status, main goals, targeted users, access policies), Input data (about data needs/categories, relevance, providers), Output data (on maps/cartographic outputs, maritime areas and planning units, access/use categories), Monitoring data.

Table 1 summarises the answers given by all the partners participating in the project.

As a general consideration, it is evident that the approaches in the various countries vary quite a lot, depending on previous conditions and decisions on technical, organisational, administrative and political issues.

Trying to take into account the main elements collected, we can summarise a few common denominators:

- Portals
 - in most cases the portals providing MSP-related information do not have MSP as their sole focus, but instead they cover multiple objectives and provide data and information on broader environmental and/or administrative domains;
 - similarly, the portals are intended to be used by a variety of users: public administrations, stakeholders, researchers, the general public;
 - the language used both in the main interface and in the description of metadata and data is almost entirely the national language while, in a few cases, some metadata are also described in English;
 - all the portals provide public access to MSP-related information, while only a few sections might be restricted for administrative or privacy issues;
 - metadata catalogues are implemented only by some Member States, but the catalogues are not specifically oriented to MSP

- the portals have the main function to allow the visualisation and (where possible) access to the data, but no advanced functionalities or tools (e.g. for analysis, integration, dashboards, ...) are available;
- input data (data that are used as an input for the preparation of the plans) include a wide range of topics, with various common elements, but not entirely aligned among the countries;
- with regard to the output data (data representing the output of the plan itself), the approaches to cartographic outputs and the type of uses/restrictions per planning unit are diverse and represent different approaches to defining and analysing planning needs and decisions
- indicators maps and monitoring data were not always clearly defined.

It has to be remembered that this information was collected during the project, while most of the Member States were still developing their MSP processes and some of the elements investigated by the questionnaire were not yet fully clarified. In some cases, some components (especially concerning the portal interface, metadata, some additional functionalities) may still be under development or improvement.

Table 1: summary of information collected through the questionnaire on sharing and consolidation of MSP data and information needs.

	France	Italy	Spain	Slovenia	Malta	Greece
Name	Geolittoral SIMM Maritime limits	SID II portale del mare	InfoMar	Spatial Information System (PIS)	Map Server	
Type of portal	Multiple	Unique	Unique	Unique		Unique
Aim	Multipurpose	Multipurpose	Multipurpose	Multipurpose	Multipurpose	Multipurpose
Status	Geolittoral: existing SIMM/Milieu Marin France: existing; MSP section in preparation French national portal of maritime limits: existing; MSP datasets preparation	Existing; MSP section in development	Existing; MSP section in development	Existing; MSP as pdf documents	Internal geoserver for PA; External geoserver for the public.	Under development
URL	Geolittoral: http://www.geolittoral.developpement-durable.gouv.fr/ SIMM/Milieu Marin France: https://www.milieumarinfrance.fr/ French national portal of maritime limits: https://maritimelimits.gouv.fr/	https://www.sid.mit.gov.it	http://infomar.cedex.es	http://www.pis.gov.si/	Public geoportal: http://geoserver.pa.org.mt/publicgeoserver	http://maps.msp-greece.eu/
Access	Public access	Public access	No login required (restricted section to be developed)	No login required; some contents restricted	Internal geoserver has restricted access; external geoserver is public.	No login required
Language	French	Italian	Spanish	Slovenian	English	Greek

	France	Italy	Spain	Slovenia	Malta	Greece
Manager	Geolittoral: Cerema SIMM/Milieu Marin France: OFB French national portal of maritime limits: SHOMM	MIT	Cedex	Ministry of the Environment and Spatial Planning, Directorate for Spatial Planning, Construction and Housing	Planning Authority	Ministry of Environment and Energy
Metadata catalogue	Yes	No	Yes	No	no	Yes
MSP only	No	No	No	No	no	No
Users	PA, stakeholders, research, general public	PA, stakeholders, research, general public	PA, stakeholders, general public	PA, stakeholders, general public	PA, stakeholders, general public	PA, stakeholders, general public
Input data	Cross boundary	biological characteristics, pressures and impacts, fishing, marine transport routes and traffic flows	Fishing grounds, maritime traffic, distribution of species, physical and chemical characteristics, Raw material extraction, Oil and gas, cables and pipelines, off shore wind farms, identification of PSSA	fishing, transport, migratory species, renewable energy	maritime transport, aquaculture areas, species protection	Physical/Chemical/Biological information, Nature and species protection and conservation, Underwater cultural heritage, Oil and gas, Renewable energies, Maritime transport routes and traffic flows, Fishing, Aquaculture, Tourism and recreation
	Data providers	Defined - each public body/ministry is associated to the list of layers provided	Defined - each public body/ministry is associated to the list of layers provided	Defined, provides a list of public bodies/ministries associated to a list of data needed	Defined, provides a list of public bodies/ministries associated to a list of data needed	Defined, provides a list of public bodies/ministries associated to a list of data needed

	France	Italy	Spain	Slovenia	Malta	Greece	
Output data	Cartographic outputs	Outputs provided in 3 parts: 1) inventory; 2) cross-cutting analysis; 3) strategic objectives and planning;	1) 15 maps presenting the state of the art; 2) Maps presenting main interactions; 3) Main cartographic output of the planning activity with their Planning Units and their respective vocation	Maps about the current and future situation of activities provided	Thematic maps provided (by activity/use)	The current Strategic plan for the Environment and Development document provides a marine strategic objectives map	Not yet defined
	Planning areas/units	Defined and mapped	Defined and mapped	Defined and mapped (MSFD)	Defined and mapped	Defined and mapped	Not yet defined
	Type of access/use of the planning units	The plan defines maritime spatial planning areas which are coherent planning units regarding issues and objectives. These planning units correspond to priority objectives.	Typologies defined by the plan are proposed (generic use, priority use, limited use, reserved use)	Distinguish among areas of current and future uses. All these areas may differentiate between uses of general interest, and other sectoral (private) uses. A detailed terminology is already being discussed internally within the team of MSP.	Contains a plan of uses and activities at sea, which is determined by substantive topics. Categories are specified for each area.	Defines maritime uses according to each planning unit, and also outlines the environmental objectives for each planning unit	The plans are going to provide goals, principles and/or rules for the development of human activities, taking into consideration the specificities of the marine areas
	Indicators	No maps	Under definition	Under definition	Under definition	no	Not yet defined
	Monitoring	In preparation; Links with MSFD	In preparation; Links with MSFD	In preparation; Links with MSFD	In preparation	Linked with MSFD	Not yet defined; links with MSFD

