
# MSP Data Study

## Evaluation of data and knowledge gaps to implement MSP

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## Acronyms

| | |
|---|---|
| **BSH**: | Bundesamt für Seeschifffahrt und Hydrographie |
| **CBSS**: | Council of the Baltic Sea States |
| **CCS**: | Carbon Capture and Sequestration |
| **CIS**: | Coastal Information System |
| **DAR**: | Data Adequacy Report |
| **DG MARE**: | Directorate-General for Maritime Affairs and Fisheries |
| **DSS**: | Decision Support System |
| **EBA**: | Ecosystem Based Approach |
| **EC**: | European Commission |
| **EEZ**: | Exclusive Economic Zone |
| **EMODnet**: | European Marine Observation and Data Network |
| **ESPON**: | European Observation Network for Territorial Development and Cohesion |
| **EU**: | European Union |
| **GIS**: | Geographic information System |
| **HELCOM**: | Helsinki Commission |
| **ICES**: | International Council for the Exploration of the Sea |
| **ICZM**: | Integrated Coastal Zone Management |
| **INSPIRE**: | Infrastructure for Spatial Information in Europe |
| **MARSPLAN BS**: | Maritime Spatial Planning in the Black Sea |
| **MEMS**: | Marine Environment Monitoring Service |
| **MIS**: | Marine Information System |
| **MMO**: | Marine Management Organisation |
| **MPA:** | Marine Protected Area |
| **MSFD**: | Marine Strategy Framework Directive |
| **MSP**: | Maritime Spatial Planning |
| **MV**: | Mecklenburg-Vorpommern |
| **VASAB**: | Vision and Strategies around the Baltic Sea |

## Abstract

The MSP Data Study, undertaken on behalf of DG MARE between February and December 2016, presents an overview of what data and knowledge are needed by Member States for MSP decision making, taking into account different scales and different points in the MSP cycle. It examines current and future MSP data and knowledge issues from various perspectives (i.e. from Member States, Sea Basin(s) as well as projects and other relevant initiatives) in order to identify:

- What data is available for MSP purposes and what data is actually used for MSP;
- Commonalities in MSP projects and Member State experiences;
- The potential for EMODnet sea basin portals to help coordination of MSP at a regional level and options for realising marine spatial data infrastructures to implement MSP;
- Potential revisions to be made concerning INSPIRE specifications for MSP purposes.

The study finds that across all European Sea Basins, countries are encountering similar issues with respect to MSP data needs. Differences are found in the scope of activities and sea uses between Member States and Sea Basins and the type of planning that is being carried out. Common data gaps include socio-economic data for different uses and socio-cultural information. By and large, data and information gaps are not so much about what data is missing but more about how to aggregate and interpret data in order to acquire the information needed by a planner. Challenges for Member States lie in developing second generation plans which require more analytical information and strategic evidence. Underlying this is the need for spatial evaluation tools for assessment, impact and conflict analysis purposes. Transnational MSP data needs are different to national MSP data needs. While the scope and level of detail of data needed is typically much simpler, ensuring its coherence and harmonisation across boundaries remains a challenge. Pan-European initiatives, such as the EMODnet data portals and Sea Basin Checkpoints have the potential to support transboundary MSP data exchange needs by providing access to a range of harmonised data sets across European Sea Basins and testing the availability and adequacy of existing data sets to meet commercial and policy challenges.

## Executive Summary

### *Background*

The Technical Study on "Evaluation of data and knowledge gaps to implement MSP" (MSP Data Study) is one of the tasks in year 1 of the contract "Assistance Mechanism for the Implementation of Maritime Spatial Planning". The objective of this contract is to provide administrative and technical assistance to Member States in the implementation of the Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning[1].

The MSP Data Study presents an overview of what data and knowledge are needed and used by Member States for MSP decision making, taking into account different scales and different points in the MSP cycle. Specifically, it provides:

- A Sea Basin analysis of what data is available for MSP purposes and what data is actually used for MSP, indicating where there are technical and political issues concerning accessibility and availability of the data, and gaps in information;
- Insight into the 'commonalities' identified in MSP projects and Member State experiences;
- A discussion on the potential for EMODnet sea basin portals to help coordination of MSP at a regional level and options for realising marine spatial data infrastructures to implement MSP;
- An evaluation of the potential revisions to be made concerning INSPIRE specifications for MSP purposes.

### *Added Value*

Recognising that Member States are all at different stages of implementing the MSP directive, the study aims to gain a better understanding of MSP data and knowledge issues from the Member State planner's perspective and enable a coherent transfer of knowledge across 23 Member States, highlighting what countries can learn from each other.

By carrying out a systematic analysis of what has already been done and where, the study seeks to identify similarities and differences between Sea Basins and transfer key outputs and synergies. The study does not identify a minimum set of data requirements that countries should use. It considers national developments and Sea Basin approaches, examining where the EU can add value to the implementation of MSP by Member States by providing a framework to assist Member States with their MSP processes (as far as data are concerned) and identifying future EU funding priorities and policy recommendations at a sea basin and macro-regional level.

[1] OJ L 257/135

***Approach***

The timeframe of the study, including the conclusion of the final report, was 10 months, running from mid-February to mid-December 2016. The approach was organized into **three phases**.

**First**, desk research along three lines of investigation was carried out, as follows:

An analysis of planners' needs.

An in-depth review of projects and initiatives with relevance to MSP data needs.

An in-depth review of data infrastructures with relevance to MSP data needs.

**Second**, the study sought to verify the findings of the desk research with Member States and validate the actual needs of planners. To do this, the results from the desk research were compiled into a spreadsheet, which was distributed to MSP Member State Expert Group representatives for review along with a communication providing guidelines on the type of interview questions we wanted to discuss with them. All Member States made important contributions to the verification process. While the level of detail with which we could engage with different countries varied because Member States are at different stages in terms of implementing MSP in their respective countries, all the Member State inputs were incorporated and appreciated.

In the **third** phase of the study, the combined results of the desk research and verification process were synthesised into Sea Basin perspectives and priorities and suggestions for DG MARE were identified.

***Key findings, conclusions and ways forward***

The overall aim of this study was to gain a better understanding of current and future MSP data and knowledge issues from various perspectives (i.e. Member States, Sea Basin(s) as well as projects and other relevant initiatives) in order to identify practical suggestions for:

- the current MSP processes undertaken at Member State level, as well as,
- future initiatives that could be supported by the EU to assist Member States with the implementation of MSP (be it in the framework of the current ongoing MSP Assistance Mechanism, other service / study contracts or policy initiatives).

To do this, we made an assessment of a) what data and information is actually needed by planners at different stages of the planning process, b) which data categories and data sets this translates into, and c) what are the key knowledge gaps. With this in mind, there are three areas under which the key findings are summarized.

- Data and information needs
- Transboundary exchange of data
- The role of pan-European initiatives

**Data and information needs**

### *… similarities*

Across all European Sea Basins, countries are trying to do similar things with respect to MSP data leading to similar type of issues related to MSP Data needs.

Data categories currently used by MSP planners to collect evidence to inform existing plans and pilot plans essentially show many similarities.

Most sectors (shipping, energy, mineral extraction, recreation, nature conservation, telecommunications, fishing, underwater cultural heritage, military) are present in every plan reflecting the essentially similar nature of maritime activities in each country but also slight differences in how each sector is described and analysed.

### *… differences*

Differences in the scope of activities and sea uses between Member States and Sea Basins are mostly related to the weight given to each sector in terms of diversity of data specified and specific expression of the sector (e.g. whether offshore energy refers to offshore wind farming, wave energy, CCS, oil and gas, etc.).

Moreover, what is different is the level of importance given to data issues depending on where countries are with regard to their MSP process, the level of availability of data in different countries and the specific geographic, economic and cultural differences between the Sea Basins. In the first phase of planning, data and information needs relate to evidence which describes the current situation, called stocktaking, baseline or current status information. In subsequent planning phases, evidence needs become more complicated and relate to analysis of conflicts and synergies, spatial and environmental compatibility of different activities and impact assessments, as well as future scenarios for sea use management.

**Most importantly, the study has shown that MSP data and information needs strongly depend on the type of planning that is carried out, i.e. spatial optimisation and risk minimisation approach, fully integrated, forward-looking approach or somewhere in between. Even with the 'MSP Framework Directive', types of planning differ across countries due to different geographic, legal, economic, cultural as well as spatial planning backgrounds of the countries in question.**

#### *… the need for socio-economic data to go into MSP*

Common data gaps are found under the categories of socio-economic data for different uses/activities, commercial fisheries data and socio-cultural information. At the same time, it should be noted that socio-economic data is present. The issue is that it is badly compartmented and therefore difficult to extract marine component of socio-economic data. Existing data sets are often not useful for MSP purposes. As an example, no distinction is made between terrestrial and maritime socio-economic data, which makes it difficult to quantify the proportion to be attributed to maritime activities (e.g. tourism or shipping: is it inland or port traffic or sea movements?)

**Most significant differences are found in the use of socio-economic data in a plan. Only few datasets relate to the wider socio-economic environment. Older plans are less likely to include socio-economic type of information but all of the more recent drafts or plans make some reference to it, indicating the importance of this data category for the future.**

*Several Member States thought it would be useful to collect, share and discuss some of the initial progress being made on methods to extract marine socio-economic data, the kind of evidence that could be used to describe the marine socio-economic environment and the impacts of maritime industries on the adjoining coast and wider economy.*

Moreover, socio-cultural information is almost entirely lacking, even though it would be especially important in the context of implementing the ecosystem based approach.

While the concept of ecosystem services has advanced over the last decade, along with theoretical methods for valuation, actually quantifying the value of ecosystem services in a practical way remains a struggle for planners.

*There is a need for tools and guidance on how to practically factor in the value of ecosystem services into plans. From our knowledge gathered throughout the overall MSP Assistance Mechanism we are aware that some countries are already making noticeable advances in this field. Thus, before going into any further steps it would be useful to share and discuss the knowledge gained on these efforts across other EU Member States.*

### *… linking MFSD and MSP data efforts*

Physical and biological data are often related to the MSFD categories and in some cases are drawn directly from MSFD assessments. Where there are direct links to MSFD assessment, the descriptive data categories also include human pressures and occasionally the sources of such pressures (e.g. marine litter, marine underwater noise, point sources of pollution).

*Linking MSFD and MSP efforts in this manner seems an effective way of ensuring MSP is based on sound environmental evidence; in turn, it is a way of ensuring that MSP is able to contribute to achieving the objectives of the MSFD. It makes sense to make this relationship explicit and to encourage countries to link their MSFD process to supplying physical and biological evidence for MSP, as a basis for implementing the Ecosystem Based Approach.*

### *… moving from descriptive to strategic evidence*

Having said all this, the demand for actual data for MSP purposes is often overestimated. For actual planning, one does not need much data. What is needed, however, is knowledge about the underlying processes, knowledge to make sound judgements, which indirectly requires data.

What has come out of the study is almost self-evident: the majority of available evidence is descriptive. Strategic evidence is still rare, especially related to future uses and activities and the economic and environmental impact of activities.

*Concerning data and information gaps, the issue is not so much about data but more about aggregated data. In other words, it is not so much about* ***what data*** *but more* ***how to aggregate and interpret the data*** *in order to acquire the information needed by the planner.*

More attention should be paid to assessment methods including assessment and solutions to conflicts, analysis of the spatial dimension of future trends and building the core of an MSP evidence-base. It has to be noted that, especially at project level, some initial assessment tools have been developed, but it seems that those are a) either not used as they may not fit the purpose of 'real' MSPlanners or b) that they are not known to MSPlanners or c) that the potential scope of how they could be used is not communicated sufficiently. It remains to be seen, how and whether tools, which are currently developed within the newest generation of projects, with strong involvement of the MSP authorities, will gain higher acceptance.

*It is clear that there is a need for more information about cause-effect relations as well as about cumulative effect of different pressures, for example, the effect of diverse uses of the marine space on the environment and ecosystems (e.g. in combination with climate change and other factors) as well as conflict analysis.*

**Countries are confident with stocktaking and the descriptive part of MSP status quo assessments. The challenge lies in developing second generation plans which require more analytical information and strategic evidence. There is a need for spatial evaluation tools for assessment, impact and conflict analysis purposes. Moreover more and better tools are needed for analysis of the spatial dimension of future trends and related future scenario planning.**

*Promote the exchange of practices, which relate to the aggregation and interpretation of data and information.*

*Promote the exchange on existing spatial evaluation tools for assessment, impact and conflict analysis.*

*As regards future scenario tools, it makes sense first to exchange existing as well as developing practices within currently ongoing projects.*

*In all cases, however, it is anticipated that it will not be sufficient to exchange*

**Transboundary data exchange**

### *… across institutions as well as countries*

It should be highlighted that an integrated approach like MSP describes a new philosophy and practice of coastal and marine governance, demanding no less than a paradigm shift in marine management[2]. In order to achieve true integration, MSP requires unprecedented levels of collaboration - between national ministries and authorities, between MSP authorities and stakeholders, and between stakeholders. This is likely to require more than a little extra participation or a few added mechanisms for dialogue. **A paradigm shift is needed in how authorities and stakeholders work together**, based on an understanding of the complex processes involved in MSP, the timescale this requires and also the constraints and opportunities of collaboration within and across borders, especially also within a data and information context.

Moreover, MSP needs to strike a **balance** between **transnational and national concerns and scales, flexibility and stability, inclusiveness and exclusiveness, fast and slow action**, and **continuity and discontinuity**. All of these also apply to data and information exchange.

With regard to scale and speed of decision-making for example, strategic long-term planning needs to be combined with licensing decisions, each of which require different types of data at different levels. Shared visions for regional seas need to be translated into national and sub-national spatial policy, again requiring different data and levels of detail. Moreover, data cannot be separated from inclusiveness, where experience so far has shown that information needs to be inclusive rather than exclusive if conflicts are to be avoided. This not only means involvement of different stakeholders, but also acceptance of other beliefs, values and knowledge as legitimate contributions to the debate. This kind of inclusiveness and the acceptance of different types of knowledge can generate a sense of fairness and trust in data-related proceedings, which in turn increases support for decisions and the decision-making process (Kannen et al., 2012, see footnote).

[2] Kannen et al., 2012. KnowSeas Deliverable 5.3: Assessment of environmental governance structures and specific case studies in Europe's Regional Seas.

Last not least, it is worth remembering that tensions exist with respect to data continuity and flexibility. For example, sharing data between institutions and countries requires a certain level of trust and good faith. Building trust is a time-consuming process which requires continuity of institutions and also continuity within institutions (for example, regular meetings and staff continuity). At the same time, continuity can become an obstacle if it turns into inflexibility and procedural lock-in and the inability to respond to changing circumstances (Kannen et al., 2012, see footnote).

**There is a need to regularly evaluate data collection procedures and the continued value of data and knowledge that is being collected.**

### *… specifics of transnational data exchange*

**Transnational MSP data needs are different to national MSP data needs. The scope and level of detail of data needed is typically much simpler, however, ensuring its coherence and harmonisation across boundaries remains a challenge.**

Underlying issues with respect to transboundary MSP data exchange include limited data interoperability due to different data protocols and formats, different languages between countries, the need for high level political agreement as well as good cooperation between local and regional interest groups.

The study has shown that the Baltic Sea Region can be seen as a frontrunner with respect to transboundary MSP data exchange, which may be due to the long-term history of collaboration between institutions and even people involved – mainly gained at project level, which provides evidence in itself that data sharing requires a high level of trust.

At the same time it should be noted that even the Baltic Sea Region is only still at the beginning of true transboundary data exchange with a long road ahead before arriving at operational transboundary MSP data exchange in this region. Nevertheless, the example of the Baltic Sea Region does highlight the need for regions to develop strategic visions which can steer project development and ensure continuity and efficient use of resources and infrastructure, thus, securing that experiences are passed on from one project to another.

*Continue EU support for transboundary MSP projects and initiatives, especially applied projects, which are led by and involve MSP authorities. Even though such a project approach is recommended across all Sea Basins, this needs to be complemented by funding mechanisms, which support more longer term strategic networks (along the example of EMODNet), which provide for a systematic approach, while at same time making use of a variety of implementing parties.*

#### The role of pan-European initiatives

The INSPIRE spatial themes potentially provides a useful framework for establishing coherence and harmonisation of spatial data both sub-nationally between different

agencies and on a transboundary level, but they are not exclusively the solution to resolving inter-agency or transboundary spatial needs for MSP.

Most of the MSP data themes can be mapped directly onto INSPIRE data themes, with a few exceptions found under fishing, renewable energies, tourism, ports and spatial policy.

**Most notably, however, economic data is not considered at all within the scope of the INSPIRE spatial themes.**

*There is a need to consider expanding the scope of INSPIRE spatial themes to allow for economic data and / or expand the definitions of INSPIRE data themes for MSP purposes, in particular with respect to fishing, renewable energies, tourism and ports.*

**Moreover, as MSP evolves, newer, more complex data categories may evolve which cannot be catered for within the INSPIRE framework.**

*As the two directives evolve in parallel, it would be useful to promote exchange of* ***knowledge*** *between the two, e.g. similar to work already undertaken with MSFD and INSPIRE through Marine Pilot Project.*

Other complementary initiatives should be considered in the context of transboundary spatial needs for MSP. For example, the **European Marine Observation and Data Network (EMODnet) already delivers harmonised transboundary marine spatial data for a number of relevant MSP data categories (i.e. bathymetry, geology, seabed habitats, chemistry, biology, physics, human activities and coastal mapping) covering all European sea-basins**. EMODnet is working closely with the Joint Research Centre (JRC) to ensure that the data portals are fully INSPIRE compliant, a process which has revealed some discrepancies in the data models which are being resolved.

The various EMODnet data portals developed as a series of projects under the DG MARE Marine Knowledge 2020 Strategy policy initiative illustrate the importance of long term data initiatives which not only provide access to data but also have a role to play as data stewards ensuring that the data generated through various means, including research projects, are safeguarded and made available for re-use beyond the life time of a project.

**The EMODnet data portals are all relevant for regional maritime spatial planning and transboundary data exchange. The recent addition of the EMODnet Human Activities data portal (www.emodnet-humanactivities.eu) is particularly relevant as it provides access to an expanding range of harmonised datasets covering human activities across all European Sea Basins. In the future, the EMODnet Human Activities data portal could also host national MSP data layers for visualisation and download.**

**The EMODnet Sea Basin Checkpoint results are all of high interest to MSP authorities.**

*Promote a wider dissemination of EMODnet Sea Basin Checkpoint results to MSP authorities.*

## Résumé


### *Contexte*

L'étude technique sur «L'évaluation des données et des lacunes dans la mise en œuvre de la planification de l'espace maritime» (ou Étude des données relatives à la planification de l'espace maritime) est l'une des missions de l'année 1 du contrat «Mécanisme d'assistance pour la mise en œuvre de la planification de l'espace maritime». Ce contrat a pour objectif de fournir une assistance technique et administrative aux États membres dans l'application de la directive 2014/89/EU du Parlement Européen et du Conseil du 23 juillet 2014 établissant un cadre pour la planification de l'espace maritime[3].

L'étude de données relatives à la planification de l'espace maritime présente une vue d'ensemble des données et des connaissances dont les États-Membres ont besoin pour prendre leurs décisions, en prenant en compte les différentes échelles et étapes dans le cycle de planification de l'espace maritime. Plus spécifiquement, elle fournit:

- Une analyse des données disponibles dans chaque bassin maritime pouvant être utilisées pour la planification de l'espace maritime, identifiant les problèmes techniques et politiques concernant l'accessibilité et la disponibilité des données ainsi que les lacunes d'information ;
- Un aperçu des 'similitudes' identifiées dans les projets de planification de l'espace maritime et les expériences des États-membres ;
- Une évocation des potentialités des portails de bassin maritime EMODnet pour aider à la coordination de la planification de l'espace maritime au niveau régional ainsi que des options pour réaliser des infrastructures de données géographiques maritimes afin de mettre en œuvre la planification de l'espace maritime ;
- Une évaluation des révisions potentielles de la directive dite INSPIRE en matière de planification de l'espace maritime.

### *Valeur ajoutée*

Reconnaissant que tous les États membres sont à des stades différents de mise en œuvre de la directive sur la planification de l'espace maritime, cette étude se propose d'offrir une meilleure compréhension des problèmes en matière de savoir et de données sur la planification de l'espace maritime, du point de vue des planificateurs des différent États membres, afin de permettre un transfert de savoir cohérent dans les 23 États membres et souligner ce que les pays peuvent apprendre les uns des autres.

En effectuant une analyse systématique de ce qui a déjà été fait dans différents pays, l'étude vise à identifier les similitudes et les différences entre bassins maritimes et transférer les résultats et les synergies clés. L'étude ne spécifie pas de quantité minimum de données devant être utilisées par les différent pays. Dans une approche tenant


[3] JO L 257/135

compte des évolutions nationales et par bassin, elle étudie où l'UE peut valoriser la mise en œuvre de la planification de l'espace maritime en offrant un cadre pour assister les États membres dans le processus de planification de l'espace maritime (du moins au niveau des données) et identifie les futures priorités de financement et de recommandations politiques au niveau des bassins maritimes et macro-régionaux.