2.2 Implementation of a common MSP knowledge catalogue for the Mediterranean Sea

The goal of the sub-task 3.1.2 “Implementation of a common MSP knowledge catalogue” was the implementation of a tool for the collection and sharing of MSP-relevant information for the Mediterranean Sea.

This catalogue doesn’t have the ambition to provide a unique place where to directly access and visualise all the geospatial datasets relevant for supporting MSP for all Member States in the Mediterranean area. More concretely and realistically, it has been implemented to exploit standard metadata and interoperable services to reference relevant information from national MSP data portals, ongoing and past European projects (e.g. SUPREME, SIMWESTMED, PORTODIMARE) and other European and international portals, allowing to search, filter and aggregate information in relation to geographic area (e.g. marine basins and regions), topic categories (e.g. maritime uses, environmental characteristics), data availability policies (e.g. free, on demand, for research purposes), interoperability (e.g. web services).

While the technical details of the tool and a more detailed description of the content of the MSP Knowledge catalogue are described in the deliverable D26 “MSP knowledge catalogue implementation”, here we describe the process that led to the inclusion of metadata information from national geoportals and catalogues.

Previous initiatives and projects already approached the issue of the dishomogeneity of distribution, availability, access of marine data. In particular, in the Mediterranean area, some EU funded projects had specific activities focused on this, namely ADRIPLAN, SUPREME, SIMWESTMED and PORTODIMARE, to mention the most important ones dealing explicitly with Maritime Spatial Planning.

Starting from those experience, to which various MSPMED partners participated as main contributors, the Comprehensive Knowledge Archive Network - CKAN¹ was chosen as the tool to implement the catalogue. It is an open source project used all over the world to organise and make available open data on many different domains. It is well maintained by an active open source community of developers and it is strongly based on open standards for the description of metadata and the interoperable services used for accessing and sharing them. It was also previously used as a tool to prepare and share datasets among partners in the projects SUPREME and PORTODIMARE.

In the MSPMED project it has been used as a collector of already existing datasets, described through metadata referencing the original source of information.

¹ <https://ckan.org/>

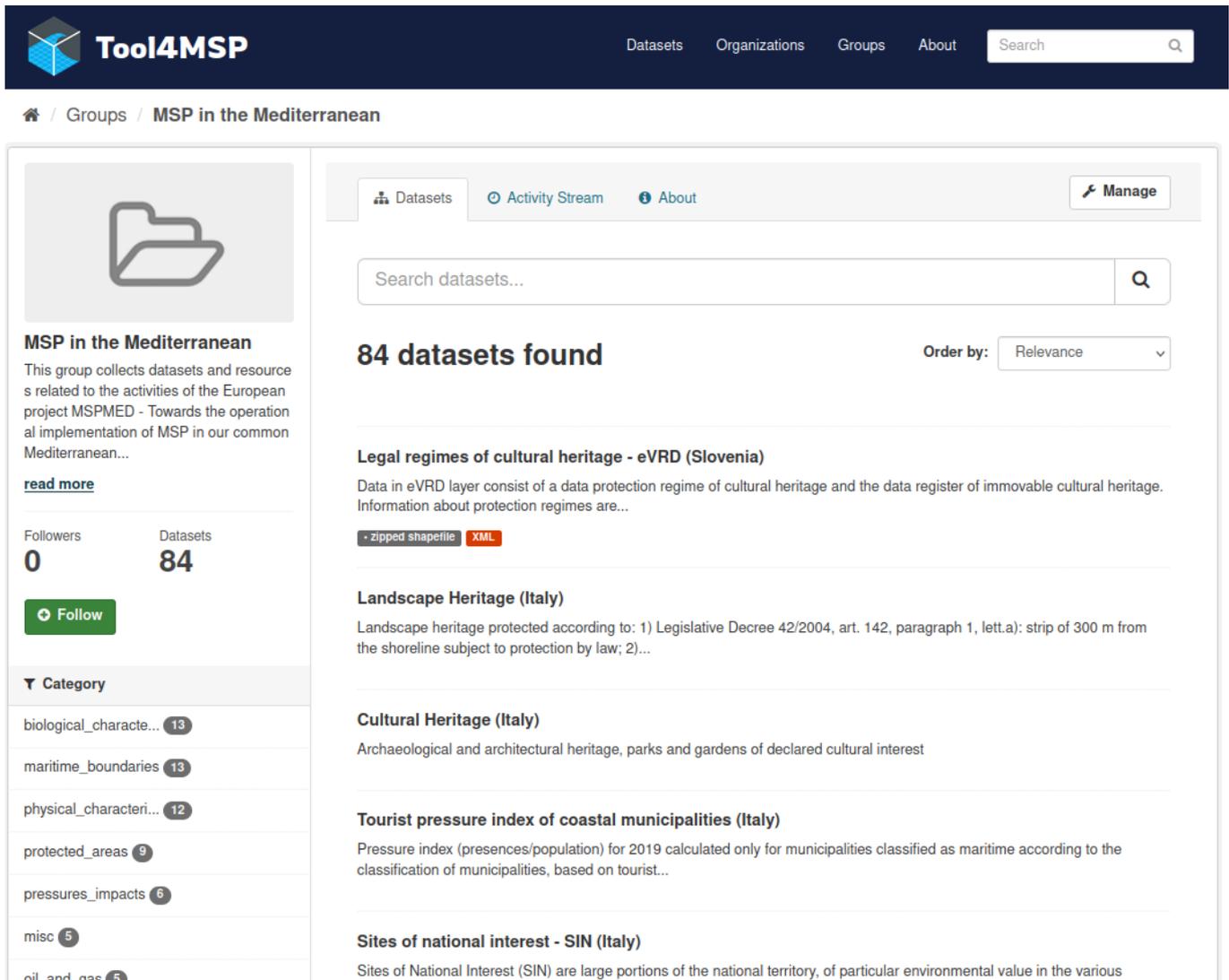
The main goal in fact is to allow the creation and possible growth of a centralised hub of curated information that has the aim to make more visible and accessible datasets already organised by Member States in their portals and catalogues.

The analysis performed through the questionnaire shows that many portals already exist to share MSP-related information, but there are various issues for a Mediterranean-wide use case, such as the fact that they are generally not MSP-focused, the main language is the national one, classifications of domains/topics do not cover main MSP categories of information. This way a user who wants to collect information on a cross-boundary topic would have to go in each and every portal and deal with all of those differences and inconsistencies.

Through the MSP knowledge catalogue, on the other hand, it is easier to filter datasets by domain area, subject category, provider, type of web service and be able to reach and (where possible) view and download datasets of interest.

A specific section of the portal (called “MSP in the Mediterranean” group²) is in fact dedicated to the datasets collected in the MSPMED project that have relevance for the national MSP plans.

² <https://catalogue.tools4msp.eu/group/msp-in-the-mediterranean>



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Legal regimes of cultural heritage - eVRD (Slovenia)
 Data in eVRD layer consist of a data protection regime of cultural heritage and the data register of immovable cultural heritage. Information about protection regimes are...
 • zipped shapefile XML

Landscape Heritage (Italy)
 Landscape heritage protected according to: 1) Legislative Decree 42/2004, art. 142, paragraph 1, lett.a): strip of 300 m from the shoreline subject to protection by law; 2)...

Cultural Heritage (Italy)
 Archaeological and architectural heritage, parks and gardens of declared cultural interest

Tourist pressure index of coastal municipalities (Italy)
 Pressure index (presences/population) for 2019 calculated only for municipalities classified as maritime according to the classification of municipalities, based on tourist...

Sites of national interest - SIN (Italy)
 Sites of National Interest (SIN) are large portions of the national territory, of particular environmental value in the various

Figure 1: section of the MSP Knowledge Catalogue dedicated to the datasets related to MSP in the Mediterranean Sea.

2.3 The European context

To support the “establishment of coherent and coordinated maritime spatial plans across the Mediterranean Region”, it is very important to build a common knowledge base to help the sharing and compatibility of MSP-relevant data at the Mediterranean scale. But this is only feasible if MSP data aligns with the framework and the requirements set up by the Directive 2007/2 EC INSPIRE and connects with relevant initiatives at European scale (especially EMODnet and its Human Activities initiative).

In Europe, during the last years, the European Commission has provided strong support towards the coordination of national efforts for the implementation of the MSP Directive.

Several projects have been funded to create synergies between countries and to build collaborative activities at basin level (in the Mediterranean, Atlantic and North seas).

In addition to this, the European Commission has directly financed the European MSP Platform³, as a result of the “MSP Assistance Mechanism” implemented by CINEA on behalf of DG MARE.

Of particular relevance to the topic of data sharing and to the MSPMED project is the creation of an expert group focused on MSP data issues, the Technical Expert Group (TEG) on Data for MSP⁴, started as a workshop in late 2019 and then developed as a consolidated initiative and network of experts working to “facilitate availability of data and information sharing between Member States on maritime spatial plans across the EU” and “on the state of the marine environment in connection with the established maritime spatial plans and ensure coherence across the EU”.

Representatives of all Member States participating in the MSPMED project were involved and contributed to the activities of the TEG on Data for MSP, also leading some of the working groups created to develop specific topics.

The main output of the TEG has been the document “Proposal for making harmonised MSP plan data available across Europe”⁵, in which two already existing MSP-oriented data models were presented (the HELCOM-VASAB model implemented in BASEMAPS, and the MSP INSPIRE data model developed in the MarSP project) and a third one was developed with the support of the EMODnet Human Activities⁶ team as a “hybrid” solution to represent and share a common European MSP data layer.

These efforts have been actively considered by MSPMED partners during the course of the project, in some cases (e.g. Italy with the activity 3.2 “Data use and sharing in Italy” and the deliverable D29 “Modules implementation”) even producing a workflow to transform the national MSP model and underlying planning units dataset and make it fully compatible with the EMODnet MSP data model so as to include it in the EMODnet Human Activities MSP layer. In other cases, the EU guidelines developed by the TEG have activated processes at the national level that may eventually lead to the inclusion of other national MSP plans into the common European MSP data layer (e.g. France and D32 “Study for the publication of the boundaries of the Mediterranean DSF vocation areas”, specifically looking at adaptation needed for its data to ensure consistency of the data model at the European level and publish data both on national portals and on EMODnet Human Activities).