***Approche***

L'étude, jusqu'à conclusion du rapport final, s'est déroulée sur une période de 10 mois, de mi-février à mi-décembre 2016. L'approche s'est présentée en **trois phases**.

**Premièrement,** une analyse documentaire a été menée sur les trois axes de recherche suivants :

Une analyse des besoins des planificateurs.

Un examen approfondi des projets et initiatives présentant un intérêt en matière de données nécessaires à la planification de l'espace maritime.

Un examen approfondi des infrastructures de données présentant un intérêt pour la planification de l'espace maritime.

**Dans un deuxième temps,** une vérification des résultats de l'analyse documentaire a été conduite auprès des États membres afin de valider les besoins réels des planificateurs. Pour y parvenir, les résultats de la recherche documentaire ont été compilés dans une feuille de calcul distribuée aux représentants des États membres siégeant au sein du groupe d'experts de planification de l'espace maritime afin d'être révisés. Une note exposant les questions que nous souhaitions aborder avec eux leur a également été fournie. Tous les États membres ont apporté une contribution importante au processus de vérification. Bien que le niveau de détail soit très variable d'un État membre à l'autre, ceux-ci se trouvant chacun à des stades différents en termes de mise en œuvre de planification de l'espace maritime, les avis de tous les États membres ont été pris en compte et fortement appréciés.

La **troisième** phase de l'étude a consisté en une synthèse des résultats de l'analyse documentaire et du processus de vérification selon les perspectives et priorités des bassins maritimes, et a permis d'identifier des suggestions à formuler à la DG MARE.

***Résultats clés, conclusions et pistes de réflexion***

Cette étude vise une meilleure compréhension des problèmes actuels et futurs en matière de savoir et de données liés à la planification de l'espace maritime en prenant en compte différentes perspectives (États membres, bassins maritimes, projets et autres initiatives notables) afin d'identifier des suggestions pratiques concernant:

- les processus actuels de planification de l'espace maritime au niveau des États membres,
- les initiatives futures pouvant être soutenues par l'UE pour aider les États membres à mettre en œuvre la planification de l'espace maritime (que ce soit dans le cadre du mécanisme d'assistance, d'autres services / contrats d'étude ou d'initiatives politiques).

Pour atteindre cet objectif, cette étude examine a) de quelles données et informations ont besoin les planificateurs aux différentes étapes de la planification, b) quelles catégories et séries de données sont concernées, et c) quelles sont les principaux manques de connaissance. Dans cette optique, les résultats clés ont été résumés en trois axes.

- Besoins en données et informations
- Échange transfrontalier de données
- Rôle des initiatives paneuropéennes

**Besoins en données et informations**

### *… similitudes*

Dans tous les bassins maritimes européens, les États prennent des initiatives similaires en matière de données relatives à la planification de l'espace maritime, ce qui conduit aux mêmes types de problèmes.

Les catégories de données utilisées par les planificateurs pour collecter des données afin de façonner les plans existants et les plans pilotes présentent de nombreuses similitudes.

La plupart des secteurs (la navigation, l'énergie, l'extraction minière, les loisirs, la protection de l'environnement, les télécommunications, la pêche, le patrimoine culturel subaquatique, la défense) sont présents dans tous les plans et reflètent la nature essentiellement similaire des activités maritimes de chaque pays, mais aussi les légères différences dans la manière dont chaque secteur est décrit ou analysé.

### *… différences*

Les différences dans les champs d'activités et d'utilisations de la mer entre les États membres et bassins maritimes sont principalement liées au poids donné à chaque secteur en termes de diversité des données spécifiées et d'expression spécifique employée pour chaque secteur (par exemple est-ce que la notion d'énergie offshore recouvre les fermes éoliennes offshore, l'énergie hydraulique, la séquestration géologique, le pétrole et le gaz, etc...).

De plus, le niveau d'importance conféré aux problèmes de données dépend du niveau d'avancement des pays dans le processus de planification de l'espace maritime, du niveau de disponibilité des données dans les différents pays et des spécificités géographiques, économiques et culturelles des bassins maritimes. Durant la première phase de la planification, les besoins en données et informations sont relatifs aux documents décrivant la situation actuelle, tels des inventaires, renseignements de base ou informations sur l'état actuel. Dans les phases de planification ultérieures, les besoins de données se complexifient et sont liés à l'analyse des conflits et des synergies, aux compatibilités spatiales et environnementales des différentes activités et études d'impact, ainsi qu'aux scénarios futurs de planification de l'espace maritime.

**Avant tout, cette étude démontre que les besoins de données et d'information pour la planification de l'espace maritime dépendent fortement du type de planification mené, qu'il s'agisse par exemple d'une approche par l'optimisation**

**spatiale et la minimisation des risques, d'une approche pleinement intégrée et prospective, ou d'une approche mixte. Même au sein de la 'directive cadre pour la planification de l'espace maritime', les types de planification diffèrent selon les pays pour cause de différences de contextes géographique, juridique, économique, culturel ainsi que dans leur politique d'aménagement du territoire.**

***… la nécessité d'intégrer les données socio-économiques à la planification de l'espace maritime***

Les manques de données les plus fréquents sont d'ordre socio-économique pour différentes utilisations/activités comme les données sur les pêches commerciales et les informations d'ordre socioculturel. Pourtant, ces données socio-économiques existent bel et bien. Le problème est que celles-ci sont mal sectorisées et qu'il est donc difficile d'en extraire des composantes maritimes. Les séries de données existantes sont souvent inutilisables pour la planification de l'espace maritime. Par exemple, aucune distinction n'est faite entre les données socio-économiques terrestres et maritimes, ce qui rend difficile de quantifier la proportion devant être attribuée aux activités maritimes (ex. pour le tourisme ou la navigation : s'agit-il de mouvements terrestres, maritimes ou de trafic portuaire ?)

**Les différences les plus significatives ont été trouvées dans l'utilisation des données socio-économiques dans les plans. Seules quelques séries de données sont reliées à un environnement socio-économique plus large. Les plans les plus anciens sont moins susceptibles d'inclure des informations d'ordre socio-économique tandis que tous les projets de plans ou plans récents y font référence, ce qui montre l'importance de ces données pour l'avenir.**

*Plusieurs États membres ont estimé qu'il serait utile de recueillir, de partager et de discuter de certains des progrès initiaux réalisés concernant les méthodes d'extraction des données socio-économiques maritimes, du type de données pouvant être utilisées pour décrire l'environnement socioéconomique marin et des impacts des industries maritimes sur la côte attenante et l'économie dans son ensemble.*

De plus, les informations socioculturelles sont pratiquement inexistantes, même si elles paraissent indispensables dans le contexte de la mise en œuvre d'une approche basée sur l'écosystème.

Tandis que le concept de services éco systémiques a évolué durant la dernière décennie en même temps que les méthodes théoriques d'évaluation, la quantification de la valeur de ces services éco systémiques demeure en pratique un défi pour les planificateurs.

*Il existe un besoin en outils et orientations sur la façon de prendre en compte en pratique la valeur des services éco systémiques dans les plans. D'après les connaissances recueillies dans le cadre du Mécanisme d'assistance pour la planification de l'espace maritime, nous sommes conscients que certains pays font déjà des progrès notables dans ce domaine. Ainsi, avant d'aller plus loin, il serait utile de partager et d'évoquer les connaissances acquises grâce à ces travaux à travers d'autres États membres de l'UE.*

### *….relier les travaux de collecte des données de la directive cadre « stratégie pour le milieu marin » (DCSMM) et de la planification de l'espace maritime*

Les données physiques et biologiques collectées correspondent souvent aux catégories de la DCSMM et sont dans certains cas directement tirées des évaluations relatives à celle-ci. Quand des liens directs sont disponibles vers les évaluations de la DCSMM, les catégories de données descriptives incluent également la pression humaine et parfois les sources de telles pressions (par ex. les déchets marins, les sons sous-marins, les sources ponctuelles de pollution).

*Lier les efforts de la DCSMM et ceux de la planification de l'espace maritime semble un moyen efficace d'assurer que la planification de l'espace maritime se base sur des données environnementales solides. Par ailleurs, c'est un moyen de s'assurer que la planification de l'espace maritime est en mesure de contribuer à la réalisation des objectifs de la DCSMM. Il est donc logique de rendre cette relation explicite et d'encourager les pays à lier leurs processus relatifs à la DCSMM à la fourniture de données physiques et biologiques pour la planification de l'espace maritime servant de base à la mise en œuvre de l'approche fondée sur les écosystèmes.*

### *… passer de données descriptives à des données stratégiques*

Ceci étant dit, le besoin de données pour la planification de l'espace maritime est souvent surestimé. Il n'y a pas besoin d'énormément de données pour mettre en œuvre une planification. Ce qui est nécessaire, toutefois, c'est la connaissance des processus sous-jacents, connaissance permettant de prendre des décisions éclairées, ce qui requiert indirectement des données.

L'étude permet de dégager un résultat allant presque de soi : la majorité des données disponibles sont descriptives. Les données stratégiques sont encore rares, spécialement en ce qui concerne les utilisations et activités futures, ainsi que l'impact économique et environnemental de ces activités.

*En ce qui concerne les lacunes en matière de données et d'information, la question ne concerne pas tant les données que les données agrégées. En d'autres termes, la question n'est pas tant « **quelles sont les données** » mais plutôt **« comment agréger et interpréter les données** afin d'obtenir les informations nécessaires au planificateur ».*

Les méthodes d'évaluation devraient faire l'objet d'une plus grande attention, notamment l'évaluation et la résolution des conflits, l'analyse de la dimension spatiale des tendances futures et la constitution d'une base de données sur la planification de l'espace maritime. Il convient également de souligner que, spécialement au niveau des projets, certains outils d'évaluation initiale ont été développés. Or, il apparaît que ceux-ci ne sont a) pas utilisés car ils ne conviennent pas aux objectifs de 'vrais' planificateurs de l'espace maritimes ou b) pas connus par les planificateurs ou c) que leur champ d'utilisation potentiel ne fait pas l'objet d'une communication suffisante. Il reste donc à examiner comment et dans quelle mesure les outils actuellement développés dans le cadre de la

nouvelle génération de projets, avec une forte implication des autorités de planification de l'espace maritime, seront mieux pris en compte.

*Il est clairement nécessaire d'obtenir davantage d'informations sur les relations de cause à effet ainsi que sur l'effet cumulatif de différentes pressions, par exemple l'effet des diverses utilisations de l'espace marin sur l'environnement et les écosystèmes (par exemple en combinaison avec le changement climatique et d'autres facteurs) ainsi qu'une analyse des conflits.*

**Les États maitrisent bien les inventaires et les parties descriptives des évaluations du statu quo de la planification de l'espace maritime. C'est le développement de plans de seconde génération nécessitant plus d'informations analytiques et de données stratégiques qui demeure difficile. Il existe un besoin d'outils d'évaluation spatiale à des fins d'examen, d'impact et d'analyse de conflits. De plus, des outils plus nombreux et plus performants sont nécessaires pour analyser la dimension spatiale des tendances futures et la planification de scénarios qui en découle.**

*Promouvoir l'échange de pratiques relatives à l'agrégation et à l'interprétation des données et des informations.*

*Promouvoir l'échange autour des outils d'évaluation spatiale existants pour l'évaluation, l'impact et l'analyse des conflits.*

*En ce qui concerne les outils de futurs scenarios, il serait tout d'abord judicieux d'échanger sur les pratiques existantes et les pratiques en développement dans le cadre des projets en cours.*

*Dans tous les cas, toutefois, on peut s'attendre à ce qu'il ne suffise pas d'échanger sur les pratiques «existantes», mais qu'il faille déployer des efforts spécifiques pour élaborer de nouveaux outils ciblés.*

*Certains États membres ont exprimé l'idée qu'il serait utile de mettre à disposition des fonds européens pour contrôler/auditer les différents processus de planification de l'espace maritime mis en place dans certains pays. L'objectif de cet(te) évaluation/audit serait d'identifier les domaines dans lesquels ces processus pourraient être améliorés ou même rationalisés, à la discrétion de chaque État membre.*

**Échange transfrontalier de données**

### *… entre institutions et états*

Il faut en outre souligner qu'une approche intégrée comme la planification de l'espace maritime décrit une philosophie et une pratique nouvelle de la gouvernance marine et côtière, **ce qui exige un changement de paradigme en matière de gestion**

**marine**[4]. Pour réussir une véritable intégration, la planification de l'espace maritime requiert des niveaux de collaboration sans précédent, entre les ministères et autorités nationales, entre les autorités de planification de l'espace maritime et les parties prenantes, et au sein des différentes parties prenantes. Il faudra probablement un peu plus qu'une petite implication supplémentaire et quelques mécanismes nouveaux pour instaurer le dialogue. **Un changement de paradigme est nécessaire dans la coopération entre les autorités et les différentes parties prenantes,** se basant sur une compréhension des processus complexes entrant en jeu dans la planification de l'espace maritime, le calendrier à mettre en place et également les contraintes et opportunités de collaboration à l'intérieur et au-delà des frontières, en particulier dans le domaine des données et de l'information.

De plus, la planification de l'espace maritime doit créer un **équilibre** entre **préoccupations nationales et transnationales, flexibilité et stabilité, inclusion et exclusion, rapidité et lenteur d'action, continuité et discontinuité**. Tout ceci s'applique également aux données et à l'échange d'informations.

En ce qui concerne l'échelle et la vitesse de prise de décisions par exemple, la planification stratégique à long terme nécessite d'être combinée à des décisions relatives aux permis, chacune requérant des types de données différents à des niveaux variables. Les visions communes pour les mers régionales doivent se traduire dans la politique d'aménagement du territoire nationale et infranationale ce qui, encore une fois, requiert différentes données et niveaux de détail. De plus, les données ne peuvent être séparées de l'inclusion, car l'expérience a montré jusqu'ici qu'il est préférable que l'information soit plutôt inclusive qu'exclusive afin d'éviter les conflits. Ceci signifie non seulement l'implication de différentes parties prenantes, mais aussi l'acceptation d'autres croyances, valeurs et connaissances en tant que contributions légitimes au débat. Ce type d'inclusion et l'acceptation de divers types de connaissances peut générer un sentiment de justice et de confiance dans les procédés relatifs aux données, ce qui accroit le soutien en faveur des décisions et du processus décisionnel (Kannen et al., voir note de bas de page).

Enfin, il faut garder à l'esprit qu'il existe des tensions en ce qui concerne la continuité et la flexibilité des données. Par exemple, le partage des données entre les institutions et les pays requiert un certain niveau de confiance et de bonne foi. Etablir des rapports de confiance est un processus long qui nécessite la continuité des institutions et également la continuité au sein-même des institutions (par exemple, des réunions régulières et de la continuité dans le personnel). En même temps, la continuité peut devenir un obstacle si celle-ci devient synonyme de rigidité et d'enfermement procédural, entraînant une incapacité de réagir à un changement de circonstances (Kannen et al, 2012, voir note de bas de page).

[4] Kannen et al., 2012. KnowSeas Deliverable 5.3: Assessment of environmental governance structures and specific case studies in Europe's Regional Seas.

**Il est donc nécessaire d'évaluer régulièrement les procédures de collecte de données ainsi que la valeur continue des données et du savoir collectés.**

### *… les spécificités de l'échange transnational de données*

**Les besoins transnationaux en données pour la planification de l'espace maritime nationale diffèrent des besoins nationaux. L'éventail et le niveau de détail des données nécessaires est souvent très simplifié, même si assurer leur cohérence et leur harmonisation au-delà des frontières demeure un défi.**

Les problèmes de fond ayant trait à l'échange transfrontalier de données sur la planification de l'espace maritime résident dans l'interopérabilité limitée des données due à différents protocoles et formats de données, des différences linguistiques entre les pays, du besoin d'accord politique à haut niveau ainsi que d'une bonne coopération entre les groupes d'intérêt locaux et régionaux.

Il ressort de l'étude que la Région de la Mer Baltique peut être vue comme pionnière en matière d'échange de données sur la planification de l'espace maritime. Ceci semble dû à une longue tradition de collaboration tant institutionnelle que personnelle, principalement au niveau de projets, ce qui montre bien que l'échange de données requiert un haut niveau de confiance.

En même temps, il convient de remarquer que même pour la région de la Mer Baltique il reste encore un long chemin à parcourir pour parvenir à un échange transfrontalier de données opérationnel en matière de planification de l'espace maritime. Néanmoins, l'exemple de la Région de la Mer Baltique met en lumière la nécessité pour les régions de développer des visions stratégiques pouvant conduire le développement de projets et assurer la continuité et l'utilisation efficace des ressources et infrastructures, tout en garantissant ainsi que les expériences seront transmises d'un projet à l'autre.

*Poursuivre le soutien de l'UE aux initiatives et projets transfrontaliers en matière de planification de l'espace maritime, en particulier les projets appliqués, qui sont dirigés par et impliquent les autorités en charge de la planification de l'espace maritime. Même si une telle approche de projet est recommandée dans tous les bassins maritimes, elle doit être complétée par des mécanismes de financement qui soutiennent des réseaux stratégiques à plus long terme (selon l'exemple d'EMODnet) qui prévoient une approche systématique tout en utilisant une variété de parties exécutantes.*

#### Le rôle des initiatives paneuropéennes

Les thèmes spatiaux d'INSPIRE offrent potentiellement un cadre très utile pour établir une cohérence et une harmonisation des données spatiales tant au niveau infranational, entre différentes agences, qu'au niveau transfrontalier, mais elles ne sont pas l'unique solution pour répondre aux besoins inter-agences ou transfrontaliers pour la planification de l'espace maritime.

La plupart des données de planification de l'espace maritime peuvent être traduites directement en données INSPIRE, à quelques exceptions près telles la pêche, les énergies renouvelables, le tourisme, les activités portuaires et la politique d'aménagement du territoire.

**Toutefois, les donnés économiques notamment, ne sont pas du tout prises en compte dans les thèmes spatiaux d'INSPIRE.**

*Il est nécessaire d'envisager d'étendre la portée des thèmes spatiaux d'INSPIRE afin de pouvoir y incorporer des données économiques et/ou d'élargir les définitions des thèmes de données INSPIRE à des fins de planification de l'espace maritime, notamment en ce qui concerne la pêche, les énergies renouvelables, le tourisme et les activités portuaires.*

**De plus, au fil de l'évolution de la planification de l'espace maritime, des catégories de données plus récentes et complexes pourraient se développer qui pourraient être prises en compte dans le cadre d'INSPIRE.**

*Puisqu'elles évoluent en parallèle, il serait utile de promouvoir l'échange de savoir entre les deux directives, sur le modèle du travail déjà entrepris par la DCSMM et INSPIRE avec le Projet Pilote Marin.*

D'autres initiatives complémentaires devraient être envisagées dans le contexte des besoins spatiaux transfrontaliers pour la planification de l'espace maritime. Par exemple, **le réseau européen d'observation de données du milieu marin (EMODnet) offre déjà des données géographiques marines transfrontalières harmonisées pour de nombreuses catégories de données relatives à la planification de l'espace maritime (bathymétrie, géologie, habitats des fonds marins, chimie, biologie, physique, activités humaines et cartographie côtière) couvrant tous les bassins maritimes européens.** EMODnet travaille en étroite collaboration avec le Centre commun de recherche (CCR) pour s'assurer que les portails de données sont parfaitement conformes à la directive INSPIRE. Un procédé qui révèle certaines disparités, en train d'être résolues, concernant les modèles de données.

Les nombreux portails de données EMODnet développés sous forme d'une série de projets dans le cadre de l'initiative « Connaissance du milieu marin 2020 » de la DG MARE illustrent l'importance des initiatives de long terme en matière de données. Celles-ci ne fournissent pas qu'un simple accès aux données mais ont également un rôle à jouer en tant que gardiennes des données s'assurant que celles-ci, générées par différentes sources dont les projets de recherche, sont sauvegardées et rendues disponibles pour être réutilisées au-delà de la durée du projet.

**Les portails de données EMODnet sont tous pertinents pour la planification de l'espace maritime régional et l'échange transfrontalier de données. L'ajout récent du portail EMODnet sur les activités humaines (www.emodnet-humanactivities.eu**) est particulièrement pertinent car il offre un accès à un nombre grandissant de données harmonisées concernant les activités humaines dans tous les bassins maritimes européens. **À l'avenir, le portail de données EMODnet sur les activités humaines pourrait également héberger des couches de données**

**nationales relatives à la planification de l'espace maritime pouvant être consultées et téléchargées.**

**Les résultats enregistrés par les points de contrôle EMODnet des bassins maritimes sont tous d'un grand intérêt pour les autorités de planification de l'espace maritime.**

*Promouvoir une diffusion plus large des résultats des points de contrôle EMODnet des bassins maritimes aux autorités de planification de l'espace maritime*

# Chapter 1: Introduction

## *Background*

The Technical Study on "Evaluation of data and knowledge gaps to implement MSP" (MSP Data Study) is one of the tasks of the contract "Assistance Mechanism for the Implementation of Maritime Spatial Planning". The objective of this contract is to provide administrative and technical assistance to Member States in the implementation of the Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning[5].