³ <https://maritime-spatial-planning.ec.europa.eu/>

⁴ <https://maritime-spatial-planning.ec.europa.eu/msp-resources/technical-expert-group-teg-data-msp>

⁵ https://maritime-spatial-planning.ec.europa.eu/sites/default/files/hz0121216enn.en_.pdf

⁶ <https://www.emodnet-humanactivities.eu/>

During the course of the MSPMED project, the tasks included in the WP3, and described previously, formed the core of the activities focused on data and information sharing. Anyway, several other initiatives and tasks were connected with WP3, with different levels of interaction. In particular, in the WP4, the Task 4.1 *Address transboundary issues of common concern* produced an inventory of stakeholders, data and tools used for maritime security and surveillance activities and included the sub-task T4.1.3 on the production of datasets of transnational interest that has also been used to enrich the MSP Knowledge Catalogue with a few additional datasets. Under this task, a specific activity for the integration of diverse information in a single web portal was developed Shom (presented in the deliverable D38⁷ and accessible here <https://mspmed.eu/project/france/>) implementing an interoperable web tool as demonstrator in order to improve the use and visibility of data of interest at the Mediterranean level, and to enable a cross-analysis with information related to European maritime planning, surveillance and environment.



Figure 2: screenshot of the web tool developed by SHOM integrating a few Mediterranean datasets.

A dedicated workshop was also organised in July 2021 on the theme “From data to knowledge. Supporting adaptive management in MSP” producing the deliverable D25 “Report 4th Technical Workshops”⁸.

⁷ <https://mspmed.eu/wp-content/uploads/2022/08/D38-1.pdf>

⁸ <https://mspmed.eu/wp-content/uploads/2022/08/D25-1.pdf>

3 Challenges and future perspectives on data and information sharing

Art. 10 of the MSP Directive states that “Member States shall organise the use of the best available data, and decide how to organise the sharing of information, necessary for maritime spatial plans”.

The MSPMED work package 3 has been called “Data use and sharing” exactly to support that requirement and its activities have been focused on organising, enhancing and making more easily available the wealth of data collected by Member States for the preparation and execution phases of their MSP processes.

3.1 Needs and challenges

Maritime Spatial Planning is a complex process, requiring an integrated and multi-level approach in several phases of its implementation. This inherent complexity of the MSP process is made more intense by the complexity related to data and information needed for its development.

The activities developed during the MSPMED project, and in particular in the WP3, have assessed the current situation at the Mediterranean level both in the first phase of the project, through the collection of national experiences in the questionnaire described in [section 2.1](#), and in the following phases, supporting the implementation of the plans at national scales.

The following points highlight some important issues that are shared across the data and information infrastructures dealing with MSP:

- MSP is multidisciplinary by nature, encompassing various domains, from energy to tourism, from natural protected areas to underwater cultural heritage, from fishery to military activities. Consequently, reference institutions, collection purposes and processes, metadata quality, and update levels are all handled in different ways, so that the derived datasets are also very different.
- MSP is a multi-stage process, where data are not collected once for all, but need to be gathered in the initial stages for defining an initial assessment and current conditions, refined in the following ones to analyse issues, constraints and define management actions, and then updated at the end of the process to monitor its implementation
- MSP data is transboundary and multiscale in both a spatial (global, transboundary, national, local) and temporal (past, present and future scenarios) sense. The use and

combination of data representing phenomena that are not entirely consistent spatially and temporally requires caution and care.

- data is usually not collected specifically to answer MSP questions, but because required by national and European legislation related to specific environmental, cultural or socio-economic purposes. In this sense, available data is hardly “MSP ready”, and needs to be supplemented or processed to be used properly in this context.
- MSP requires the participation (at different levels) of multiple types of users, from international and national authorities, local authorities, managers and planners, researchers and scientists, to private actors, NGOs and citizens. This involves an intense effort not only for reaching, engaging and interacting with such a diverse group of people, but also to make information (and data, where possible) available with different levels of complexity. In fact, while researchers, analysts and planners might need to have direct access to raw data for re-analysis and producing enhanced results and integrated products, managers and decision makers would prefer to access already summarised content and citizens additional outputs more directed towards information and dissemination. This is by no means an easy task and the portals currently available mainly meet the needs of users with medium to advanced technical and thematic skills.
- Existing national data portals and catalogues provide very valuable tools to discover and access relevant information for MSP and are functional, rich and well updated. Nevertheless, some critical issues may compromise its fully efficient use:
 - data are sometimes duplicated in different portals and can overlap or be fragmented,
 - some data (and/or its metadata information) may be outdated,
 - regarding accessibility, data is not always downloadable, sometimes because of the sensitiveness of the data, but sometimes without a clear reason,
 - data availability is not always uniform, neither spatially nor temporally, and sometimes there are subjects that are very rich in information, while others are very poor
 - socio-economic data are still poorly represented and represent an issue that will require dedicated efforts

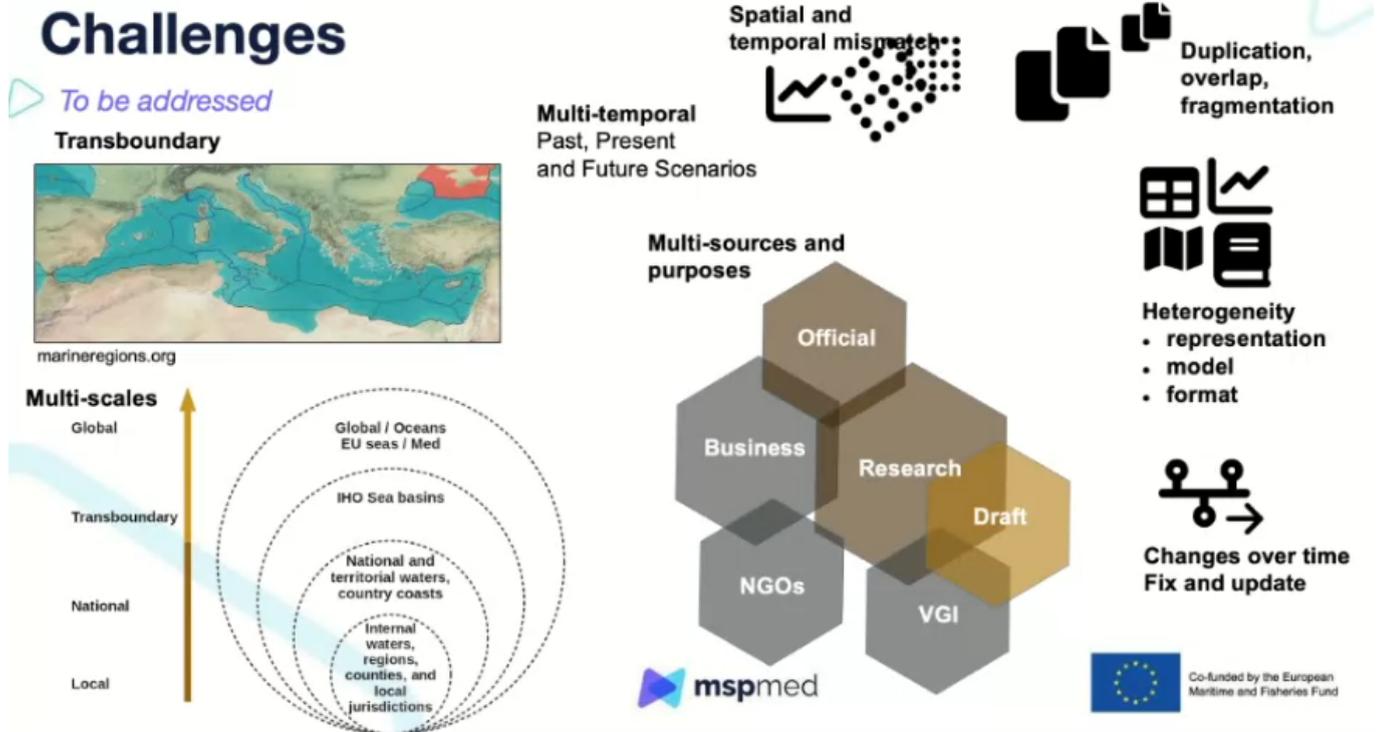


Figure 3: graphical representation of some of the challenges related to the use and sharing of data in MSP.

3.2 Future perspectives

All the above-mentioned issues and challenges require technical, organisational and collaborative efforts to be tackled, and the MSPMED project has worked to help Member States to advance; many other aspects have anyway to be taken into account and improved in the next 5-10 years.

First of all, the European context has been a continuous stimulus towards the standardisation of information and practises among countries: starting from the INSPIRE Directive in 2007 and then through the funding of several European projects and the MSP Assistance Mechanism, MSs have received guidelines, funding and networks to work together and exchange good practices. During the MSPMED project, the active participation of several project members in the activities of the Technical Expert Group on data for MSP allowed them to test and rapidly be able to implement the guidelines in view of the publication of national MSP plans in the common EMODnet Human Activities platform. Italy has already made the initial contacts to start the ingestion process in the EMODnet platform, while other countries have laid the groundwork to do so in the coming months.