The goal of the MSP Data Study is to identify what data and knowledge are needed by Member States for MSP decision making, taking into account different scales and different points in the MSP cycle. The study is designed to identify data and knowledge issues currently relevant to the implementation of MSP by Member States and to provide suggestions on how they could be overcome. Specifically, the study objectives are to:

- Analyse, by Sea Basin, what data is available for MSP purposes and what data is actually used for MSP, indicating where there are technical and political issues concerning accessibility and availability of the data, and gaps in information;
- Deliver a basis for common knowledge across Sea Basins by providing insight into the 'commonalities' identified in MSP projects and Member State experiences as well as highlighting any innovations made;
- Propose options for the realisation of marine spatial data infrastructures to implement MSP;
- Consider existing data collection mechanisms, including the work done by the European Commission to assemble marine data, data products and metadata from diverse sources in a uniform way through the European Marine Observation and Data Network (EMODnet), and the potential for EMODnet sea basin portals to help coordination of MSP at a regional level;
- Evaluate potential revisions to be made concerning INSPIRE specifications for MSP purposes.

## *Added Value*

Recognising that Member States are all at different stages of implementing the MSP directive, the study aims to gain a better understanding of MSP data and knowledge issues from the Member State planner's perspective and enable a coherent transfer of knowledge across 23 Member States, highlighting what countries can learn from each other.

By carrying out a systematic analysis of what has already been done and where, the study seeks to identify similarities and differences between Sea Basins and transfer key

[5] OJ L 257/135

outputs and synergies. The study considers national developments and Sea Basin approaches, examining where the EU can add value to the implementation of MSP by Member States by providing a framework to assist Member States with their MSP processes (as far as data are concerned) and identifying future EU funding priorities and policy recommendations at a sea basin and macro-regional level.

***Approach***

The timeframe of the study, including the conclusion of the final report, was 10 months, running from mid-February to mid-December 2016. The approach was organized into **three phases**.

**First**, desk research along three lines of investigation was carried out, as follows:

1. An analysis of planners' needs.
2. An in-depth review of projects and initiatives with relevance to MSP data needs.
3. An in-depth review of data infrastructures with relevance to MSP data needs.

**Second**, the study sought to verify the findings of the desk research with Member States and validate the actual needs of planners. To do this, the results from the desk research were compiled into a spreadsheet, which was distributed to MSP Member State Expert Group representatives for review along with a communication providing guidelines on the type of interview questions we wanted to discuss with them. A detailed overview of projects / initiatives and data infrastructures with relevance to MSP data needs can be found in Annexes 1 and 2. These include:

Annex 1: Sea basin overview of ongoing and finalised EU projects and national initiatives and operational data infrastructures identifying relevant MSP data-related outputs as well as a sea basin overview of operational marine data infrastructures used by planners.

Annex 2: Detailed overview of operational marine data infrastructures with potential relevance to the MSP process.

All Member States made important contributions to the verification process. While the level of detail with which we could engage with different countries varied because Member States are at different stages in terms of implementing MSP in their respective countries, all the Member State inputs were incorporated and appreciated.

In the **third** phase of the study, the combined results of the desk research and verification process were synthesised into Sea Basin perspectives and priorities and recommendations for DG MARE were identified.

The rest of this report is organised as follows. The results from each line of investigation, combining the desk research findings with the input provided by Member States within the verification process as well as the Sea Basin perspectives, are presented in detail as individual chapters (Chapters 2 – 4). Chapter 5 presents two Case Studies which profile in more detail pertinent MSP data related issues, namely, "putting transboundary MSP data policy into action" and "the strengths and weaknesses of coastal information systems". These case studies were chosen because they provide an opportunity to present in detail two highly relevant MSP data issues with real examples of what has

worked, what has not worked and why. Chapter 6 summarizes observations and presents conclusions and recommendations. Annex 1 provides Sea Basin overviews of ongoing and finalised projects / initiatives with relevance to the MSP process as well as operational marine data infrastructures used by planners. Annex 2 provides an overview of operational marine data infrastructures with potential relevance to the MSP process. Annex 3 contains the questions for the semi-structured interviews with Member States.

## Chapter 2: Analysis of Planners' Needs

An overview of data and information categories and datasets commonly used in MSP processes has been compiled based on a review of MSP plans and/or relevant strategy reports from Member States who have appointed an MSP authority and have expressed the intention to develop an MSP plan. In doing so, a list of known data deficiencies and knowledge gaps was also compiled.

Guiding questions were:

a. What data and information do planners need to have, and at which stage of the planning process?

b. Which data categories and data sets does this translate into?

c. To what extent do planners rely on their own or local knowledge?

d. What are the key knowledge gaps?

Table 1 provides an overview of the Member State plans and strategy reports which have been consulted in this exercise. Table 2 describes the range of themes and categories of data and information commonly used in MSP processes. Table 2 also shows how these MSP themes and categories relate to INSPIRE spatial themes (column 3).

Table 1: Overview of Member States' plans and strategy reports consulted in desk research.

| Country | Maritime Plan (in English) | Maritime Plan (in country language) | Maritime Policy Framework | MSP Data or Evidence Strategy | Pilot Plans with Data Element | MSP GIS tool/map evidence base |
|---|---|---|---|---|---|---|
| **Bulgaria** | No | No | No | No | MARSPLAN BS | To be developed |
| **Belgium** | Marine Spatial Plan for the Belgian Part of the North Sea (2014) | Yes | Policy document marine environment, 2009 | No | No | Belgian Marine Atlas |
| **Croatia** | No | Yes (local plans) | No | No | Adriplan | Adriplan data portal |
| **Cyprus** | No | Yes (national plan in preparation) | No | No | THAL-CHOR | THAL-CHOR web-GIS |
| **Denmark** | No | No (national plan in preparation) | Act on Maritime Spatial Planning | No | No | Marine Spatial Data Infrastructure Denmark |
| **Estonia** | No | Yes (local plans) | Yes | No | BaltSeaPlan pilot plans | No |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Finland** | | No | Yes (local plans, needs verification) | No | No | Plan Bothnia | Maritime data portal under development |
| **France** | | No | No | French national strategy for seas and coastal zone (approved; to be soon published) | No | SimCelt, SimNorAt, SimWestMed (ongoing) | SHOM Marine Spatial Data Infrastructure data.shom.fr |
| **Germ -any** | EEZ | No | Verordnung des BMVBS über die Raumordnung in der deutschen AWZ in der Nordsee vom 21.09.2009 (BGBl.I S.3107)Verordnung des BMVBS über die Raumordnung in der deutschen AWZ in der Ostsee vom 10.12.2009 (BGBl.I S.3861) | Development Plan for the Sea and Action Plan, 2012 | No | BaltSeaPlan pilot plan | Contis Information System, GeoSeaPortal (BSH) |
| | MV | No | Landesraumentwicklungsprogramm Mecklenburg-Vorpommern (LEP M-V), 2016 | No | No | BaltSeaPlan pilot plan | No |
| **Greece** | | No | No | Transposition of the Marine Framework Directive 2008/56/EC into national law (L 3983/2011) | No | Adriplan<br>THAL-CHOR | Adriplan data portal<br>THAL-CHOR web-GIS |
| **Ireland** | | No | No | Harnessing our Ocean's Wealth, 2012 | Recommendations for marine evidence in HOOW | TPEA project | No |
| **Italy** | | No | No | No | No | Adriplan | Adriplan data portal |
| **Latvia** | | DRAFT Maritime Spatial Plan for The Internal Sea Waters, Territorial | Yes | No | No | BaltlSeaPlan pilot plans | National Spatial Planning Information System; plans to create a GIS for MSP |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Sea and Exclusive Economic Zone of the Republic of Latvia (May, 2016) | | | | | |
| **Lithuania** | No | Yes | No | No | BaltSeaPlan pilot plans | National Spatial Planning Information System (in Lithuanian) |
| **Malta** | Strategic Plan for Environment and Development, 2015 | Yes | Strategic Plan for Environment and Development, 2015 | No | No | No |
| **Netherlands** | Policy Document on the North Sea 2016-2021 | Yes | 2050 Spatial Agenda, 2014; National Water Plan 2016-2021 | No | No | Noordzee loke Informatiehuis Marien (under development) |
| **Poland** | No | No | Polish Maritime Policy (in Polish)<br>Polityka morska Rzeczypospolitej Polskiej do roku 2020 | No | BaltSeaPlan Pilot plans<br>Western Gulf of Gdansk | No |
| **Portugal** | No | No | National Ocean Strategy, 2013 | No | POEM (in PT only), TPEA project | To be developed |
| **Romania** | No | No | Emergency Ordinance for MSP 29.08.2016 | No | MARSPLAN BS | Marine database in preparation for MARSPLAN BS project |
| **Slovenia** | No | No | No | No | Adriplan | No |
| **Spain** | No | No | No | No | TPEA, SimWestMed (ongoing) | Geoportal Alboran Sea |
| **Sweden** | No | No | A Coherent Swedish Maritime Policy, 2008 | Suggestions for evidence themes | No | No |
| **UK** England | East Inshore and East Offshore Marine Plans (2014); South Inshore and South Offshore Marine Plans (2015) | Yes (regional) | UK Marine Policy Statement, 2011 | Yes | No | Marine Information System (MIS) |

| | | | | | | |
|---|---|---|---|---|---|---|
| North-ern Ireland | Marine Plan for Northern Ireland, in preparation | Yes | UK Marine Policy Statement, 2011 | Yes | No | Northern Ireland Marine Mapviewer, under development |
| Scot-land | Scotland's National Marine Plan, 2015 | Yes | UK Marine Policy Statement, 2011 | Yes | No | National Marine Plan Interactive (GIS) |
| Wales | Welsh National Marine Plan, first draft) | Yes | UK Marine Policy Statement, 2011 | Yes | No | Marine planning evidence portal (under development) |

***Some observations related to planners' needs***

**Different styles of planning**

MSP information and data needs strongly depend on the type of planning that is being carried out. Among those plans implemented in Europe, and based on the planning processes developed, different aims for MSP can be noted which translate into strategic and "spatial optimisation" elements. Most of the existing plans contain both elements, although the weight that is given to each may vary. Differences are also noted with respect to the degree of land-sea integration, with some plans incorporating land and sea territory (e.g. the German Länder) and others exclusively focusing on sea areas (either EEZ or from the high water mark).

One end of the scale could be described as a "spatial optimisation and risk minimisation approach", where the plan's main aim is to facilitate a rational arrangement of key maritime sectors. This type of planning responds to sectorial calls for space; its role is to act as an independent administrator of marine space. Planning decisions are driven by information provided by sectors, leading to an approach that may set aside areas for certain uses but does not inherently question the socio-economic impact of uses, for example. Although such planning can be forward-looking in that it grants priority to future uses (e.g. allocating priority areas for offshore wind farming), it is not a strategic approach to planning in the sense of comprehensive sectorial integration, nor does it tend to be participatory in the sense of jointly developing a common vision for the sea or taking into account scenarios of possible future developments. No socio-economic evidence is needed, for example, to justify priorities of one sea use over another, as the main issue is the ideal spatial arrangement of uses. In this instance, the MSP process is not understood as taking decisions on the mix of uses, but rather focuses on key activities and "arranges" other uses around these.

The other end of the scale could be described as fully integrated, forward-looking planning, where the planning process is participative, involves multiple sectors and is thus of a more strategic nature, i.e. designed to achieve integrated economic, social and ecological objectives. This type of planning is often guided by strategic objectives for the sea and not only driven by sectorial policy goals, although these do play a role. Other forms of planning are conceivable in between these two extremes. Evidence needs for

this kind of planning may be more limited in that some of the decision-making is delegated to the licensing process (e.g. EIA for siting decisions).

Evidence needs are therefore likely to be influenced by:

- The strategic level of the plan taking into account the time frame of the plan (requiring evidence on future trends, long-term perspectives, scenarios and projections for example)
- The level of integration pursued by the plan (requiring more complex evidence, for example, such as evidence of cumulative impacts of sea use)
- The degree of participation and linked to this, the types of knowledge included in decision-making (influencing the kind of evidence that is admitted to the decision-making process – e.g. scientific vs. non-scientific evidence)
- The need to be able to justify planning decisions (and in what way – e.g. if the plan is challenged in court)
- Transboundary dimension of the plan, if relevant
- Monitoring and evaluation of the planning area and the plan itself

**The crucial role of evidence**

In all countries analysed, MSP is widely understood as an evidence-based process, meaning that planning decisions are required to be based on robust evidence. At the same time, marine regions and countries differ with respect to their evidence requirements and what they consider suitable and sufficient evidence. Some countries have taken a highly strategic and comprehensive approach to MSP evidence, others have collected evidence more on an ad-hoc basis without making their evidence sources explicit. Some countries have developed a GIS system to make public their evidence base, others have not or are still considering this.

Generally, for MSP evidence is understood as information that can be used in policy making. Decision-making in MSP relies on evidence of all forms, which the MMO (Marine Management Organisation) in England (UK) describes[6] as including "environmental, social or economic assessments, scientific advice, analysis of planning and management measures, marine monitoring or the use of geographic information systems and the data that underpins them." Recognising that a perfect evidence base is highly unlikely, planning is often described as relying on the "best available evidence" at the time. This implies there are qualitative differences in the available evidence, related for example to how the evidence was generated, by whom, at what scale and time and for what purpose. In this sense at least, data and evidence share important characteristics.

It is apparent that much of the information used to generate evidence is produced by bodies other than the responsible planning authority, increasingly also including

[6] MMO Evidence Strategy 2015-2020

stakeholders. It therefore requires synthesis and further analysis and/or interpretation before it can be used to support the development of maritime spatial plans. Evidence to support plan development must have been collected and recorded using suitable, robust methods, and undergo some form of quality control. Stakeholders can supply valuable information, including qualitative evidence on the area and draft plans or quantitative data that could directly support plan policy development.

Efforts to make the wealth of marine data and observations currently stored in a myriad of national and regional databases within European more easily available through a central gateway and a series of thematic data portals are already underway as part of the long term European Marine Observation and Data Network (EMODnet) initiative by the European Commission. This initiative, a key implementation mechanism of the Marine Knowledge 2020 strategy, was launched in 2009 by DG MARE, and is increasingly expected to have a role in providing the necessary data to underpin policy and management decisions. EMODnet is also contributing to the assessment of current data gaps for effective implementation of MSP through a series of Sea-basin 'data stress tests' also known as EMODnet Sea-basin Checkpoints (see Chapter 3, page 43).

MSP requires three types of evidence.

1. Evidence related to the current situation, called stocktaking, baseline or current status information; e.g. baseline information on the current range of activities and their potential impacts on the surroundings, including social, economic and environmental aspects of this information as well as existing policy targets.
2. Future-oriented information, such as expected trends and developments; e.g. climate change, economic development, new shipping routes, new marine uses, impact of technological and knowledge advances, etc. – ideally with hints on their potential spatial impact.
3. Information related to national and EU sectorial policies and their potential impact as well as the impact of planning decisions.

The first category helps to understand the planning area, the issues the marine plan should address (e.g. impacts and pressures that should be understood and managed) and the desired outcomes of maritime spatial plan policies – often encompassed in status reports, stocktaking reports or similar exercises to describe the status quo. Examples could include area-based assessments, studies on methods and data, evidence on the distribution, abundance and breeding patterns of fish stocks.

The second and third categories specifically help to respond to more long-term challenges of policy development and delivery; this may include work to review and develop the MSP process per se or aspects related to monitoring and evaluation[7]. Most maritime spatial plans rely (to varying degrees) on a combination of these three evidence categories.

[7] MMO Evidence Strategy 2015-2020

The varied nature of MSP evidence set out above implies that not all evidence used in MSP is spatial. Non-spatial evidence might include general background information such as economic baseline studies or social impact studies which are not linked to particular marine siting decisions. Other non-spatial evidence may relate to the wider policy environment or methodologies. Non-spatial evidence is likely to play a more prominent role in earlier stages of MSP, for example in setting specific objectives for MSP (e.g. aesthetic aspects to be considered when installing a wind park along the coastline) or in designing the MSP process (e.g. stakeholder involvement).

Other evidence, such as distribution or impact maps, clearly have a spatial component; these may be more relevant in the context of actual siting decisions. Spatial data is often linked to displaying information about the planning area in a map or GIS system, or for displaying planning decisions on a map. Data specifications for the different purposes and parameters (understood here as individual measured items) will therefore also vary.

Spatial GIS data tends to play a role in three specific ways:

Overviews of spatial distribution of human activities, marine ecosystems and hotspots (e.g. species distribution maps, shipping density, wind areas, MPAs, etc.),

Identification of conflicts and compatibilities,

Different spatial scenarios

Irrespective of its spatial nature, evidence needs to be of a certain quality and reliability, which implies that it must be based on sound information and data irrespective of the source. Its metadata must also be clearly described and transparently provided.

An important aspect is that MSP evidence is required at the right scale, i.e. at the spatial and temporal scale of the maritime plan in question. Maritime plans must also consider evidence on other plans and relevant policies.

Evidence needs for MSP decision-making are closely linked to the delivery remit of the organization responsible for marine management, which may differ in different countries. For example, if a country's planning authority is also a licensing authority for maritime uses, the authority is likely to gather different levels of data and information at the same time, possibly leading to a more comprehensive collection of data than authorities that are only responsible for planning. It should also be noted that evidence collection is a dynamic process, which requires flexibility to ensure new trends are taken into account.

**Different stages of MSP have different evidence needs**

The above demonstrates that evidence needs vary along the different stages of MSP.

During the initial stages, there is a need for comprehensive stocktaking information on current uses and activities and the status of the marine environment. Evidence at this stage also includes information on sectorial policies and/or national policy objectives, including socio-economic dimension of activities on the affected region, as those may guide the concrete objectives to be defined for the MSP process as such. Most maritime spatial plans include reference to this policy environment in their general sections. There

is also a need for making this information spatially explicit, in order to map the spatial impact of cumulative human activities on ecological processes and marine ecosystems, for example, the distribution of human activities and their link to communities on land.

The analysis of conflicts and synergies is likely to require evidence on spatial and environmental compatibility of different activities and impact assessments. In many cases, such conflict analysis may not refer to current conflicts, but relate to finding space for 'new' uses coming in (e.g. offshore wind, aquaculture, new MPAs). User-user conflicts and user-environment conflicts will need to be assessed.

Different evidence is needed yet again for developing scenarios for future sea use management, such as trends and forecasts in the planning area, which are not as yet defined as a specific claim by a given sector or a concrete demand from the policy level, as well as other relevant policies than can have more long-term goals, such as renewable energy Directive.

Lastly, different evidence may be needed to enable monitoring of the planning area and the effectiveness of the plan, leading to evaluation and adaptation.

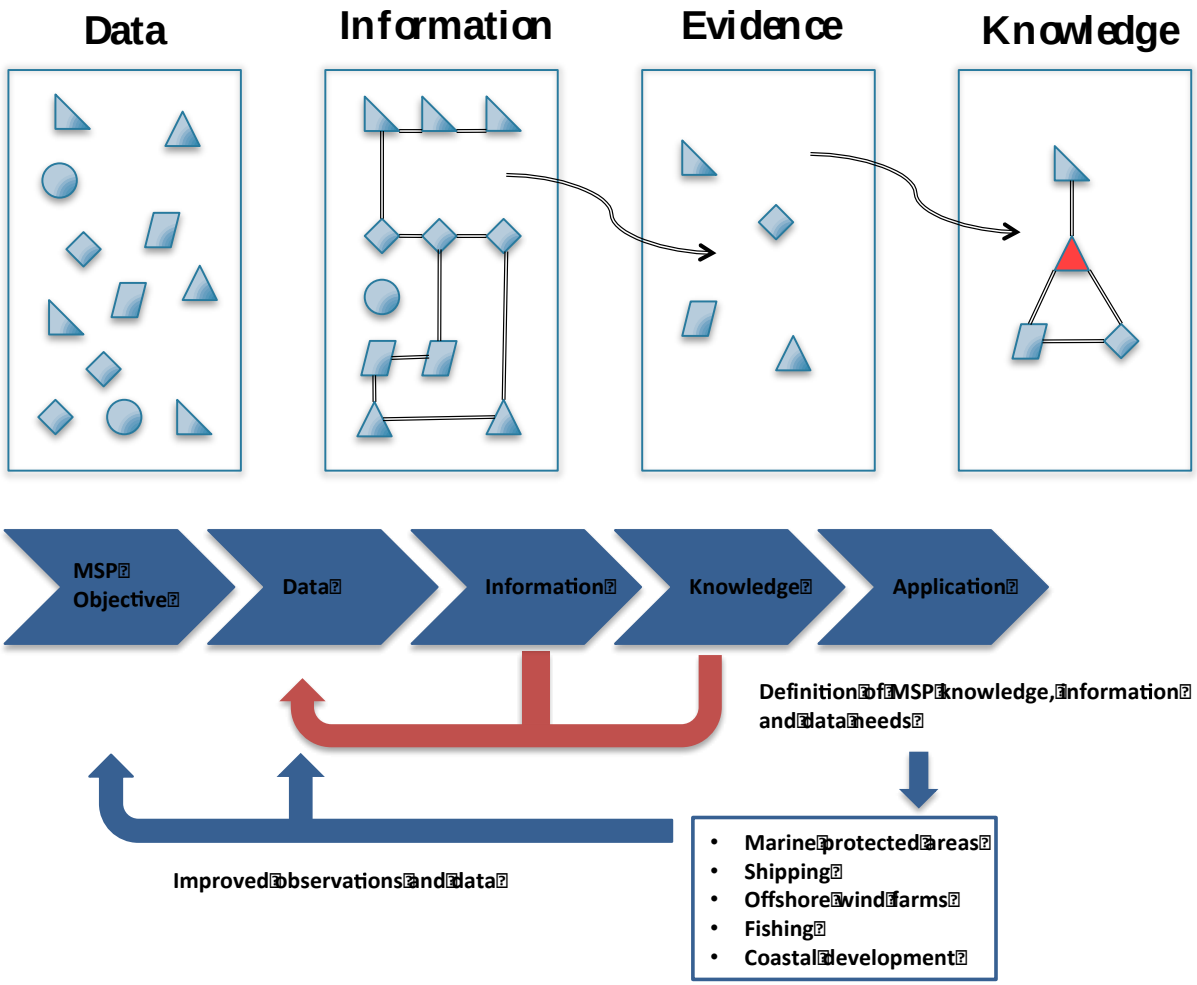


Figure 1: The knowledge cycle: from data to knowledge.

***Range of evidence collected to inform existing plans and pilot plans***

Analysis of existing data layers in marine planning databases, together with analysis of the existing statutory plans shows that the data categories, which have been used by MSP planners in their current MSPs are essentially similar (Table 2).

Four broad categories can be identified:

1. Administrative boundaries,
2. Description of the geophysical environment and biological/ecological features,
3. Data relating to the relevant human activities and sectors,
4. Socio-economic and policy-related data.

It should be highlighted that Table 2 only shows the type of data, which a) was known to be available, b) accessible (i.e. not being owned by companies) by MSPlanners and then c) used by MSPlanners. This is not to say, that MSPlanners would not like to have additional data sets; but that those may either not be known or accessible to MSPlanners or are actually not existing due to 'knowledge gaps'. Table 3 'information gaps' refers to these additional 'nice to have data sets'. In Chapters 3 and 4, we further elaborate other data infrastructures and initiatives which are potentially relevant for MSP, e.g. EMODnet thematic lots and sea basin checkpoints.

Table 2: Range of themes and categories of data and information used by MSP planners.

| **CATEGORY** | **Examples for datasets commonly used in marine plans** | **Relevant INSPIRE theme, numbers relate to Annex and subcategory[8]** |
|---|---|---|
| **ADMINISTRATIVE BORDERS** | | |
| Boundary data | National | Administrative units (1.4) |
| | Regional | Administrative units (1.4) |
| | Local | Administrative units (1.4) |
| | Territorial water | Administrative units (1.4) |
| | EEZ | Administrative units (1.4) |
| **PHYSICAL/CHEMICAL/BIOLOGICAL INFORMATION** | | |
| Physical characteristics | Seabed relief and bathymetry | Elevation (2.1) |
| | Hydrodynamics | Hydrography (1.8) |
| | Wind and wave action | Oceanographic geographical features (3.15); Sea regions |

[8] INSPIRE, Data specifications.

| | | |
|---|---|---|
| | | (3.16) |
| | Temperature | Hydrography (1.8) |
| | Turbidity | Oceanographic geographical features (3.15); Sea regions (3.16) |
| | Water transparency / light | Oceanographic geographical features (3.15); Sea regions (3.16) |
| | Salinity | Oceanographic geographical features (3.15); Sea regions (3.16) |
| | Water masses and residence time | Oceanographic geographical features (3.15); Sea regions (3.16) |
| | Nutrients and oxygen | Oceanographic geographical features (3.15); Sea regions (3.16) |
| | pH, pCO2, sea acidification | Oceanographic geographical features (3.15); Sea regions (3.16) |
| Types of habitat | Seabed | Elevation (2.1); Habitats and biotopes (3.18) |
| | Water column | Habitats and biotopes (3.18) |
| | Habitat Directive habitats | Habitats and biotopes (3.18) |
| | Habitats requiring a specific protective regime | Habitats and biotopes (3.18) |
| Biological characteristics | Seabed | Habitats and biotopes (3.18) |
| | Water column | Habitats and biotopes (3.18) |
| | Angiosperms, macroalgae | Species distribution (3.19) |
| | Fish populations | Species distribution (3.19) |
| | Sea mammals migration routes | Species distribution (3.19) |
| | Spawning and nursery areas | Habitats and biotopes (3.18); Protected sites (1.9) |
| | Fish migration routes | Habitats and biotopes (3.18); Species distribution (3.19) |
| | Sea birds | Species distribution (3.19) |
| | Non-indigenous species introduced through human activities | Species distribution (3.19) |

| | | |
|---|---|---|
| | Species habitats | Protected sites (1.9) |
| | Bird migration routes | Species distribution (3.18); Habitats and biotopes (3.19) |
| | Bird wintering grounds | Species distribution (3.18); Habitats and biotopes (3.19) |
| | Other species listed under Community legislation or international conventions | Species distribution (3.19) |
| Pressures and impacts | Physical destruction from dredging (e.g. maps on pressure) | Hydrography (1.8); Geology (2.4); Area management/restriction/regulation zones and reporting units (3.11); Sea regions (3.16) |
| | Eutrophication and algae blooms | Area management/restriction/regulation zones and reporting units (3.11); Sea regions (3.16) |
| | Physical destruction from extraction (e.g. maps on pressure) | Hydrography (1.8); Geology (2.4); Area management/restriction/regulation zones and reporting units (3.11); Sea regions (3.16) |
| | Physical destruction from dumping (e.g. maps on pressure) | Hydrography (1.8); Geology (2.4); Area management/restriction/regulation zones and reporting units (3.11); Sea regions (3.16) |
| | Underwater noise (e.g. maps of noise distribution) | Area management/restriction/regulation zones and reporting units (3.11) |
| | Marine litter (e.g. maps of areas affected by litter) | Sea regions (3.16) |
| | Introduction of synthetics and heavy metals (e.g. maps with point and distributed pollution sources) | Utility and government services (3.6); Production and industrial facilities (3.8); agriculture and aquaculture facilities (3.9) |
| | Pollution caused by ships (carbon dioxide) | Human health and safety (3.5) |
| | Introduction of radionuclides | Human health and safety (3.5); Utility and government services (3.6); Production and industrial facilities (3.8) |
| | Chemical effects from the dumping of dredged material | Human health and safety (3.5); Utility and government services (3.6); Production and industrial facilities (3.8) |

| | | |
|---|---|---|
| | Introduction of microbial pathogens (e.g. maps of point sources) | Human health and safety (3.5); Utility and government services (3.6); Production and industrial facilities (3.8) |
| | Introduction of non-indigenous species (e.g. maps of areas at risk of introduction of non-indigenous species) | Utility and government services (3.6); Production and industrial facilities (3.8); Sea regions (3.16) |
| | Selective extraction of species and bycatch (e.g. maps of areas most affected) | Sea regions (3.16) |
| | Biological disturbance as a result of sand extraction | Sea regions (3.16) |
| | Biological effects from the dumping of dredged material | Sea regions (3.16) |
| **ACTIVITIES/USES** | | |
| Aquaculture | Designated aquaculture areas | Agricultural and aquaculture facilities (3.9) |
| | Potential aquaculture areas | Agricultural and aquaculture facilities (3.9) |
| Fishing | Inshore fisheries mapping | Production and industrial facilities (3.8) |
| | VMS amalgamated density layers | Production and industrial facilities (3.8) |
| | Number of vessels | Production and industrial facilities (3.8) |
| | Capacity of vessels | Production and industrial facilities (3.8) |
| | Vessels according to fishing method | Production and industrial facilities (3.8) |
| | Fishery harbours | Geographical names (1.3) |
| | Fish landings per harbour | |
| | Fish processing industry (location) | Production and industrial facilities (3.8) |
| | Gross added value (national) | |
| | Gross added value (regional) | |
| | Direct employment | |
| | Indirect employment | |

| | | |
|---|---|---|
| | Important fishery areas (for different types of fishery) | Land use (3.4) |
| | Spatial distribution of fishing activity (by type of fishery) | |
| | Vessel movements to and from ports (by size of boat/type of fishery) | |
| | Economic importance of fisheries | |
| | Fishing management areas (where certain types of fishing is restricted) | Area management/restriction/regulation zones and reporting units (3.11) |
| Renewable energies | Location of existing wind farms/wave energy/tidal energy sites | Energy resources (3.20) |
| | Number of turbines/other plants | Energy resources (3.20) |
| | Total surface area covered | Energy resources (3.20) |
| | Water depth | Elevation (2.1) |
| | Shortest distance to the coast | Energy resources (3.20) |
| | Cable landing points | Energy resources (3.20) |
| | Location requirements and potentially suitable sites | Energy resources (3.20) |
| | Expected annual ship movements for maintenance | Energy resources (3.20) |
| | Direct employment | |
| | Indirect employment | |
| Installations & infrastructure | Electricity cables | Utility and governmental services (3.6) |
| | Safety Zones / Construction Fields | Area management/restriction/regulation zones and reporting units (3.11) |
| | Platforms | Utility and governmental services (3.6) |
| | Buoys, Pods (with link to Energy Production) | Utility and governmental services (3.6) |
| | Tunnels | Transport networks (1.7) |
| | Bridges | Transport networks (1.7) |
| | Masts | Environmental monitoring facilities (3.7) |

| | | |
|---|---|---|
| Maritime transport routes and traffic flows | IMO Routes | Transport networks (1.7) |
| | Fairways | Transport networks (1.7) |
| | Roadsteads | Transport networks (1.7) |
| | Anchorages | Transport networks (1.7) |
| | Ferry Lines/Routes/ MOS | Transport networks (1.7) |
| | AIS – several datasets:<br>(different periods/years/seasons?)<br>different Type of Traffic:<br>-All<br>-Cargo<br>-Dangerous Goods<br>-Passenger<br>-Leisure Boats<br>-Fishery<br>-Other/Unknown | Transport networks (1.7) |
| | Capital and maintenance dredging areas | Area management/restriction/regulation zones and reporting units (3.11) |
| | Dumping areas | Area management/restriction/regulation zones and reporting units (3.11) |
| | Restricted areas for shipping | Area management/restriction/regulation zones and reporting units (3.11) |
| Ports | Port locations | Geographical names (1.3) |
| | Direct employment in ports | |
| | Indirect employment in ports | |
| | Percentage of goods handled | |
| | Percentage of turnover | |
| | Total TEU transfer | |
| | Water depth | Elevation (2.1) |
| | Accessibility (how is this determined? Number slipways, berthing spots, …) | |
| Nature and species conservation sites & | N2000 areas , SAC/SPAs | Protected sites (1.9) |

| | | |
|---|---|---|
| protected areas | | |
| | MPAs | Protected sites (1.9) |
| | Ramsar sites | Protected sites (1.9) |
| | UNESCO Biosphere Reserves | Protected sites (1.9) |
| | Marine National Parks | Protected sites (1.9) |
| | Red list species | Protected sites (1.9) |
| Military | Military training areas | Area management/restriction/regulation zones and reporting units (3.11) |
| | Radar areas / military observation areas | Area management/restriction/regulation zones and reporting units (3.11) |
| | Munition disposal sites | Area management/restriction/regulation zones and reporting units (3.11) |
| Raw material extraction areas | Sand and gravel extraction areas (existing, potential) | Production and industrial facilities (3.8), Mineral resources (3.21) |
| | Natural gas extraction areas/concession areas | Production and industrial facilities (3.8); Mineral resources (3.21) |
| | Oil extraction areas /concession areas | Production and industrial facilities (3.8); Mineral resources (3.21) |
| | Carbon capture and storage areas | Production and industrial facilities (3.8); Mineral resources (3.21) |
| | Fracking | Production and industrial facilities (3.8) |
| Scientific research | Research areas | Environmental monitoring facilities (3.7) |
| | Measuring stations / networks | Environmental monitoring facilities (3.7) |
| Submarine cable & pipeline routes | Telecommunication/Data cables in use | Utility and governmental services (3.6) |
| | Telecommunication/Data cables not in use | Utility and governmental services (3.6) |
| | High Voltage Cables | Utility and governmental services (3.6) |
| | Pipelines | Utility and governmental services (3.6) |
| Tourism & recreation | Recreation and tourism areas | |

| | | |
|---|---|---|
| | Leisure / sporting activity sites | |
| | Marinas | Geographical names (1.3) |
| | Distribution of activities/sports | |
| | Distribution of tourists (bed nights) | |
| | Blue Flag awards | Geographical names (1.3) |
| | Seascapes | |
| Underwater cultural heritage | World Heritage sites | Protected sites (1.9) |
| | Listed monuments | Protected sites (1.9); Buildings (3.2) |
| | Wrecks | Protected sites (1.9); Buildings (3.2) |
| | Location of other historic sites | Buildings (3.2) |
| Coastal defence | Areas used for dredging | Human health and safety (3.5); Area management/restriction/regulation zones and reporting units (3.11); Mineral resources (3.21) |
| | Managed realignment schemes | Human health and safety (3.5); Area management/restriction/regulation zones and reporting units (3.11); Natural risk zones (3.12) |
| | Coastal protection schemes | Human health and safety (3.5); Natural risk zones (3.12) |
| | Flood defence schemes | Human health and safety (3.5); Natural risk zones (3.12) |
| **SPATIAL POLICY** | | |
| | Priority areas for activities/uses | Area management/restriction/regulation zones and reporting units (3.11) |
| | Reservation areas for activities/uses | Area management/restriction/regulation zones and reporting units (3.11) |
| | Exclusion areas for activities/uses | Area management/restriction/regulation zones and reporting units (3.11) |
| | Other area-based management designations | Area management/restriction/regulation zones and reporting units (3.11) |

| | | |
|---|---|---|
| | Spatial synergies and conflicts | Area management/restriction/regulation zones and reporting units (3.11) |
| | Long term spatial vision | |
| **SOCIO-ECONOMIC DATA** | | |
| Human population | Population estimates for localities | Population distribution – demography (3.10) |
| | Density of usual residents | Population distribution – demography (3.10) |
| Economic indicators | Economic areas | Statistical units (3.1) |
| | NUTs regions | Statistical units (3.1) |
| Social indicators | Well-being index | Statistical units (3.1) |

As can be seen from Table 2, which is based on the currently available plans and three operational Marine Information Planning[9] [10] [11]portals used by MSP authorities, least variation is noted with respect to the first two categories, i.e. the description of the geophysical environment and biological/ecological features in the planning areas and boundaries (basic geographical and administrative boundaries, such as the limits of the EEZ, country and county boundaries or depth contours).

The third category, data relating to human activities and sectors, is more varied although the main sectors are once again similar; differences are mostly related to the weight given to each sector in terms of the diversity of data categories specified and the specific expression of the sector (e.g. whether offshore energy refers to offshore wind farming, wave energy, CCS, oil and gas, etc.). The majority of sectors (shipping, energy, mineral extraction, recreation, nature conservation, telecommunications, fishing, underwater cultural heritage, military) are present in every plan and/or data portal, reflecting the essentially similar nature of maritime activities in each country but also slight differences in how each sector is described and analysed. The data specifications also reflect the kind of data currently available, for example, the EMODnet human activities portal[12]. The most significant difference is related to the fourth category, socio-economic and policy-related data, and whether socio-economic data is included in the plan/data portal. There is evidence that older plans are less likely to include this type of information (e.g. the

[9] England Marine Information System (GIS) map layers : http://defra.maps.arcgis.com/apps/webappviewer/index.html?id=2c2f6e66c0464fa99d99fd6d8822ddef)

[10] Scotland National Marine Plan interactive map layers : http://marine.gov.scot/themes/physical-characteristics

[11] Belgian Marine Atlas : https://odnature.naturalsciences.be/marine-atlas/data

[12] http://www.emodnet.eu/human-activities

German plan for the EEZ) but all of the more recent drafts or plans make some reference to it. It is therefore likely that this data category will become more important in the future.

Physical and biological data are often related to the MSFD categories and in some cases are drawn directly from MSFD assessments. Such data is largely descriptive and serves to characterise the planning area and its major features. Potential restrictions to activities can be derived from this information (e.g. water depth/suitability for offshore wind farming). Where there are direct links to MSFD assessment, the descriptive data categories also include human pressures and occasionally the sources of such pressures (e.g. marine litter, marine underwater noise, point sources of pollution). Linking MSFD and MSP efforts in this manner seems an effective way of ensuring MSP is based on sound environmental evidence; in turn, it is a way of ensuring that MSP is able to contribute to achieving the objectives of the MSFD. It makes sense to explicitly outline this relationship and to encourage countries to link their MSFD process to supplying physical and biological evidence for MSP, for a number of reasons:

1. It will avoid duplication of effort (data only needs to be collected only once).
2. It will make more explicit the links between human activities and pressures (which is often missing from the more descriptive data collections used in MSP).
3. It will enable MSP to contribute to mitigating such pressures (e.g. by introducing temporal restrictions on offshore construction to mitigate underwater noise effects, or by excluding certain activities from particularly sensitive marine areas).

This also refers to the current process of revising and evolving indicators for specific MSFD descriptors and a more active role for MSP.

Sectorial data mostly relate to the current location and spatial extent of activities and infrastructure. This includes the location and extent of existing protected areas, mostly those designated under Natura 2000 or other EU legislation, but also local marine nature reserves. Fisheries is the sector with the largest number of datasets, reflecting the importance of fisheries in the countries analysed both in terms of income generated to local communities and perception of this sector as a key stakeholder in the MSP process, as well as the complexity of the use and the need to deal with many diverse aspects (e.g. stocks (of many species), fishing grounds, biologically important areas, restrictions, fishery effort, socio-economic impact of fishing activity) in order to fully understand the sector. Typically, fisheries data is more readily available for deep sea fishing and scarce for coastal, small-scale, traditional fisheries. Datasets indirectly also reflect important spatial requirements of sectors (e.g. distance to the shore of offshore wind farms), although this information is not explicitly collected for planning purposes. Datasets also reflect the socio-economic importance of sectors, (e.g. the economic value of fish landings, the economic importance of ports), although the inclusion of such socio-economic data is still the exception rather than the rule. The importance of land-sea interaction is reflected in spatial information on landing points of infrastructure (e.g. cables, pipelines) and ports.

Only few datasets relate to the wider socio-economic environment. Presently, available data mostly seems related to fisheries but there is also data referring to ports (e.g. turnover) or general demographics of the coastal areas adjoining the planning area. The draft Welsh plan (UK) highlights the need to go beyond spatial evidence to include socio-economic evidence and governance-related evidence (e.g. on stakeholder involvement and the wider policy environment). Also the Polish stocktaking report suggests such an approach and a number of research projects as well as studies are working on this topic. It would be useful to screen and further discuss with EU Member States these advances on samples and methods of generating evidence that can be used to describe the socio-economic environment and the impacts of maritime industries on the adjoining coast and wider economy. Moreover, it is important to monitor socio-economic indicators in order to assess real benefit of MSP for local coastal communities.

On a general point, it is worth noting that the large majority of available evidence is descriptive, falling within the category of applied evidence. Strategic evidence is still rare, especially related to future uses and activities and the economic and environmental impact of activities.

***MSP data themes and the INSPIRE Directive***

The Infrastructure for Spatial Information in the European Community (INSPIRE) is a set of European Union and national legal acts and their coordinated implementation. "INSPIRE creates a common standard to make environmental information quickly and easily accessible for integrated policy decision making at all levels of government while supporting the exchange of information and data between the local, regional, national and European or international levels" (Marine Pilot, 2015). INSPIRE aims to improve the consistency, availability and re-use of spatial information, as well as decision making in support of environmental policies and of policies that have an impact on the environment. It specifically makes requirements with respect to:

- Metadata
- Interoperability of spatial data sets and services
- Network services (e.g. discovery, view, download, transformation services)
- Data sharing
- Coordination and complementary measures.

All of these issues are of high relevance to MSP where data exchange between different bodies, data accessibility and data quality can still represent an issue. Most importantly, the INSPIRE Directive also creates a framework for transboundary exchange of data. Many pilot projects on MSP have referred to the need to create common transboundary data standards and refer to INSPIRE as a minimum framework (e.g. TPEA, BaltSeaPlan). Most Member States preparing maritime spatial plans are working to make their MSP data and data systems INSPIRE compliant, with many going beyond these minimum requirements.