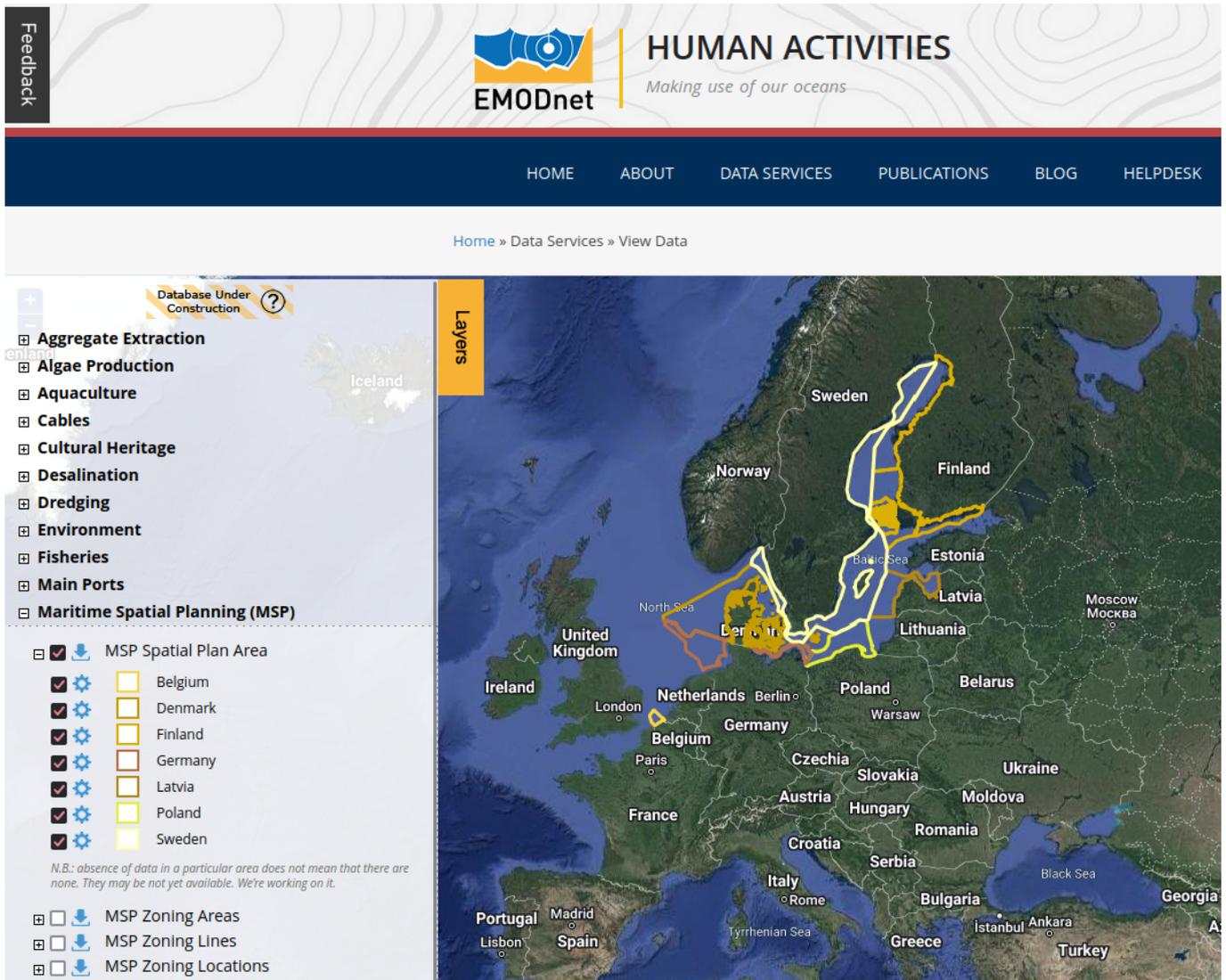


Figure 4: the *View Data* interface of EMODnet Human Activities portal showing the MSP data layers. So far only Member States in the North and Baltic Seas have finalised the upload of their plans in the European platform.

This is only an initial step, to make planning units and vocation areas available in a common way. MSPMED partners are aware that common data models (such as the one proposed in EMODnet) are always a compromise between different approaches, needs and specificities; this is true also here, and the specificities of each national plan (as well as the legal validity of information contained) still have to be referred to the source national portal. In any case, the availability of the MSP plans of (ideally) all Member States in one place would allow easier access and comparison of the main elements of the plans and would especially help cross-border and large-scale analyses. Collaborative initiatives such as the TEG on data for

MSP has for sure helped in this process and should be supported and promoted also in the coming years to continue the exchange of experiences and best practices.

Staying on the topic of technological tools useful for organising data coming from different countries, the MSP Knowledge Catalogue developed in the MSPMED project seeks to fill a void in aggregating and allowing an easier discovery of relevant data used as a basis for the national MSP plans. The aim is not substituting the original portals, but to support cross-border and cross-domain use cases and questions that are hard to be answered by multiple access points. As with data, metadata also needs to be kept up-to-date to enable users to discover and then access relevant information; this needs a coordinated effort by all the metadata providers to semantically align MSP-related terms and codelists so that aggregator systems, such as the MSP Knowledge Catalogue, can automatically retrieve new and updated information directly from the source.

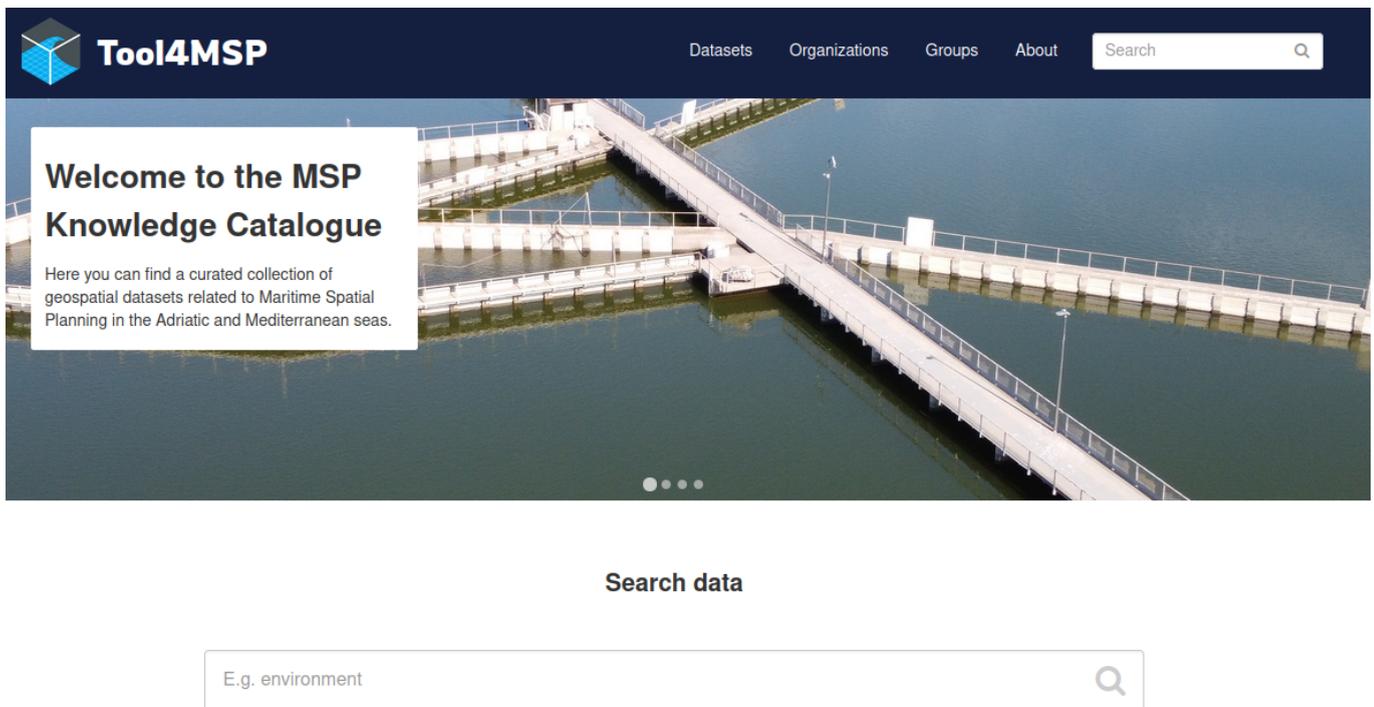


Figure 5: homepage of the MSP Knowledge Catalogue.