**Data considered by the 'INSPIRE' Directive**

INSPIRE is concerned with spatial data, defined as any data with a direct or indirect reference to a specific location or geographical area. As INSPIRE focuses on decision-making in support of environmental policies and of policies that have an impact on the environment, the thematic scope of the Directive is broad. Nevertheless, the wide range of themes covered by INSPIRE represents the broad needs for fulfilling expected actions for sustainable development and the multi-purpose needs for eGovernment actions (INSPIRE IMS, 2003). Therefore, it is useful to examine how MSP data themes relate to the INSPIRE spatial themes provided in the latter Directive's Annexes in order to better understand the links between INSPIRE and MSP.

The INSPIRE Directive now includes 34 data themes that define the scope of INSPIRE. They are subdivided into three annexes which are not based on a thematic or hierarchical logic, but on the different actions the Directive requires with respect to data harmonisation, dissemination etc. Annex I and II, for example, require faster creation of metadata and quicker implementation of specific rules than Annex III.

Most of the MSP data themes identified in table 2 can be mapped directly onto INSPIRE data themes (see column 3 in table 2). However, a few MSP data themes were difficult to relate to an INSPIRE spatial theme, either because the theme is missing from the INSPIRE spatial theme specifications, or it is just not obvious where they are best placed within the INSPIRE spatial structure. Specific examples of these are found under:

- Fishing
    - Fish landings per harbour
    - Gross added value (national)
    - Gross added value (regional)
    - Direct employment
    - Indirect employment
    - Spatial distribution of fishing activity (by type of fishery)
    - Vessel movements to and from ports (by size of boat/type of fishery)
    - Economic importance of fisheries
    - Cultural importance of fisheries
- Renewable energies
    - Direct employment
    - Indirect employment
- Tourism
    - Recreation and tourism areas
    - Distribution of activities/sports
    - Distribution of tourists (bed nights)
- Ports
    - Direct employment in ports
    - Indirect employment in ports
    - Percentage of goods handled
    - Percentage of turnover

    - Total TEU transfer
    - Accessibility (how is this determined? Number slipways, berthing spots, …)
- Spatial policy
    - Long term spatial vision

This exercise illustrates a few concepts. While INSPIRE potentially provides a useful framework for establishing coherence and harmonisation of spatial data on a transboundary level, it is not exclusively the solution to resolving transboundary spatial needs for MSP. It is noteworthy that economic data is not considered at all within the scope of the INSPIRE spatial themes. There is a need to add a number of themes to the INSPIRE Annexes and / or expand the definitions of INSPIRE data themes for MSP purposes, keeping in mind though that as MSP evolves, newer, more complex data categories that cannot be catered for within the INSPIRE framework, are also evolving, for example, "long term spatial vision".

In this context, other complementary initiatives should also be considered in the context of transboundary spatial needs for MSP. For example, the European Marine Observation and Data Network (EMODnet) already delivers harmonised transboundary marine spatial data for a number of relevant MSP data categories (i.e. bathymetry, geology, seabed habitats, chemistry, biology, physics, human activities and coastal mapping) ) covering all European sea-basins. EMODnet is working closely with the Joint Research Centre (JRC) to ensure that the data portals are fully INSPIRE compliant, a process which has revealed some discrepancies in the data models which are being resolved.

***Sea Basin perspectives on MSP data issues, similarities and differences***

Across all European Sea Basins, countries are trying to do similar things with respect to MSP: stocktaking, conflict analysis, drawing up plans and planning for the future. In many instances, countries which are in the early stages of MSP already see the benefit of hindsight from more experienced countries' practices, and are starting off from a more strategic, future oriented perspective with their planning process. Still, each country has different needs in terms of the scale and scope of their maritime spatial plans and ultimately how MSP is implemented will very much depend on available resources and local interpretation. Notwithstanding the above, consulting plans between countries and supporting some degree of coherence of plans between countries can be helpful, although this remains a challenge.

MSP data issues across European Sea Basins remain the same. What makes things different between countries is the level of importance given to data issues, as this very much depends on where countries are with regard to their MSP process and the availability of suitable data to support their national MSP needs. In addition, specific geographic, economic and cultural differences between the Sea Basins need to be taken into account. All Member States that were interviewed confirmed that the important MSP data issues fall under three broad categories, as follows:

1. Data and information gaps
2. Spatial evaluation tools
3. Transboundary exchange of data

**Data and information gaps**

Countries seem confident with stocktaking and the descriptive part of MSP status quo assessments. Most are taking a similar approach, though using slightly different data sets and description of categories (according to needs). However, there is a predominance of descriptive data, which describes the marine environment, and less analytical information, which is where the challenge lies in developing second generation plans. These tend to be more ambitious in scope and focus on a broader range of evidence. Some data gaps do exist, and commonly, these are found under the categories of socio-economic data for different uses/activities, commercial fisheries data and socio-cultural information. The latter is almost entirely lacking, although this is especially important in the context of implementing the ecosystem based approach (EBA). While the concept of ecosystem services has advanced over the last decade and theoretical approaches have been developed to quantify their value[13], applying these practically to an ecosystem based approach remains a struggle for planners. There is a need for tools and guidance on how to factor in this type of data and information.

Table 3: Overview of information gaps identified by Member States organised by MSP data category.

| **DATA CATEGORIES** | **INFORMATION GAPS** |
|---|---|
| **ADMINISTRATIVE BORDERS** | |
| Boundary data | Harmonisation of data across borders |
| **PHYSICAL/CHEMICAL/BIOLOGICAL INFORMATION** | |
| Types of habitat | Detailed data on species and habitats particularly in deep-sea areas |
| Biological characteristics | Structure and composition of benthic populations |
| | Indicators of benthic habitat ecosystems and biodiversity |
| | Bird inventories in offshore areas |
| | Bird distribution data offshore outside breeding season |
| Pressures & impacts | Knowledge of sensitivity of living environments to various forms of use, including cumulative effects |
| | Assessment grounds for pollutants in sediments and their physical |

[13] Turner K., 2011; Turner et al., 2014.

| | |
|---|---|
| | impact along the coast |
| | Level of discharge of nutrients from private sewage |
| | How forestry measures affect leakages of nitrogen and phosphorus from woodland into watercourses and oceans |
| | Transport of nutrient and metals from small estuarial water courses |
| | Sea use and land use interactions, determining economic significance, flows and environmental pressures |
| **ACTIVITIES/USES** | |
| Aquaculture | Environmental effects of different types of farming and feedstuff, for example, through nutrient leakage |
| Fishing | Quantitative connections between human activities, including shore exploitation and the capacity and sensitivity of fish habitats |
| | Coastal (small-scale/traditional) fishing catches and their distribution |
| | Sports/recreational fishing |
| | Knowledge of the structure of populations of exploited fish species |
| | Cultural importance of fisheries |
| Renewable energies | Uncertainty concerning quantitative information regarding the technical potential for sea-wave power |
| Nature and species conservation sites & protected areas | Knowledge base regarding marine natural values and ecosystems |
| | Natural values of deeper sea areas |
| | Detailed information regarding the depth and character of sea beds |
| | Distribution of non-native species and ecological effects |
| Military | No access to information regarding, for example, pollutants within Armed Forces' firing ranges at sea |
| Raw material extraction areas | Aggregate sites |
| | Impact of aggregate extraction |
| | Location of desalination plants |
| Tourism & recreation | Uniform definition of recreation and tourism, or for maritime tourism and how activities should be measured |
| | Studies that go beyond economic values such as employment and turnover |
| Underwater cultural | Systematic inventory of underwater cultural heritage |

| | |
|---|---|
| heritage | |
| | Remains of prehistoric settlements and harbours |
| | Confidentiality of data |
| **SOCIO-ECONOMIC DATA** | |
| Human population | Data is available but problem lies with way data is compartmented. |
| Economic indicators | ditto |
| Social indicators | ditto |

Further insight into specific data and information gaps are likely to be identified as part of the EMODnet Sea-basin Checkpoints where the availability and adequacy of marine data to meet different commercial and policy challenges is being evaluated (see Chapter 3, page 43).

Overall, with respect to data and information gaps, the issue for MSP authorities is not so much about data issues but more about aggregated data issues. In other words, it is not so much about **what data** but more **how to aggregate and interpret the data** in order to acquire the information needed by the planner.

**Spatial evaluation tools**

A common recurring theme among countries is therefore also the desire to search for, develop and exchange practices, which relate to the aggregation and interpretation of data and information, especially, spatial evaluation tools for assessment and impact analysis purposes. While we found a number of examples of assessment tools that were developed or applied in the project context (see Chapter 3, Assessment Tools), we found very little evidence during the consultation process with MSP authorities that any of these tools were actually being used by MSPlanners. It is not clear whether this is because those tools that have been developed are a) not used because they are not fit for purpose for 'real' MSPlanners, or b) they are not known to MSPlanners, or c) the potential scope of how they could be used is not communicated sufficiently to MSPlanners.

Notwithstanding the above, exchange of and support with the following types of analyses was identified:

- Analysis of commercial fisheries information, trend analyses of fishing and fish-related activities including spatial aspects
- Methods for the management and presentation of uncertainties in the spatial information regarding fish and fishing
- Strategic assessment of cumulative effects
- Co-existence for marine planning and marine licensing
- Impact assessments and sustainability appraisals

- Impact displacement of activities over time
- Relationships between uses and ecosystems
- Interactions and risk analyses
- Future scenario planning
- Assessing cause and effect, accumulation of impacts, risks
- Ecosystem service assessments
- Implementing full ecosystem approach

**Transboundary data exchange**

Transboundary MSP data needs are different from national MSP data needs. The scope and level of detail of data needed is much simpler, usually dealing with issues such as where bathymetry, shipping lines or energy corridors cross political boundaries. However, ensuring the coherence and harmonisation of these data across boundaries remains a challenge due to different data protocols and formats. Typically, this is complicated by a number of underlying issues: different languages between countries, the need for high level political agreement to share relevant data across boundaries and the need for good cooperation between local and regional interest groups. Here, cooperation between MSP authorities is essential (see Case Study "Putting transboundary MSP data policy into action: a history of MSP collaboration in the Baltic Sea Region").

***Views with respect to data portals/coordination facilities***

**The trend is to establish national/sub-national MSP data portals and GIS facilities**

A trend can be noted in that most countries are making efforts to develop evidence strategies for MSP and are considering options for MSP data infrastructures, including the creation of GIS databases to support the MSP process. Fully operational MSP portals and GIS databases include those of the UK (England and Scotland) and to some degree Germany, Belgium and the Netherlands. Other countries have in development or are planning to establish GIS MSP portals (Cyprus, Denmark, Estonia, Finland, France, Greece, Ireland, Latvia, Lithuania, Portugal and UK (Northern Ireland)).

It is evident from the descriptions of different systems that existing national GIS databases serve several parallel functions. An important function is to increase the transparency of the MSP process and display all up-to-date MSP information to the wider public. In the UK for example, all of the databases can be freely navigated to display geospatial information on the planning area together with specific planning information. Layers can be displayed individually or in combination, rendering the databases a useful communication as well as analysis tool. Another function of the databases is to encourage stakeholders to actively provide data, offering the opportunity to upload datasets as long as certain data requirements are met (e.g. metadata).

This trend is indicative of the recognition that MSP is a public process that depends on the active collaboration of a wide range of stakeholders, especially where evidence and supporting data is concerned. The benefits of a GIS-based system to support MSP are

well summarised in the following quote: "A national maritime spatial planning capacity and responsibility for data coordination and exchange (…) will facilitate decision support through the visualisation of ecosystem features and existing and proposed activities in our ocean space."[14] And more specifically, "a MSP data coordination and exchange facility would enable relevant quality-assured data to be input from a range of different public and private sector providers, and all made available to such providers, marine users, and the general public as freely as possible through an MSP web portal."[15]

[14] Marine Institute Ireland, 2015.

[15] Harnessing our Ocean Wealth. An Integrated Marine Plan for Ireland, 2012.

## Chapter 3: Review of European Projects and Initiatives

### *Overview*

The motivation to carry out a review of European projects and initiatives is obvious. While these projects are typically short-lived (1 – 3 years), in many instances they have proved to be very useful mechanisms for stimulating longer term strategic directions, developing stakeholder ownership and channelling important policy issues through appropriate authorities. The key is to ensure that important results and outputs are transferred to wider interest groups and that they make their way into policy making processes and onto MSP planners' desks. With this in mind, a total of 62 European projects and initiatives with relevance to MSP were reviewed in order to identify important MSP data-related outputs that address and / or generate the following output categories:

- Stocktaking maps
- Data / knowledge needs / gaps
- Data portals
- Mapping tools
- Assessment tools
- Data policy
- Transboundary exchange of MSP data

The objective was to establish which outputs and recommendations from projects and initiatives are relevant for MSP planners' work, which (from completed projects) have actually been picked up and used by MSP planners, and which (from ongoing projects) are potentially of high interest to MSP planners in the future. This, in turn, provides a vantage point from which to assess commonalities between Sea Basins.

### *Highlights*

Out of the 62 projects / initiatives that were considered, 48 were identified with potentially relevant MSP data-related outputs. 24 projects / initiatives are finalised and 24 are ongoing. Table 4 provides a sea basin overview of the distribution of different output categories. Figures 2 and 3 show the sea basin distribution of the MSP data-related outputs for complete and ongoing projects / initiatives, respectively. A detailed Sea Basin overview of complete and ongoing projects / initiatives is given in Annex 1 of this report. Here, we summarise important highlights and observations.

Table 4: Sea basin overview of different output categories from current (ongoing) projects / initiatives.

| | Stock-taking Maps | Knowl-edge Gaps | Data Portal | Mapping Tools | Assess-ment Tools | Data Policy | Trans-boundary Exchange |
|---|---|---|---|---|---|---|---|
| European | 2 (1) | 3 (1) | 2 (1) | 0 (1) | 5 (0) | 3 (0) | 0 (1) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Baltic Sea | 3 (2) | 4 (4) | 0 (2) | 4 (4) | 2 (4) | 3 (6) | 4 (5) |
| North Sea | 1 (1) | 2 (2) | 0 (0) | 1 (0) | 1 (0) | 0 (1) | 1 (2) |
| Atlantic | 1 (0) | 0 (3) | 1 (0) | 2 (0) | 1 (0) | 0 (1) | 1 (3) |
| Mediterr-anean | 3 (2) | 4 (3) | 0 (0) | 4 (0) | 2 (1) | 3 (1) | 4 (2) |
| Black Sea | 1 (1) | 2 (2) | 0 (1) | 2 (0) | 0 (0) | 1 (1) | 1 (2) |

Generally, data-related output from completed projects consist of a cross-section of most output categories across sea basins (Figure 2).

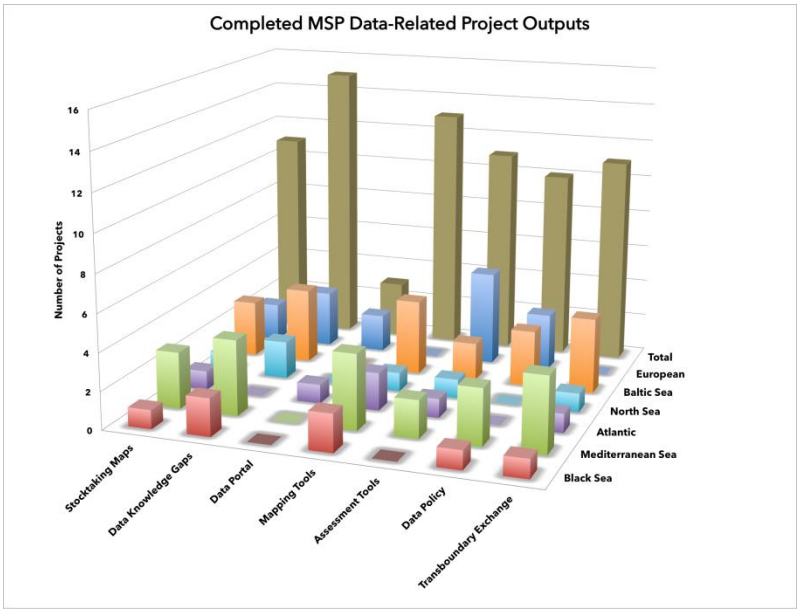


Figure 2: Sea basin distribution of MSP data-related outputs from complete projects / initiatives.

With ongoing projects, a shift in emphasis of the type of output is evident across sea basins and the trend is mostly towards (Figure 3):

- Stocktaking maps
- Data knowledge gaps
- Data policy
- Transboundary exchange

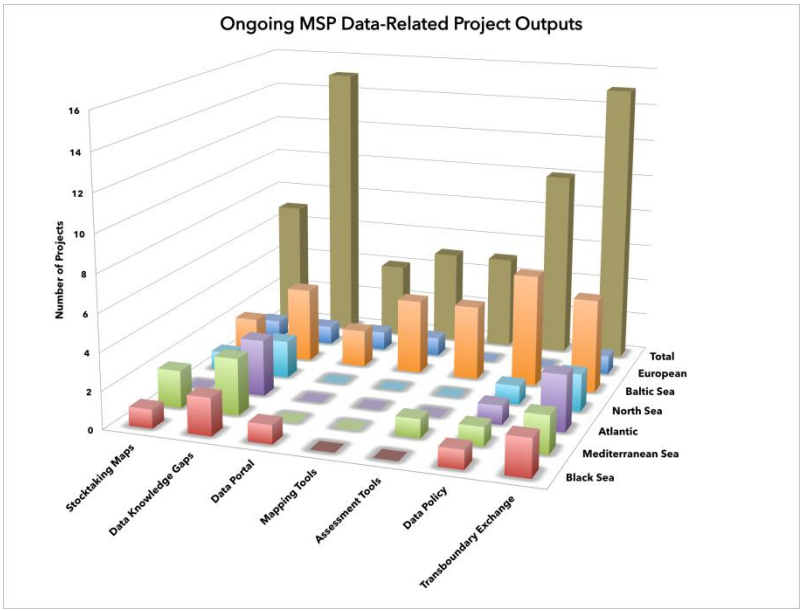


Figure 3: Sea basin distribution of MSP data-related output from ongoing projects / initiatives.

### *Stocktaking Maps and Mapping Tools*

Several stocktaking exercises have been carried out in the framework of MSP projects, mapping sea use (e.g. boundaries, environment, ecology and human activities) both regionally in the Atlantic, Baltic Sea, Black Sea, Eastern Mediterranean Sea and North Sea (e.g. MESH, BaltSeaPlan, EcoDump, Plan Bothnia, ArtWei, MISIS, SHAPE, ADRIPLAN, THAL-CHOR, C-Scope, Blast) and Europe-wide (e.g. ESaTDOR, CoExist).

Many of these efforts have resulted in the development of online mapping tools, a number of which have transitioned into operational systems. Most notable examples of these are: Belgium Coastal Atlas developed under C-Scope, Plan Bothnia integrated into HELCOM-VASAB data portal, MESH Seabed Habitat maps integrated into EMODnet, Adriatic Atlas developed under SHAPE, ADRIPLAN Data Portal developed under ADRIPLAN, the European Atlas of the Sea and THAL-CHOR web-GIS. More generally, spatial data mapping tools developed within projects have been proved to be useful demonstrations of transboundary mapping issues (e.g. TPEA, ArtWei, Plan Bothnia).

Among the ongoing projects / initiatives, stocktaking exercises are being led by MSP authorities and are evolving into stocktaking exercises of transboundary mapping issues which are focussed on a combination of specific sectorial interests. Notable project examples are: NorthSEE: A North Sea Perspective on Shipping, Energy and Environment Aspects in MSP, BalticLINES: Coherent Linear Infrastructures in Baltic Maritime Spatial Plans (both led by the German Federal Maritime and Hydrographic Agency) and MarsPlan: Cross-border Maritime Spatial Planning in Black Sea – Romania and Bulgaria (led by the Romanian Ministry of Regional Development and Public Administration).

***Data portals***

Very few of the projects developed data portals, and for those that did, the portals did not survive beyond the end of the project, underlining the limited value in developing a data portal in the project context in the absence of a long term data strategy. Where data portals have survived beyond the lifetime of the project, there is a clear link to either an underlying policy initiative or the project is managed by a public body with an interest in a longer term MSP data strategy. For example, the SPICOSA Data Portal which supports the integration of science and policy information for coastal system assessment in Europe, the SHAPE Adriatic Atlas and the ADRIPLAN Data Portal are managed by public bodies with a longer term interest in maritime planning. The latter two are in fact used at a sub-national level in Italy for planning purposes.

The various EMODnet data portals developed as a series of projects under the DG MARE EMODnet initiative are sustained by the underlying Marine Knowledge 2020 Strategy policy initiative. This illustrates the importance of long term data initiatives such as EMODnet which not only provide access to data but also have a role to play as data stewards ensuring that the data generated through various means, including research projects, are safeguarded and made available for re-use beyond the life time of a project. In addition, data infrastructures such as SeaDataNet, the network of National Oceanographic Data Centres (NODC) which provides the backbone of some of the EMODnet data portals, has been developed and maintained as a series of European Framework Programme projects.

***Data and knowledge gaps, data policy and transboundary data exchange***

Data and knowledge gaps are examined in some form or another in many of the finalised and ongoing projects / initiatives. Common challenges with respect to data gaps, data policy and transboundary data exchange are found at the European, sea basin and regional scales.

These include:

- Availability of suitable **data sets in consistent manner** (i.e. compatible formats) across sea basins and regions, coherence across boundaries.
- **No statistical unit** (i.e. NUTS equivalent) for sea space.
- Difficulty in **disaggregating information between land and sea**.
- **Paucity of data or information** on land-sea interactions, e.g. degree to which coastal communities are dependent on their links to adjacent seas and the potential for them to benefit from growing maritime sectors.
- **Limited access to social, economic and governance data**, although this is improving.
- Gaps and weaknesses in **historical time series**, and ensuring data quality.

- **Translating data and information into indicators**, although this is improving, in particular in the light of MSFD implementation and efforts by HELCOM, EEA, OSPAR.
- Accessing / handling **tacit knowledge** in a transparent manner.
- **Spatial dimension of future trends and developments**.
- **Transboundary specific**: language issues, political agreement, cooperation between local and regional interest groups.

***Assessment tools***

We found a number of examples in projects where **various assessment tools were called for** to support the interpretation of information and building of evidence for MSP (Table 5). We also found instances where some assessment tools were developed and/or applied throughout the course of a project, however, we found **very little evidence** during the consultation process with MSP authorities **that any of these were actually being used by MSP planners**.

It should be noted that Table 5 relates to complete / finalised projects. Most notably within the currently ongoing BalticLINes and NorthSEE projects, which are implemented by the MSP authorities around the Baltic and North Sea countries, project partners work towards further developing the current '**MSP Challenge**' game (which has so far mainly been used to raise awareness of stakeholders towards the overall MSP dimension as well as for educational purposes) into a '**simulation tool**', which shall assist MS Planners as well as sectors to visualise the **spatial dimension of future trends and developments as well as sea-basin wide planning issues** – and thus potentially provide support for future planning decisions to be taken by the respective EU Member States.

Table 5: Examples of assessment tools found in complete projects.

| **Type of Assessment Tool** | **Project (s)** | **Geographic Scope** |
|---|---|---|
| Applied modelling tools to support management (e.g. environmental investigations, sedimentary patterns, site selection, ecological risks) | EcoDump (2011 – 2014)<br><br>MESH (2004 – 2008) | Baltic Sea: Lithuania / Poland<br>Atlantic |
| Maritime region typology: sea uses and land-sea interactions (i.e. economic significance, flows and environmental pressures) | EsaTDoR (2010 – 2013) | European |
| Interactions and risk analysis | MESMA (2009 – 2013)<br>COEXIST (2010 – 2013) | European<br>European |

| | | |
|---|---|---|
| | C-Scope (2008 – 2011) | North Sea |
| Decision support software for conservation planning, e.g. MARXAN | developed in Australian Nectar project<br>used in BaltSpace | Baltic Sea |
| Cumulative impact assessments | ADRIPLAN (2013 – 2015) | Adriatic-Ionian Seas |
| Conflict Score Tool | ADRIPLAN (2013 – 2015) | Adriatic-Ionian Seas |
| Data harmonisation across boundaries, for example nautical information | Blast (2009 – 2012) | North Sea |
| Future scenario planning | Options CIS | European |

***How are these projects adding value to MSP authorities?***

It is interesting to observe that issues which have been identified in finalised projects have in some cases been picked up as policy issues and are being addressed at national and transboundary levels through ongoing projects / initiatives.

A notable example of this is the special case of the Baltic Sea region where one can trace the evolution of MSP over the last 14 years. The idea of sea-use planning was introduced as far back as 2002 in the BaltCoast project. This was followed by a 14 year period marked by a series of subsequent projects that built on each other both thematically and institutionally. The data and information theme was first highlighted in 2005 and has continued to be a focus. Today, the ongoing BalticLINES project (2016 – 2019) is tackling the development of a spatial data infrastructure to support the transnational coherence of shipping routes and energy corridors in maritime spatial plans in the region.

While the Baltic Sea Region may be the frontrunner with respect to transboundary MSP data exchange, it is still at the beginning of true transboundary data exchange. Operational transboundary MSP data exchange in this region is still a way in the future, never mind in other European Sea Basins.

Nevertheless, the Baltic Sea Region does provide a good model for other Sea Basins on transboundary MSP collaboration and continued EU support for transboundary MSP projects and initiatives. This particularly concerns applied projects, which are led by and involve MSP authorities. Such projects are recommended across all Sea Basins (see Case Study "Putting transboundary MSP data policy into action: a history of MSP collaboration in the Baltic Sea Region").

Other projects and initiatives worth noting from the MSP planners perspective that address data and knowledge gaps, data policy and transboundary data exchange are SHAPE (2011 – 2014) which identified the most relevant topics and data for ICZM and MSP in the Adriatic Sea and ADRIPLAN (2013 – 2015) which developed an exercise for maritime spatial plan of the Adriatic-Ionian region and implemented the now operational, ADRIPLAN Data Portal. Meanwhile, the ShoCMed project (2008 – 2014) defined criteria and identified priorities to improve the knowledge on site selection and carrying capacity

for aquaculture, for the development of sustainable marine aquaculture within an ecosystem based perspective along coastal areas of the Mediterranean.

In the Black Sea, the MISIS project (2012 – 2014) undertook a first stocktaking exercise of the western Black Sea and an initial assessment of data management needs. This has been succeeded by MARSPLAN (2015 – 2017), which aims to create a cross-border institutional framework for MSP data exchange between Romania-Bulgaria.

In the Atlantic, the TPEA project (2012-2014) developed a transboundary GIS/web viewer for the two case study areas of Spain/Portugal and Ireland/Northern Ireland.

Three further ongoing projects which are of high interest to various Member States should be mentioned:

The first is the NorthSEE project (2016 – 2019), which shall provide a North Sea perspective on shipping, energy and environment aspects in MSP. It is notable that this project is led by an MSP authority and entails a collaboration between MSP authorities.

The second is the SIMCelt project (2016 – 2017), which aims to support the implementation of the MSP Directive by Member States within the Celtic Seas and cross-border cooperation between these Member States. One of its specific objectives is to identify and address data gaps and support the coherence of data analysis across marine area boundaries.

The third is the effort by the European Commission to assemble marine data, data products and metadata from diverse sources in a uniform way through the European Marine Observation and Data Network (EMODnet). EMODnet is not a project in itself, but rather a long term marine data initiative developed through a series of projects launched by the European Commission's Directorate-General for Maritime and Fisheries (DG MARE) in 2009. It is a key implementation mechanism of its Marine Knowledge 2020 strategy. Essentially, EMODnet is a network of approximately 160 organisations working together to observe the sea, process the data according to international standards and make that information freely available as interoperable data layers and data products.

The principles of EMODnet are to:

- collect data once and use it many times,
- develop standards across disciplines as well as within them,
- process and validate data at different levels. Structures are already developing at national level but infrastructure at sea-basin and European level is needed,
- provide sustainable financing at an EU level so as to extract maximum value from the efforts of individual Member States,
- build on existing efforts where data communities have already organized themselves,
- develop a decision-making process for priorities that is user-driven,
- accompany data with statements on ownership, accuracy and precision, and

- recognise that marine data is a public good and discourage cost-recovery pricing from public bodies.

EMODnet has now become a centralised gateway to a range of data archives managed by local, national, regional and international organisations providing access to European marine data across seven thematic areas: bathymetry; geology; seabed habitats; chemistry; biology; physics; human activities. The recent addition of the EMODnet Human Activities data portal (www.emodnet-humanactivities.eu) is particularly relevant for MSP as it provides access to an expanding range of harmonised datasets covering human activities across all European Sea Basins. In the future, the EMODnet Human Activities data portal could also host national MSP data layers for visualisation and download.

A first assessment of the availability of marine data required to solve specific problems in each of Europe's sea-basins is being undertaken through the EMODnet Sea-basin Checkpoints, the outcomes of which may help with the coordination of MSP at a regional level. These EMODnet Checkpoints are data 'stress test' exercises where the fitness for purpose of existing marine data services to meet particular commercial and policy challenges with relevance to MSP is being assessed. The assessment also tests whether or not these existing marine data services meet the needs of public and private users. The challenges include wind farm siting, marine protected areas, oil platform leak, climate and coastal protection, fisheries management, marine environmental management, river inputs to the coastal environment. Audits of marine data services are being carried out to evaluate the availability and adequacy of data to solve these challenges.

For each challenge, **Data Adequacy Reports (DARs)** are being produced which provide insight into the type of difficulties encountered when solving the challenges and in doing so, will identify data gaps and duplications. For example, in the case of the Windfarm Siting challenge, the checkpoints will determine the suitability of sites for development of a wind farm taking into account all aspects including wind strength, seafloor geology, environmental impact, shipping lanes. The exact details depend on the sea basin, but in most cases they include taking into account data from more than one nation's waters and in the process, evaluate the adequacy of existing sources of data to fulfil the challenge.

So while the type of challenges that are set across all sea basins are the same, it is expected that the results of the data stress tests will identify a number of sea-basin specific data gaps and issues, as well as possible solutions and commonalities..

At the time of writing this report, DARs for all Sea Basins are available on the DG MARE Maritime Forum (some of them are still in draft form undergoing a review process) and on the respective EMODnet Sea-Basin Checkpoint webpages[16]. The main findings in each sea basin will be presented at the "EMODnet Sea-basin Checkpoints Stakeholder Conference"[17] in Brussels on 14 and 15 February 2017.

[16] EMODnet Sea Basin Checkpoints : http://www.emodnet.eu/checkpoints

[17] http://www.emodnet.eu/upcoming-events

During the consultation process with Member States, it became clear that MSP authorities were not entirely familiar with the activities of EMODnet and the EMODnet Sea-basin Checkpoints. However, EMODnet is becoming more visible in general, so more and more, planners know what it is and understand its potential to support regional planning efforts and transboundary data exchange. All Member States expressed a high level of interest in the outputs of the Sea Basin Checkpoints.

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## Chapter 4: Review of Data Infrastructures with Relevance to MSP

### *Overview*

The basis for the review of data infrastructures with relevance to MSP was the MSP Directive which indicates that maritime plans should consider relevant interactions between environmental, economic, social and safety aspects with respect to activities and uses of marine space. Building on what has been identified as the potential range of themes and categories of data and information that MSP planners are interested in, a systematic analysis of data infrastructures across European sea basins was carried out in order to identify the scope and potential relevance of existing data infrastructures to MSP processes. The focus is on European and National level systems which are operational (i.e. regularly updated and maintained). Themes and sub-themes adopted from the MMO Evidence Strategy 2015 – 2020 were used to establish the scope of the data infrastructure with respect to providing relevant data for MSP purposes.

Key questions are:

1. What is it exactly?
   a. Data Catalogue (typically a listing of data, its availability and how to source);
   b. Data Portal (online direct access to data sets)
   c. GIS Mapping Tool (access to mapping tool to display spatial data)
   d. Information Service (service which aggregates data into information product)
   e. Assessment Tool (method or specialised tool to support further analysis and interpretation)
2. What is its spatial coverage?
   a. European, Sea Basin, Regional, National
3. Which themes[18] and sub-themes does it address within the planning cycle?
   a. Describing the marine area:
      i. state of the environment,
      ii. distribution of human activities,
      iii. social value of human activities and environment,
      iv. economic value of human activities and environment.
   b. Interactions in the marine area:
      i. pressures resulting from human activities,
      ii. sensitivities,
      iii. potential impacts and effects of human activities,
      iv. interaction pathways.
   c. Integrated management:
      i. integrated assessments,
      ii. tools for monitoring and evaluating management approaches,
      iii. methodologies for adaptive management.

[18] MMO Evidence Strategy 2015 – 2020.

The objective here is to establish which operational data infrastructures are holding data which is potentially available for MSP purposes and which of these data infrastructures are actually used by MSP planners.

### *Highlights*

A total of 60 data infrastructures that potentially address one or more of the above MSP process themes have been identified so far. A complete listing of these can be found in Annex 2 of this report. Among these, we find a broad coverage of different types of data infrastructures across the different sea basins, with data portals being at the forefront, followed by GIS mapping tools and information services (Figure 6).

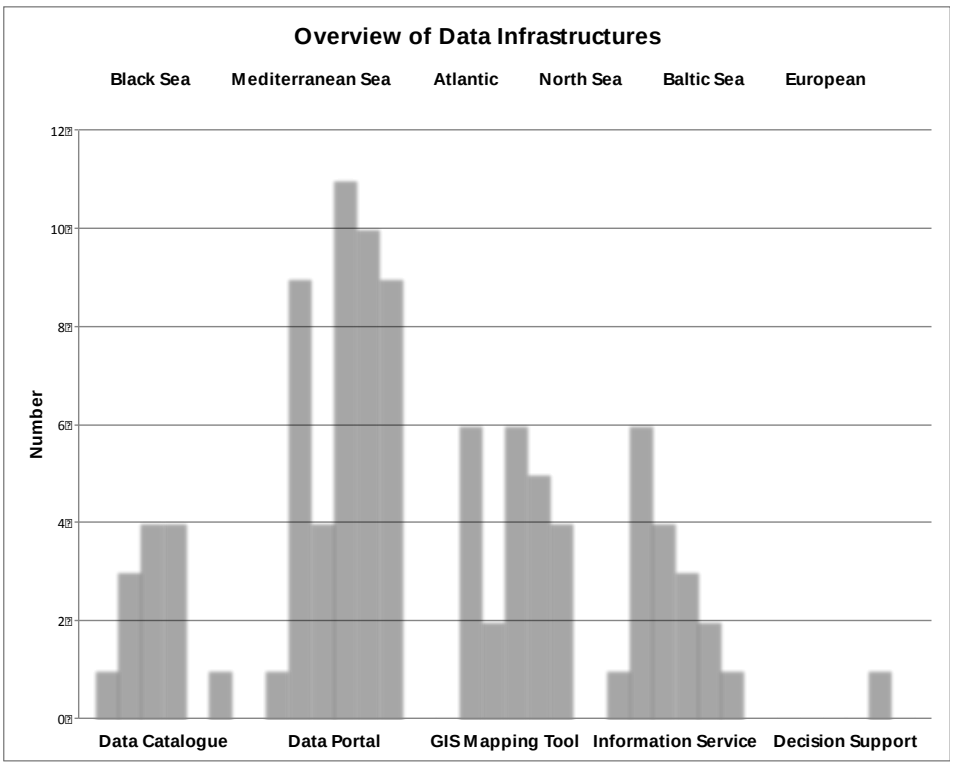


Figure 6: Sea Basin Overview of Data Infrastructures.

A sea basin analysis of the relevance of different types of data infrastructures to MSP process themes reveals that **most data infrastructures**, especially data portals, GIS mapping tools and information services, are addressing **theme a) describing the marine environment** (Figure 7). To a lesser extent, there are some data catalogues, data portals and GIS mapping tools which address theme b) interactions in the marine area. We only found one assessment tool in the Baltic Sea (i.e. BalticNest Decision Support System (DSS)) which potentially addresses theme c) integrated management and is in the public domain.

The BalticNest DSS consists of a series of modelling and analysis modules which provide a framework for identifying nutrient reductions to achieve good environmental status in the Baltic Sea Region. The system integrates atmospheric emissions and loads, riverine and marine data, catchment agriculture data, a catchment model, a fishery management

model, a hydrodynamic model and a cost minimisation model. It is aimed at both researchers and managers and can be run in expert and manager mode. The model is intended as a tool in management, but at the same time, underlying assumptions and model parameters are presented in a transparent way for scientists to evaluate[19].

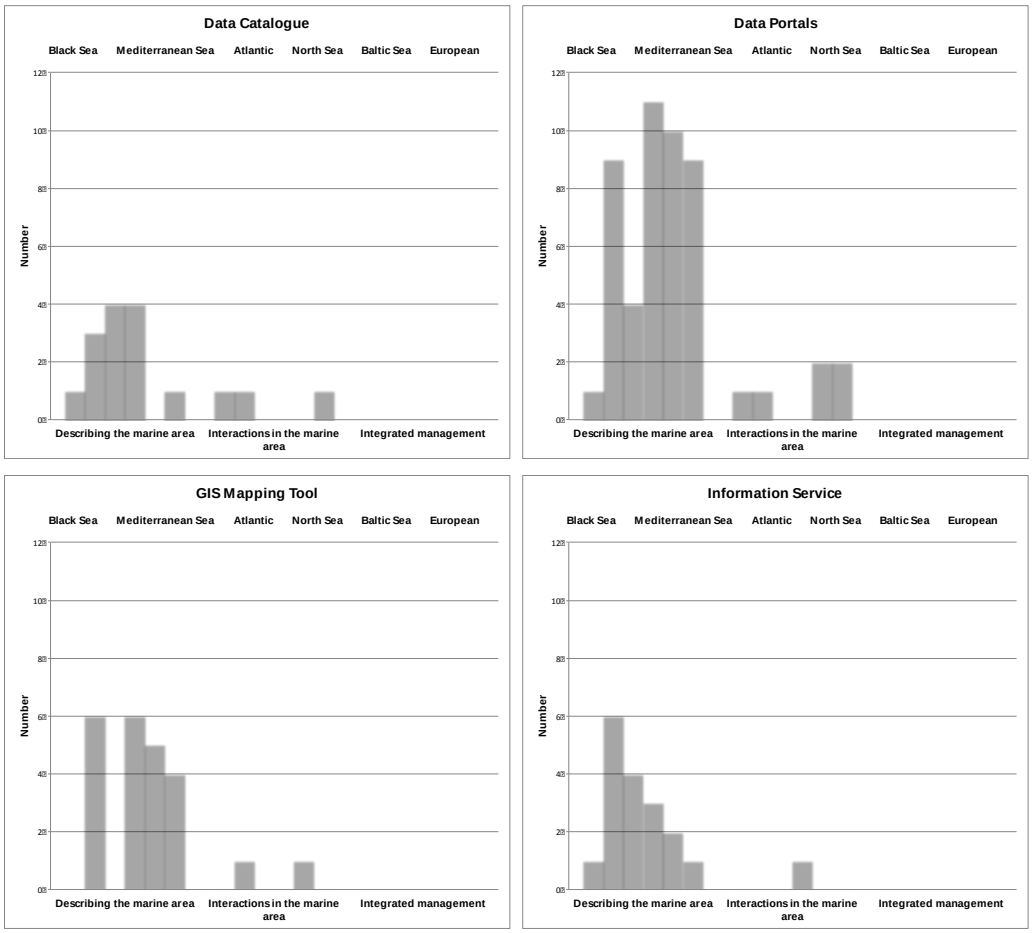


Figure 7: Sea basin distribution of data infrastructure type by MSP process theme.

Further investigation highlights how most of the data and information contained within the data infrastructures is **heavily biased towards sub themes (i) the state of the environment** and **(ii) distribution of human activities** under theme a) describing the marine area (Figure 8).

To a much lesser extent, there are some data infrastructures which address (iii) social value of human activities and environment and (iv) economic value of human activities and environment under theme a). We found a modest number of data infrastructures which potentially address all of the sub themes under theme b) interactions in the marine area, but the numbers are very small, between 1 and 2 options distributed across most sea basins.

[19] http://www.balticnest.org/balticnest/thenestsystem.4.2beb0a011325eb5811a8000127598.html

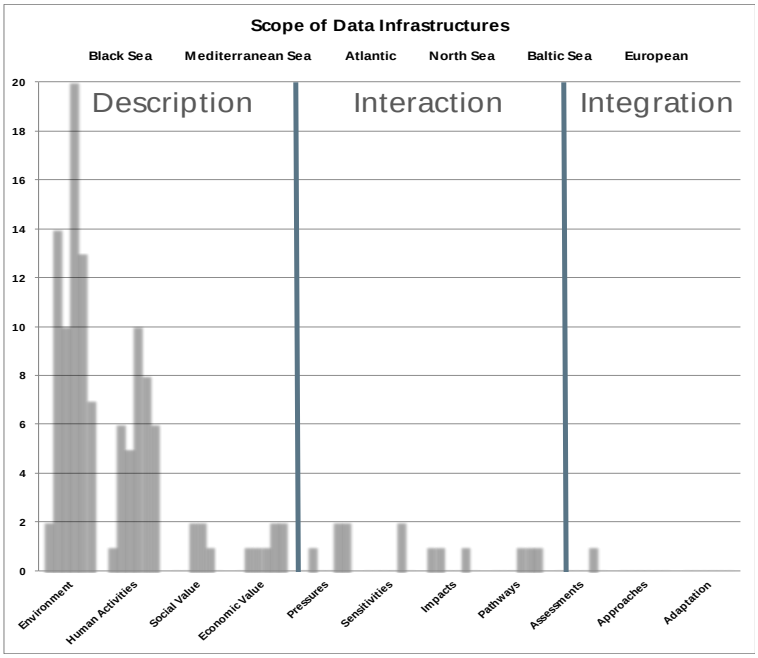


Figure 8: Sea basin distribution of scope of data infrastructures under MSP process theme.