An additional element, which is currently not available in almost any MSP-related portal or platform, is the re-use of data and information in advanced tools for analysis and production of integrated results. With increasing data availability and its standardisation and interoperability (which it is hoped to progressively improve), decision support tools (e.g. tools for cumulative effects assessment, aquaculture zoning, etc.) based on the best available data can really

improve the process of analysis and assessment of environmental conditions and interactions with sea uses.

One element that has been mentioned in several occasions and meetings is the importance of fostering connections with states in the southern part of the Mediterranean; although they are not bound by the requirements of the EU MSP Directive, the issues they face in protecting the marine environment and managing the uses of the sea are very similar. Similarly, data-related issues, such as the need to share information on an inherently transboundary domain as within the Mediterranean sea, require a common vision and approach. To this end, collaboration and exchange of experiences and best practices between MSPMED partners and international organisations such as UNEP/MAP (Mediterranean Action Plan) have been pursued with great care and determination during the project and are crucial in the future for the achievement of common goals also in data sharing and reuse.

A global challenge, which is by no means unique to MSP, is climate change: it has very significant effects of various environmental components both on land and at sea, which in turn cause effects on uses at sea. In this continuously evolving framework, it is fundamental that the *data ecosystem* of portals, services, tools, and knowledge is able to evolve and adapt to support such changes. Data (and underlying metadata) has to be updated (or newly collected) when the analysed domain changes, technological frameworks evolve in the way data are collected, managed, stored, shared and the semantic knowledge and description of observed features and phenomena need to enrich to follow the evolving concepts coming out from the integration of uses and environmental component happening at sea.

Key for the assessment, monitoring and future evolution of plans is also considering the MSP as a recurrent process, requiring continuous data integration and an adaptive management able to learn from past management actions to improve future planning. For this purpose, the development of common indicators for the achievement of plan objectives should be a common effort by all member states.

One of the reasons why data should be organised and shared widely and efficiently is also to allow effective stakeholder engagement by providing access to the best available knowledge on the marine space and maritime activities, as well as how they impact each other, the marine ecosystems and the services they provide. This aspect can be considered from a dual perspective, i.e. both from the point of view of information and dissemination of results, and from the point of view of stakeholders participation in the collection and/or evaluation of data and information. With regard to the first perspective, data can play an important role in communicating what information was considered to be the basis for defining the vision and objectives of the plan, and to disseminate in a simple the measures necessary to achieve these objectives and the development of tools such as the geo stories (or story maps) could be efficient means to communicate even complex messages. The second point instead would require a comprehensive and structured participatory approach which might also include

citizen science activities to fully engage stakeholders and citizens and a dynamic interaction between the MSP process and society through a process of knowledge co-production.

Even more important is the issue of the involvement of the private sector or other commercial entities in the collection of data; in fact, many uses of the sea deal with energy companies, transport and tourism operators, trade and professional associations and so on. These data, and other non-authoritative data, such as research data, are sometimes difficult to access and rarely considered when assessing current conditions and future trends. This is not a trivial task and requires strategic vision and action at local, national and European level, but it could drastically improve the level of knowledge of the system and thus also decisions based on that knowledge.

This also touches another related point, namely the promotion of a fully FAIR and open data ecosystem. FAIR refers to data which are of findable, accessible, interoperable, and reusable⁹, while open can be understood as “content that can be freely used, modified, and shared by anyone for any purpose”¹⁰. Of course, there are many reasons why some data are not currently FAIR (starting with the lack of resources, personnel and expertise to transform data in this way) or are not open (primarily security, privacy or commercial issues), but striving towards these goals is also one of the main aims of the European data strategy¹¹, which aims to foster data-driven innovation and create a single market for data for the benefit of the whole society.

⁹ Wilkinson et al. (2016). "The FAIR Guiding Principles for scientific data management and stewardship". *Scientific Data*. **3** (1): <https://doi.org/10.1038/sdata.2016.18>

¹⁰ <http://opendefinition.org/>

¹¹ https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

4 Annex 1 - Questionnaire on sharing and consolidation of MSP data and information needs

This questionnaire is part of the WP3 and specifically the activity 3.1.1 *Sharing and consolidation of data and information needs*, under the task 3.1 "Building and sharing a common knowledge catalogue".

It aims at collecting information on how member states are (or will be) organising data and information needs that guide the implementation of their maritime spatial plans and at creating a common harmonised definition of the types and categories of data that has to be considered as the least common denominators

This questionnaire has a strong focus on geospatial information, but its not all about that: data needs can be clearly also fulfilled through non-spatial information (contained in tables, reports, statistics, ...) that might not already be organised in structured databases or shared via interoperable portals/services/platforms. Therefore, this information has to be considered when answering to this questionnaire.

Activity 3.1.1 has also strong links with—and is the basis for—the subsequent WP3 activities in task 3.1, (i.e. 3.1.2 "Implementation of a common MSP knowledge catalogue of metadata" and 3.1.3 "Analysis of the current data gaps and weaknesses and proposal of a methodological guidance on sharing data and information.") where additional inputs of management, structure and accessibility of the information will be required.

Each MSPMED partner is asked to answer to the following questions, collecting information from the responsible institutions/authorities in their own member state.

Section 1: National MSP portal

1.1 Does your country have (already or is considering building) a national GeoPortal for MSP?

.....

If the answer to the question 1.1 is **yes**:

1.2.1 Please describe his implementation status (e.g. Not yet started, In progress, Functionalities ready but not data, Data ready but not functionalities) and who is developing/managing it.

.....

1.2.2 In case it is already public and accessible please provide its URL

.....