The feedback received from Member States with regard to actually using operational data infrastructures indicates that about **half of these data infrastructures (33) are being used regularly by MSP planners both for describing the marine environment and to analyse interactions in the marine area** (see Table 6 below).

The list below is only indicative of the feedback from countries we had the opportunity to consult with in detail on data infrastructures and what is known in the public domain. While it may not be exhaustive, it does underline the strong bias towards data infrastructures serving descriptive data, and to a lesser extent some interactions within the marine area.

The **HELCOM Data and Map Service, is the only data infrastructure that manages a comprehensive set of analyses which address interactions in the marine area**.

Table 6: Marine data infrastructures that are actually used by MSP planners.

| **Name** | **MSP Theme** | **Scope** | **Coverage** |
|---|---|---|---|
| World Ocean Atlas | Describing marine area | Physics, Chemistry, Biology | Global |
| GEBCO | Describing marine area | Bathymetry | Global |
| EEA Database | Describing marine area<br>Interactions in marine area | Physics, Chemistry, Biology<br>Human activities | European |

| | | | |
|---|---|---|---|
| EMODnet Thematic Lots | Describing marine area<br>Interactions in marine area | Physics, Chemistry, Biology<br>Human activities | European |
| SeaDataNet | Describing marine area | Physics, Chemistry, Biology<br>Bathymetry | European |
| European Atlas of the Sea | Describing marine area | Physics, Chemistry, Biology<br>Human activities | European |
| Eurostat Database | Describing marine area | Economic value of human activities | European |
| ESPON 2013 Database | Describing marine area | Human Activities | European |
| INSPIRE Geoportal | Describing marine area | Diverse | European |
| ICES Data Portal | Describing marine area | Physics, Chemistry, Biology | European |
| Copernicus MEMS | Describing marine area | Physics, Chemistry, Biology | European |
| SHOM Marine Data Portal: data.shom.fr | Describing marine area | Maritime boundaries and geophysical data, cables and pipelines, TSS | Global - French maritime areas |
| Spanish Harbours Authority | Describing marine area | Physics | Atlantic, West Mediterr-anean Sea |
| Balearic Islands Coastal Observing and Forecasting System | Describing marine area | Physics | West Mediterr-anean Sea |
| HELCOM Map and Data Service | Describing marine area<br>Interactions in marine area | State of the biological, physical and chemical environment<br>Distribution of human activities<br>Sensitivities<br>Pressures resulting from human activities<br>Social value of human activities and the environment<br>Economic value of human activities and | Baltic Sea |

| | | | |
|---|---|---|---|
| | | the environment | |
| Baltic Sea Bathymetry Database | Describing marine area | Bathymetry | Baltic Sea |
| SMHI Open Data Catalogue | Describing marine area | Physics | Baltic Sea |
| SEAGIS | Describing marine area | Diverse | Baltic Sea |
| GeoSea-Portal | Describing marine area | Physics, Chemistry, Biology<br>Human activities | Germany |
| Marine Data Infrastructure Germany | Describing marine area | Physics, Chemistry, Biology<br>Human activities | Germany |
| CONTIS | Describing marine area | Physics, Chemistry, Biology<br>Human activities | Germany |
| POSEIDON | Describing marine area | Physics | Greece |
| THAL-CHOR WebGIS | Describing marine area<br>Interactions in marine area | Distribution of human activities<br>Pressures resulting from human activities | Greece / Cyprus |
| Cyprus Coastal Ocean Forecasting Observing System | Describing marine area | Physics | Cyprus |
| SHAPE Adriatic Atlas | Describing marine area<br>Interactions in marine area | Physics, Chemistry, Biology, Geology, Bathymetry<br>Human activities | Adriatic Sea |
| ADRIPLAN Data Portal | Describing marine area<br>Interactions in marine area | Physics, Chemistry, Biology, Geology, Bathymetry<br>Human activities | Adriatic Sea |
| Flemish Banks Monitoring Network | Describing marine area | Physics | Belgium |
| Marine Atlas | Describing marine area<br>Interactions in marine area | Physics, Chemistry, Biology, Geology, Bathymetry<br>Human activities | Belgium |
| Belgian Coastal Atlas | Describing marine area<br>Interactions in marine | Physics, Chemistry, Biology, Geology, Bathymetry | Belgium |

| | | | |
|---|---|---|---|
| | area | Human activities | |
| Noordzeeloket | Describing marine area<br>Interactions in marine area | Physics, Chemistry, Biology, Geology, Bathymetry<br>Human activities | Netherlands |
| informatiehuis marine (Marine Information House) | Describing marine area | Physics, Chemistry, Biology | Netherlands |
| Marine Spatial Data Infrastructure Denmark | Describing marine area<br>Interactions in marine area | Physics, Chemistry, Biology, Geology, Bathymetry<br>Human activities | Denmark |
| MMO Marine Planning Evidence | Describing marine area<br>Interactions in marine area | Physics, Chemistry, Biology, Geology, Bathymetry<br>Human activities | UK |

# Chapter 5: Case Studies

## *Case Study 1: Putting transboundary MSP data policy into action - a history of MSP collaboration in the Baltic Sea Region*

### The special case of the Baltic Sea Region (BSR)

The specific political, historical and environmental circumstances of the Baltic provide a particular context that has greatly influenced the region's ability to engage in transboundary MSP. Below we set out some of the factors that contribute to the Baltic's ability to collaborate.

Firstly, compared to other regional seas, the Baltic Sea has a strong tradition of environmental protection, dating back to the Helsinki Convention that was first signed in 1974. From its original purpose of addressing the state of the environment and chemical and nutrient pollution, the Convention changed the focus to eutrophication and later to more holistic approaches and ecosystem considerations. Stakeholder participation became part of HELCOM operations in the 1990s (observers, stakeholder workshops). The 2008 Baltic Sea Action Plan (BSAP) introduced the Ecosystem Approach to the Baltic and was prepared in parallel to the MSFD with a conscious aim of coordinating the two policies. One of the most recent developments within HELCOM has been the active promotion of MSP in a joint working group with VASAB. Throughout its existence, data and information played an important role, resulting in the establishment of shared HELCOM databases on environmental parameters and the publication of Baltic Sea-wide maps and reports.

Secondly, the Baltic Sea stands out on account of its diversity of transnational governance institutions. The area has several intergovernmental organisations (HELCOM, CBSS, VASAB) and an even larger number of non-governmental international networks, adding variability to the discourse on environmental protection of the Baltic Sea (Kannen et al. 2012) and enabling a culture of transnational collaboration in the field of environmental management and spatial and regional development. Visions and Strategies around the Baltic Sea 2010 (VASAB), established in 1992 focuses on developing common approaches and exchange of experiences in spatial planning and regional development; it began to develop regional approaches to MSP together with HELCOM in 2010.

An additional "soft" factor is the long and intimate history of transnational cooperation and international trade. Even the Iron Curtain did not disrupt the shared sense of identity that has long existed around the Baltic. When the socialist regimes ended, a new period of collaboration started almost immediately. It is interesting to note that in the Black Sea region, similar collaboration across the former west/east divide is much weaker (Kannen et al. 2012).

The latest significant change has been the EU's eastern enlargement. Today Russia is the only riparian state that is not a member of the EU. This has significant consequences for policy in that all countries but one are required to implement EU Directives. The MSFD Directive, for example, changed the status of the Helsinki Convention in the sense that

EU Directives are now the strongest instruments to guide the actions of the member states.

**A brief history of MSP in the BSR**

The Baltic Sea Region is often described as a forerunner in transboundary MSP due to a long history of collaboration that dates back to 2002[20].

MSP was started by VASAB in the Baltic Sea Region. In 2001, the plea for MSP appeared in the Wismar Ministerial Conference of VASAB. This gave the reason for the first world-wide international project on MSP – BaltCoast. (Figure 4)

The first joint MSP project in the BSR was **BaltCoast (2002-2005)** which applied the concept of ICZM to offshore areas and combined it with the strengths and tools of spatial planning. The BaltCoast project was led by the Mecklenburg-Vorpommern (MV) Ministry of Transport, Building and Regional Development which was keen to use the transnational experience to strengthen its own MSP process. At the time, MV was already engaged in developing the state's first maritime spatial plan, which was formally adopted the same year that BaltSpace ended (in 2005).

BaltCoast carried out the first comprehensive inventory of offshore uses and demands in the Baltic Sea. The inventory demonstrates expanding demands, including shipping, offshore wind farming, nature protection, coastal and marine tourism, mineral extraction (oil, gas, sand), and utility networks, and notes that many of these can be conflicting. The offshore recommendations developed on the basis of this analysis[21] highlight the need to systematically exchange information on offshore areas. Improving the availability and accessibility of mapped information was a key demand, leading to the recommendation of a GIS-based "fact bank" on offshore uses with secured updating routines and easy access across borders. The project notes that in most BSR countries existing and planned offshore uses are not systematically mapped and that existing information is scattered and difficult to access. Specific data recommendations include (1) the nomination of national contact points with legal competence for organising offshore geo-information compilation, storage (exchangeable GIS format) and distribution, (2) the definition of transnationally agreed standard information to be collected, (3) the collection and regular updating of data by various responsible institutions to ensure data quality, and (4) facilitation of free transnational access to relevant information for spatial planning authorities.

The **PlanCoast project (2005-2008)** expanded the BaltCoast approach by including a greater diversity of partners and stretching to the Adriatic and Black Sea. PlanCoast also resulted in specific data and information recommendations[22] – some of which are still valid today. In line with its MSP planning cycle, a key recommendation was to carry out a regular analysis of coastal and marine uses and to prepare integrated and constantly updated maps of marine spatial uses through ongoing spatial observation and

[20] Zaucha, 2014a; 2014b

[21] BaltCoast Inventory, 2015.

[22] PlanCoast Handbook, 2008.

monitoring. Countries were recommended to maintain an updated database of uses and their impacts, although there was no specification as to what data and impacts this should contain. PlanCoast also specifically referred to the need for data to be comparable and accessible and uses the EU INSPIRE Directive as a common framework. Recommendations include (1) to agree on a form of systematic information exchange, (2) to bring together coastal and marine data collection and data management in one institution, and (3) to formalise data flows by creating a regularly updated coastal and maritime cadastre. A distinction was drawn between the regular monitoring of trends (for which relevant data should be collected regularly and continuously) and specific planning tasks, which may only require the collection of specific data related to acute spatial problems. There was no immediate implementation of any of these recommendations, as most countries had only begun to designate MSP authorities at the time; nevertheless they represented a solid grounding for subsequent project work and also national considerations for designing MSP processes.

Discussions on **BaltSeaPlan (2009-2012)** began in 2007, two years before the actual project started, in line with the publication of the EU Blue Book on Integrated Maritime Policy. When BaltSeaPlan was conceived, there was still considerable uncertainty as to which authorities would become tasked with MSP in the various countries. Active partners in the project therefor included those institutions and organisations that could expect to be given an active role in MSP in their countries. They included marine research institutes and universities as well as NGOs as important stakeholders and/or organisers of stakeholder participation in MSP processes. With respect to data and information, this turned out to be useful because many of the partners were also data providers or providers of modelling tools.

A key aim of BaltSeaPlan was to improve the information base for MSP. This included compilations of current uses, natural values and conflicts in the Baltic Sea, clarifying MSP data needs, identifying data and information sources, filling data gaps and exchanging data, identifying relevant modelling methods and developing an MSP data governance model. The project had a dedicated data team which identified knowledge gaps in MSP; these included the lack of spatial attribution of environmental data, a lack of knowledge on cumulative impacts and interactions of human activities on the marine ecosystem, underwater cultural heritage and information on the economic valuation of planning decisions.

In the meantime HELCOM joined VASAB in pursuing MSP in the BSR. In 2010 a joint working group on MSP was launched, replacing the VASAB working group that prepared policy foundations for transboundary MSP in the BSR.

In 2010, one year into the BaltSeaPlan project, the HELCOM/VASAB MSP Principles were published.

Principle 6 refers to high quality data and information basis. It states that "Maritime Spatial Planning should be based on best available and up to date comprehensive information of high quality that to the largest extent possible should be shared by all. This calls for close cooperation of relevant GIS and geo-statistical databases, including the HELCOM GIS, for monitoring and research in order to facilitate a transboundary data

exchange process that could lead to a harmonised pan-Baltic data and information base for planning." This base should cover historical baselines, present status as well as future projections of both environmental aspects and human activities. It should be as comprehensive, openly accessible and constantly updated as possible. Also, compatibility with European and Global initiatives should be ensured."[23] At about the same time, the EU MSP Principles were published, also referring to the need for a strong data and knowledge base. Referring to the European Marine Observation and Data Network (EMODNET) as a valid base for MSP, the principles state that data should be managed at the appropriate level (global, European, regional, national, local) and acknowledge that different types of knowledge (environmental, socio-economic, etc.) are needed. They further state that the gathering of data and of relevant knowledge should be carried out on the basis of collaboration within maritime regions, not only between EU Member States, but also with other parties within those regions; third countries, regional organisations, as well as other stakeholders. By 2010, the topic of data and information for MSP had thus reached the strategic Baltic and European level.

The **BaltSeaPlan Vision 2030** points at data and information as a key factor of success. In the "vision of the future", the following idealised picture is drafted of MSP data and information in the Baltic:

- Human activities and uses are mapped and these maps are constantly updated.
- Ecosystem services have been described in a spatial context and mapped in order to show the spatial distribution of ecosystem values.
- Information of lifecycles and demands on species (nursery areas / spawning sites) and the interrelationship with other spatial claims is available to enable this issue to be dealt with at transnational level.
- An information base has been created, which brings together uses, pressures and their impacts, as well as environmental information and habitat maps.
- Indicators for good environmental status are in place and implemented in full.
- A sensitivity index has been developed for the Baltic Sea and knowledge gaps have been identified and filled accordingly.
- The economic value of ecosystem benefits has been described.

BaltSeaPlan describes the existing data challenges as data availability/quality, decentralised data storage, restrictions on data access, issues of scale and resolution (leading to problems with mapping), and selective scope of data coverage. The HELCOM and CONTIS databases are highlighted as potential integrated databases for the management in the Baltic Sea and for implementing MSP, as are the EMODNET, MDI-DE and INSPIRE geo-portals, although none have a specific MSP focus. The project further notes that no country in the Baltic Sea Region currently has an integrated marine database at the national level. Yet, many countries were developing relevant networking attempts, usually driven by the need to implement the INSPIRE Directive. Various

[23] HELCOM/VASAB Principles, 2010.

databases are currently being developed, partly available as Web Map Services or via geoportals. The final data report notes that "it is no longer the lack of databases, but their impenetrable complexity which presents the biggest challenge for an integrated marine data infrastructure. At the same time, it seems that nobody has any real intention of unifying the national/sectorial marine databases."[24]

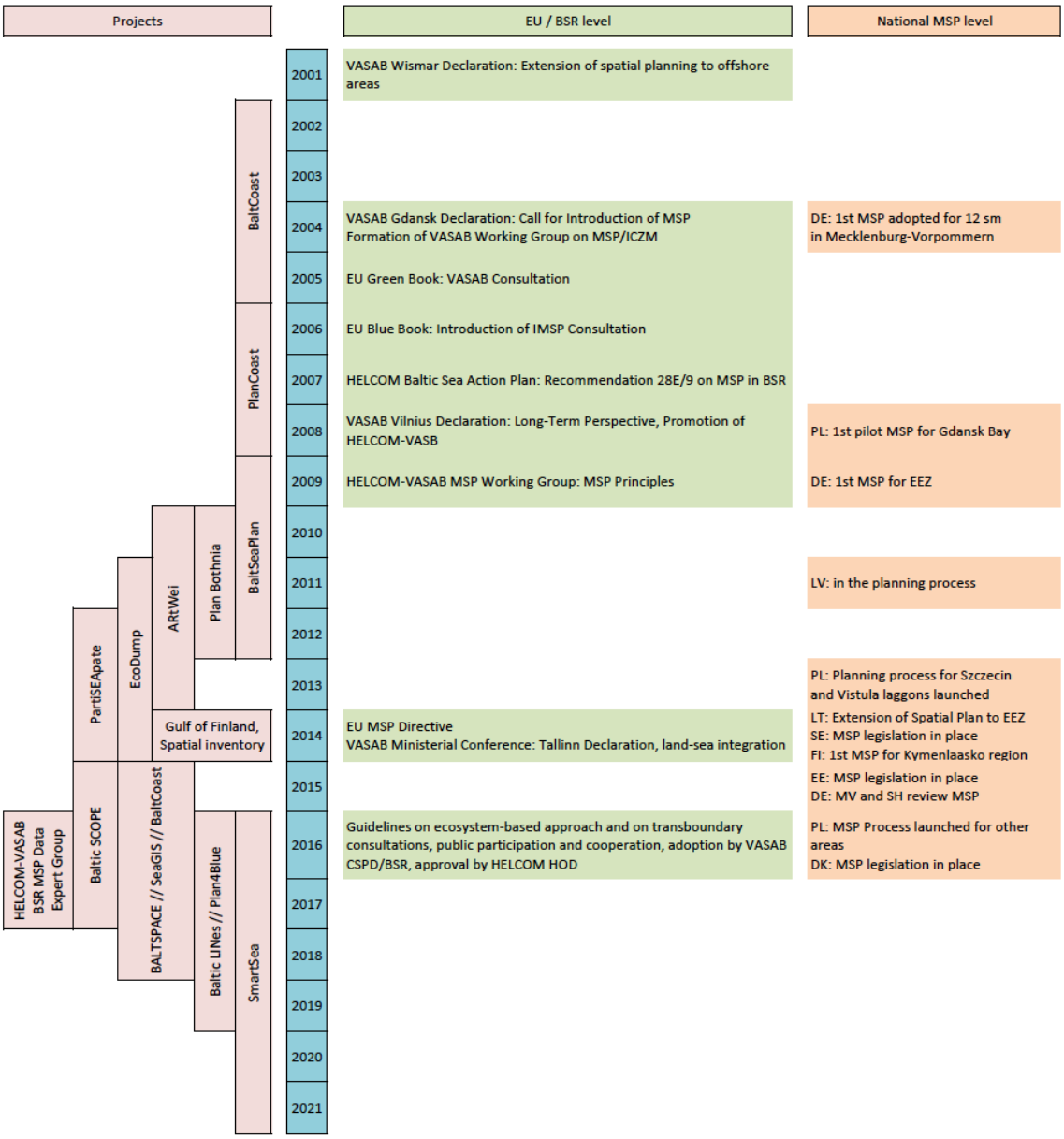


Figure 4: An overview of MSP projects, events at the EU and BSR policy level, and national MSP developments (adapted from Schultz-Zehden and Gee, 2012 and updated with more recent information).

[24] Schultz-Zehden and Gee, 2013.

A key BaltSeaPlan recommendation is the creation of a pan-Baltic MSP infrastructure for up to date, transferable and interoperable MSP data and metadata. In line with this, BaltSeaPlan recommends to amend the INSPIRE Directive with respect to marine space and maritime features to cover relevant aspects. A transnational network for MSP data exchange is proposed consisting of a pan-Baltic MSP Data Coordinating group (managing the Baltic MSP infrastructure, making available pan-Baltic MSP relevant data sets, creating harmonised Pan Baltic MSP relevant data sets from national data etc), national and regional MSP data contact points (making national MSP relevant data available to the MSP Infrastructure), and MSP data providers, offering their data to the regional / national MSP data contact points according to set rules. A portal is suggested to facilitate data exchange, offering digital maps and geodata services. Another key recommendation is the set-up of a permanent MSP Data Expert Group to act as an advisor, consisting of spatial planners and GIS experts from all BSR countries, with additional experts to be appointed and/or consulted as necessary. This expert group should be tasked with:

a. monitoring and proposing improvements to the content of pan-Baltic data sets and the data exchange system,
b. providing methodology for MSP in relation to data needs and management, and advising on gaps to be filled,
c. ensuring the link to other data networks as mentioned above,
d. ensuring the link to the Transnational MSP Coordination Secretariat (BaltSeaPlan Vision 2030).

The **PartiSEApate project (2012-2014)** continued the work of BaltSeaPlan with a specific focus on multi-level MSP governance. This was a timely shift of focus away from technical data issues and towards transboundary processes and procedures. PartiSEApate proposed a general structure for implementing multi-level MSP governance including data and information, outlining specific roles and responsibilities of the various bodies and giving particular weight to the HELCOM/VASAB MSP Working Group. Dedicated sub-groups were suggested as a mechanism for dealing with specific topics, again including data and information[25].