1.2.3 Please describe its main goals (e.g inform about MSP concepts, process, outputs; share final plans; share input data; provide tools to interact/build/analyse with information/data)

.....

1.2.4 What are the targeted users and the access policies? (e.g. access to the portal restricted to regulators (national bodies and regional administrations; controlled access to researchers, administrations, experts; general public: citizens, NGOs, ...)

.....

If the answer to the question 1.1 is **no**, please describe:

1.3.1 How data and information are planned to be shared, to whom and through what data policy?

.....

1.3.2 What tools/procedures are going to be used for accessing data and information?

.....

Section 2: Input Data

2.1 What are the most important data needs (data topic categories) that are at the basis of the National Plan in your country? (*consider that some of the categories can contain different types*

of information, e.g "Fishing" can be about distribution of fishing effort or delimitation/regulation/planning of no-fishing area)

Please list them reusing terms from the following list¹² or expand/detail it:

- Boundaries
 - terrestrial
 - marine
- Activities/uses
 - Raw material extraction
 - Dumping materials
 - Aquaculture
 - Cables and pipelines
 - Nature and species protection and conservation
 - Fishing
 - Oil and gas
 - Renewable energies
 - Military
 - Ports
 - Maritime transport routes and traffic flows
 - Scientific research
 - Tourism and recreation
 - Underwater cultural heritage
 - Coastal land uses/activities
- Physical/Chemical/Biological information
 - Pressures and impacts
 - Biological characteristics
 - Types of habitat
 - Physical characteristics
 - Chemical characteristics
- Socio economic data
 - Human population
 - Economic indicators
 - Social indicators
- Other

.....

¹² This list has been derived from a comparison among various other MSP data categories lists related to different initiatives/projects (see Table 1)

2.2 Are there specific data in your country that you would classify as highly relevant with respect to cross-boundary issues? Please list and describe them.

.....

2.3 Could you list the most relevant data providers to your national MSP process, describing also which data topic categories they are contributing to?

.....

Section 3: Output data (i.e. maps/layers in the plan produced through the MSP process)

3.1 Do you already have a list of maps/cartographic outputs that your country will produce in the National Plans? Could you please describe them?

.....

3.2 Does the plan include or provide for a division into maritime areas/sub-areas and specific planning units? Could you describe the geographical delineation of the subdivisions (and/or provide direct link to its spatial representation, if available)?

.....

3.3 Could you describe if and how the plan is going to define/categorise the types of access/use of the planning units (e.g. *through specific output maps or other tools*)? Have these categories already been defined (e.g. *priority, reserved, allowed, restricted, forbidden*)?

.....

3.4 Do you plan to produce (or do you see a potential for producing) indicators maps to be included in the plan and/or in the geospatial portal? What type of indicators are you going to use/produce?

.....

Section 4: Monitoring data

4.1 Please describe if and how data on monitoring of the plan are or will be managed in the national MSP process, and current or potential connections with the MSFD monitoring programs.

.....

5 Please provide any additional information useful to describe your national data and information needs for the MSP process.

.....

Table 1: Comparison of data categories from different projects/initiatives.

Data categories	EMODnet themes	MSP EMODnet themes	MSP directive themes	Helcom themes	Baltic sea	SUPREME/PORTODIMARE MSP Data study	
Boundaries		Boundaries		Administrative borders		Maritime/terrestrial boundaries	Boundary data
	Aggregate Extraction	Raw material extraction	raw material extraction areas	Raw material extraction	Raw material extraction areas	Raw material extraction areas	Raw material extraction areas
	Aquaculture	Aquaculture (include algae)	aquaculture areas	Aquaculture	Aquaculture	Aquaculture	Aquaculture
	Algae Production						
	Cables	Cables	submarine cable and pipeline routes	Cables and pipelines	Submarine cable and pipeline routes	Submarine cable & pipeline routes	
	Pipelines	Pipelines					
	Dredging	Dredging					
	Environment	Nature Protection/Conservation	nature and species conservation sites and protected areas	Nature protection	Nature and species conservation	Nature and species conservation sites & protected areas	Nature and species conservation sites & protected areas
	Fisheries	Fishing areas	fishing areas	Fishing areas	Fishing	Fishing	Fishing
	Ocean Energy Facilities	Ocean Energy Facilities	installations and infrastructures*	Installations and infrastructures	Installations and infrastructures		
Activities/uses	Oil and Gas	Oil and Gas				Oil and gas	
	Wind farms	Wind farms				Renewable energy	Renewable energies
	Nuclear Power Plants						
		Military areas; already expected to be included in EMODnet (ongoing).	military training areas	Military training	Military areas	Military	Military
	Main Ports	Ports				Ports	
	Shipping density	Maritime traffic flows (renamed label)	maritime transport routes and traffic flows	Maritime transport	Maritime transport routes and traffic flows	Maritime transport and traffic flows	
	Waste disposal	Waste disposal (at sea; exclude at ports).					
		Scientific research	scientific research	Scientific research	Scientific research	Scientific research	
		Tourism and recreation	tourism	Tourism and recreation	Tourism	Tourism & recreation	Tourism & recreation
	Cultural heritage	Cultural heritage	underwater cultural heritage	Underwater cultural heritage	Underwater cultural heritage	Underwater cultural heritage	Underwater cultural heritage
	Wrecks						
				Coast protection	Coastal defence Coastal land uses / activities		
Physical/Chemical/Biological information						Pressures and impacts	Pressures and impacts
						Biological characteristics	Biological characteristics
						Types of habitat	Types of habitat
Socio-economic data						Physical characteristics	Physical characteristics
						Human population	Human population
						Economic indicators	Economic indicators
						Social indicators	Social indicators
	Other Forms of Area Management/Designation	Other/miscellaneous (NEW)			Other General		