PartiSEApate worked to establish a pan-Baltic MSP Data Expert Group, which was duly set-up in 2014. Its terms of reference are similar to those proposed by BaltSeaPlan, and it is receiving administrative support from VASAB and HELCOM. The group has met regularly since and is currently developing proposals for common data sets and a data exchange system. Although no tangible products or mechanism for data exchange have yet been created, first steps towards such a system have been taken, not least because the group brings together planners and data/GIS experts to enable a clear understanding of planning needs and technical capabilities.

2014 marked the adoption of the EU MSP Directive with the main purpose of promoting consistency and coherence of maritime spatial plans across marine regions. In parallel,

[25] Schulz-Zehden and Gee, 2016

the HELCOM-VASAB MSP working group developed a regional set of MSP principles and adopted the Regional Baltic MSP Roadmap 2013-2020, which – among others – foresees to develop guidelines relating to MSP governance as well as regular reporting by countries on their MSP development. Maritime Spatial Planning is also a horizontal action of the EU Strategy for the Baltic Sea region. Applying transboundary, ecosystem based maritime spatial plans by 2020 has been identified as a target for the Strategy (see www.balticscope.eu) .

Currently, three transnational MSP projects are ongoing in the BSR, Baltic Scope, BaltSpace and Baltic LINes.

**Baltic Scope (2015-2017)** aims to develop common solutions to cross-border maritime planning challenges, leading to greater alignment of national plans. The project accompanies the official ongoing or planned MSP processes which have begun in most BSR Member States in response to the MSP Directive. A key task is to carry out concrete cross-border cooperation between Member States in the Baltic Sea Region, asking what is needed to achieve successful cross-border cooperation and where potential barriers may lie, as well as developing recommendations for the cross-border MSP processes. In two case studies, the project is following a systematic step-by-step approach during which specific hot topics / issues are identified, based on information brought together from the various inventories undertaken in each country that is participating in the case study. The project is the first to generate recommendations for evaluating the MSP process in the BSR and will also develop recommendations for the use and exchange of data in MSP (www.balticscope.eu).

**BaltSpace (2015-2018)** is a BONUS-funded research project that focuses on integration challenges in MSP. It has a particular focus which relates to the use of indicators and the application of tools (i.e. MARXAN) to weigh the costs and benefits associated with various options for site selection.

Out of the three current projects, **Baltic LINes (2016-2019)** is the one with the most direct relevance for data and information. The overall objective of the project is to increase the transnational coherence of shipping routes and energy corridors in MSP in the BSR, in order to prevent cross-border mismatches, to secure transnational connectivity and promote the efficient use of Baltic Sea space. Baltic LINes aims to help develop the most appropriate framework for Blue Growth activities (e.g. maritime transportation, offshore energy exploitation, coastal tourism etc.) for the coming 10-15 years, increasing investors' security. Key project activities include:

- Developing requirements for MSP in relation to the transnational and future dimension of the shipping and energy sectors in BSR;
- Harmonizing BSR MSP data infrastructure for shipping routes and energy corridors, drafting guidelines for MSP data exchange and dissemination;
- Making use of and further development of innovative tools, such as the 'MSP Challenge' and 'bow tie', to provide support to MSP authorities
- Identifying and agreeing on transnationally coherent planning of linear infrastructures;

- Providing recommendations for a formalized BSR agreement on transboundary consultations on linear infrastructure within the MSP process (http://vasab.org/index.php/projects/baltic-lines).

**Lessons learned from the Baltic**

MSP in the BSR can now look back over a period of 14 years. These 14 years have been marked by a series of subsequent projects that built on each other both thematically and institutionally. The data and information theme was first highlighted in 2005 and has continued to be a focus. From initial assessments of maritime activities and uses, data recommendations have been developed to facilitate mapping across borders, to enable the exchange of information and to promote the alignment of maritime spatial plans. Common data challenges and data gaps have been highlighted and solutions proposed for overcoming these.

Although the situation of the Baltic is specific, there are some general lessons that could assist other sea basins in their ongoing work on (transboundary) MSP data and information.

- **Focus not only on what to share but also how to share**

In the Baltic, the focus has shifted from technical data issues to process-oriented issues – moving from the "what" to share towards the "how" to share and organise data exchange and data alignment. Both aspects are equally important. In the Baltic, it has been useful to establish national data needs first and then ask what can, and should, effectively be shared across borders. Establishing an effective means of sharing this data and wider data governance is a logical next step. Work is continuing in the Baltic on both aspects through the HELCOM/VASAB Data Expert Group, which is establishing data flows and mechanisms for tapping suitable data, as well as for developing a common framework for the type of data to be collected. So far, the focus has mostly been on descriptive data for the purpose of common mapping; analytical data is only a focus in one of the current projects (BaltSpace, the economic impacts of sea uses).

- **Broadly supported transboundary working groups on MSP are essential**

In the BSR, the HELCOM/VASAB MSP Working Group has been an instrumental driving force in the BSR, bringing together the interests of environmental protection and spatial planning in a constructive and future-oriented way. Support was provided by regional EU policy that promoted MSP as a horizontal action programme and key topic, and contributed to the necessary funding for the various MSP projects. Specifically for the data theme, a dedicated group consisting of marine planners and data experts is proving very useful in working towards a regional data infrastructure or similar mechanism for data sharing and access.

- **The MSP Directive is a driver of transboundary cooperation**

International events and developments at the Baltic Sea and EU level have strengthened BSR efforts and in turn were influenced by BSR lessons and recommendations. The MSP Directive now provides a common framework for implementing MSP in all Member

States; there is little doubt that this is a significant trigger for transboundary cooperation, also on the data theme. This is reflected in the intensity of current cooperation in the Baltic and the various parallel projects that have been instigated since the Directive came into force.

- **Transboundary projects work best where they deliver tangible benefits**

In the BSR, project partners benefited drawing tangible benefits from the projects. This may include the actual exchange of data or establishing the mechanisms of doing so. Tangible benefits are those that support ongoing MSP processes at the national level. This is apparent in the BaltCoast project, which was instigated by MV in Germany as a way of supporting the state's ongoing MSP process, and where the data issue was raised for the first time. A similar case can be made for Baltic Scope where partners are also drawing direct benefits in terms of greater coordination of ongoing MSP processes and data exchange. At the same time, it should be noted that it is not always necessary to have an MSP authority as a direct partner in order to obtain tangible data benefits. Countries like Lithuania, Latvia and Poland make good use of the expertise and data resources developed by some of their research institutes in the actual preparation of the MSPs.

- **Encourage continuity of projects and partners**

The BSR benefited from a high level of continuity and a sequence of projects dedicated to the development of MSP (Figure 4). The work of these projects generated a high level of trust between the core project partners. Many of the original project partners became national authorities for MSP, and many of the original staff is still working for the same organisations as key national experts in MSP. This degree of trust is instrumental in developing formal and informal structures and mechanisms for data exchange, possibly based on simple one-to-one contact between different planning authorities in an easy, collaborative way.

- **Build on existing transboundary organisations**

An important enabling factor in the Baltic is the broad range of transboundary organisations and institutions that facilitate the exchange of MSP-related information. Nevertheless, dedicated expert groups are useful and need to be be actively built and promoted. The HELCOM/VASAB MSP WG is one such example that resulted from the interest and dedication of key individuals. At the same time, the group benefitted from the recognition that the entire Baltic would benefit from MSP. Both HELCOM and VASAB were also willing to engage with each other.

- **Work towards a regional data infrastructure for MSP**

Efforts are already underway in many countries to establish national MSP data infrastructures and data portals; these efforts should be strengthened and supported, especially with respect to working towards a regional data infrastructure for MSP. A priority for funding should be a transboundary discussion on planning needs and corresponding data categories for MSP, enabling countries to align their data infrastructure with a view to transboundary MSP. Importantly, this should not mean that every country should collect the same data or base their marine plans on the same

information. It may simply mean that overall data categories are similar, and that transnational activities and impacts are described by similar parameters.

- **Acknowledge that developing data competence and data infrastructures takes time**

It is evident that some of the initial BSR projects have developed useful recommendations, but many of these have not yet been implemented. This was probably due to the fact that national MSP structures and authorities were initially not in place and that the necessary funding for staff and infrastructure was not established. Now that MSP authorities are in place and there is a requirement to implement MSP by a certain date, implementation of these recommendations may become easier.

The Baltic example shows that effective collaboration requires partners to work together over a certain period of time, ideally involving the same institutions in different constellations at different scales and involving hands-on planning projects as well as projects dedicated to transnational governance. Ideally, such a project approach would be coordinated by a transnational network or group (like the HELCOM/VASAB MSP WG) that is continuous and exists outside the bounds of ongoing projects. Such a group could ensure a systematic approach towards initiating and facilitating projects and make sure results are fed back to the policy level. In such a constellation, fostering specific aspects via dedicated MSP projects is an appropriate mechanism for encouraging this kind of multi-scale collaboration.

Nevertheless, processes of institutional development do take time, and there is little that can be done to speed up this process. Institutional learning can only take place through practical experience, and every solution will be different depending on the context. There is no shortcut just from reading good practice examples, although these can obviously provide a good starting point.

Furthermore, data collection also takes time. Closer relations could be developed here with the scientific community, especially also social sciences with regards to economic and socio-cultural data for MSP. There is also much mileage in looking at data structures and data categories developed by other countries, avoiding the need to reinvent the wheel but allowing for enough flexibility to adapt existing mechanisms and structures to the specific circumstances.

***Case Study 2: Strengths and weaknesses of Coastal Information Systems - Options for Coastal Information Systems (CIS)***

One of the main challenges in the implementation of ICZM and MSP is the integration of different sources of knowledge and different typologies of data. The study "Options for Coastal Information Systems (CISs)" promoted by EC DG ENV (2011) aimed at identifying key structuring requirements and related policy options for Coastal Information Systems (CISs) that may significantly improve support to ICZM through scientifically-based data, functions, tools and mechanisms.

Although the focus of the study was specifically ICZM, some of the results of the study can be transferred to the MSP context, especially because 40% (16) of the analysed information systems fully dealt with both land and marine-maritime issues. Moreover, according to the analysis 11 out of 40 CISs somehow considered MSP or sector planning at sea among their scope.

The study provides an overview of 40 CISs and an in-depth analysis of 12 CISs to illustrate the main characteristics of existing operative systems, including their strengths, weaknesses, gaps and limitations in supporting ICZM implementation[26]. Many of these characteristics equally apply to the specific context of MSP-related information systems.

- For the great majority of CISs considered (70%) the geographical area of interest was mainly defined by administrative boundaries (in particular for the national and sub-national levels), with possible limitations in capturing cross-border processes, including in particular transnational dynamics. For the remaining 30% of the cases (in particular local level ones) the area of interest was somehow defined considering the requirements of the ecosystem-based approach, e.g. referring to: coastal lagoons, estuaries, bays, marine areas in general and 1 regional sea. This is different to the situation of marine information systems, where a significant number of transboundary systems exist.
- There was an evident gap in terms of coverage of socio-economic data, and in particular governance data, while environmental and territory information were properly represented. This is most likely due to the relatively lower availability of the socio-economic and governance data, and the misperception that ICZM is mainly an environmental policy. This aspect also applies to the specific case of marine information systems and especially socio-economic data. Reasons for this gap mainly seem to be uncertainty as to the type of data that should and can be collected. With respect to governance data, there seems to be a lack of definition of and a wider question as to whether this information should be made available as part of a transboundary data system, and at what level of detail the information is required.
- Other data and information gaps or weaknesses were related to: (i) availability of integrated information resulting from the joint analysis of different data typologies (e.g. integrated maps, indicators and indexes), (ii) historical series, generally

[26] Indeed below picture refers to 2011; this might have been improved for a number of issues.

limited to a small number of specific issues, (iii) climate change related data (particularly relevant for ICZM), (iv) 3D data (e.g. DEM). Again, a similar picture emerges for the marine information systems analysed in the present study.

- Almost half of the considered CISs provided basic ICZM knowledge and process related functionalities, such as: availability of geo-spatial data, operation at different spatial scale, multi-time data and information. More advanced ICZM functions were less frequent e.g.: ICZM indicators, climate change related functions or functions supporting stakeholder involvement, vision building, scenario development, adaptive planning and management. The study clearly highlighted the need for a better understanding of what outputs are needed and the associated functionality required to deliver these.
- Tools enabling an appropriate e-participation in ICZM (i.e. e-forum, geo-tagging, data and information sharing, etc.) were rarely used. This is an aspect that already seems to be tackled by marine information systems, and progress is clearly being made in terms of enabling greater stakeholder participation in expanding the available database.
- Quite a relevant number of CISs relied on licensed software, as the use of open source software is still limited. However, about 50% provided direct access to and possibilities to download geo-spatial data. Metadata were transparently provided by a good number of CISs (about 70%), often referring to INSPIRE Directive requirements.
- Interoperability appeared to be one of the main goals of CIS developers and managers and the majority of cases analysed were putting significant efforts in it. Moreover, CISs were in general considered user-friendly enough to properly support coastal planning and management.

The CIS study pointed to two main problems to be addressed:

- Underuse or improper use of existing coastal information systems within the ICZM (and potentially the MSP) process at various scales (local, regional, national and in some case transnational). Coastal information systems include relevant information, functions and tools that could be used to support the ICZM process. However, in some cases these are not fully exploited, leading to the recommendation to encourage greater cooperation among CIS managers and ICZM actors (e.g. policy developers, planners, etc.) in order to embed the development and use of CISs in the processes of policy making and coastal and marine planning and management.
- Develop new CIS features which address weaknesses and gaps in CISs and further improve their use within the ICZM (and potentially the MSP process) at various scales.

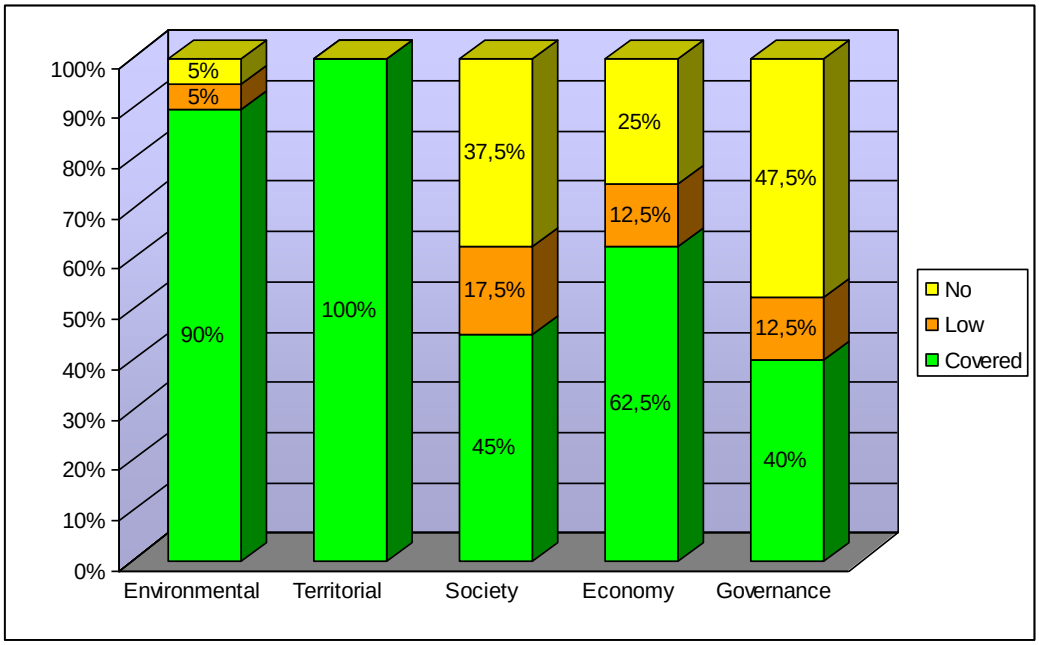


Figure 9: Percentage of CISs addressing the five information dimensions considered by the study (source: Options for coastal information systems, Final Report, DG Environment, 2011)

The study stressed the importance to act on all CIS' components including: contents (data, information, metadata and related structuring), functions related to different target users and scope (decision and policy making, coast management and planning, stakeholder participation, etc.), and management and operation mechanisms. Three specific objectives were identified to drive the formulation of policy options, addressing the above problems:

1. Increase the use of coastal information systems to provide full support to the implementation of key ICZM principles (some common to MSP), in particular as defined by the Recommendation 2002/413/EC.
2. Provide support (through data, functions and management mechanisms) to the integration between ICZM and MSP, and more in general between ICZM and related policies;
3. Simplify the use of CISs in order to make their support to the ICZM decision making easier and more immediate.

Similar recommendations could be made for improving the use of available marine information systems in MSP, especially the need to market the available systems more effectively to planners and managers (awareness-raising) and to improve collaboration between systems developers, data managers and planners in order to tailor the available systems to actual requirements and fill existing gaps.

## Chapter 6: Key findings, conclusions and ways forward

The overall aim of this study was to gain a better understanding of current and future MSP data and knowledge issues from various perspectives (i.e. Member States, Sea Basin(s) as well as projects and other relevant initiatives) in order to identify practical suggestions for

- the current MSP processes undertaken at Member State level, as well as,
- future initiatives that could be supported by the EU to assist Member States with the implementation of MSP (be it in the framework of the current ongoing MSP Assistance Mechanism, other service / study contracts or policy initiatives).

To do this, we made an assessment of a) what data and information is actually needed by planners at different stages of the planning process, b) which data categories and data sets this translates into, and c) what are the key knowledge gaps. With this in mind, there are three areas under which we can summarize the key findings and provide practical suggestions on how to proceed.

1. Data and information needs
2. Transboundary exchange of data
3. The role of pan-European initiatives

### *1. Data and information needs*

#### *… similarities*

Across all European Sea Basins, countries are trying to do similar things with respect to MSP data leading to similar type of issues related to MSP Data needs.

Data categories currently used by MSP planners to collect evidence to inform existing plans and pilot plans essentially show many similarities.

Most sectors (shipping, energy, mineral extraction, recreation, nature conservation, telecommunications, fishing, underwater cultural heritage, military) are present in every plan reflecting the essentially similar nature of maritime activities in each country but also slight differences in how each sector is described and analysed.

#### *… differences*

Differences in the scope of activities and sea uses between Member States and Sea Basins are mostly related to the weight given to each sector in terms of diversity of data specified and specific expression of the sector (e.g. whether offshore energy refers to offshore wind farming, wave energy, CCS, oil and gas, etc.).

Moreover, what is different is the level of importance given to data issues depending on where countries are with regard to their MSP process, the level of availability of data in different countries and the specific geographic, economic and cultural differences between the Sea Basins. In the first phase of planning, data and information needs relate to evidence which describes the current situation, called stocktaking, baseline or current

status information. In subsequent planning phases, evidence needs become more complicated and relate to analysis of conflicts and synergies, spatial and environmental compatibility of different activities and impact assessments, as well as future scenarios for sea use management.

**Most importantly, the study has shown that MSP data and information needs strongly depend on the type of planning that is carried out, i.e. spatial optimisation and risk minimisation approach, fully integrated, forward-looking approach or somewhere in between. Even with the 'MSP Framework Directive', types of planning differ across countries due to different geographic, legal, economic, cultural as well as spatial planning backgrounds of the countries in question.**

***… the need for socio-economic data to go into MSP***

Common data gaps are found under the categories of socio-economic data for different uses/activities, commercial fisheries data and socio-cultural information. At the same time, it should be noted, that socio-economic data is present. The issue is that it is badly compartmented and therefore difficult to extract marine component of socio-economic data. Thus existing data sets are often not useful for MSP purposes. As an example, no distinction is made between terrestrial and maritime socio-economic data, which makes it difficult to quantify the proportion to be attributed to maritime activities (e.g. tourism or shipping: is it inland or port traffic or sea movements?)

**Most significant differences are found in the use of socio-economic data in a plan. Only few datasets relate to the wider socio-economic environment. Older plans are less likely to include socio-economic type of information but all of the more recent drafts or plans make some reference to it, indicating the importance of this data category for the future.**

*Several Member States thought it would be useful to collect, share and discuss some of the initial progress being made on methods to extract marine socio-economic data, the kind of evidence that could be used to describe the marine socio-economic environment and the impacts of maritime industries on the adjoining coast and wider economy.*

Moreover, socio-cultural information is almost entirely lacking, even though it would be especially important in the context of implementing the ecosystem based approach.

While the concept of ecosystem services has advanced over the last decade, along with theoretical methods for valuation, actually quantifying the value of ecosystem services in a practical way remains a struggle for planners.

*There is a need for tools and guidance on how to practically factor in the value of ecosystem services into plans. From our knowledge gathered throughout the overall MSP Assistance Mechanism we are aware that some countries are already making noticeable advances in this field. Thus, before going into any further steps it would be useful to share and discuss the knowledge gained on these efforts across other EU Member States.*

***… linking MFSD and MSP data efforts***

Physical and biological data are often related to the MSFD categories and in some cases are drawn directly from MSFD assessments. Where there are direct links to MSFD assessment, the descriptive data categories also include human pressures and occasionally the sources of such pressures (e.g. marine litter, marine underwater noise, point sources of pollution).

*Linking MSFD and MSP efforts in this manner seems an effective way of ensuring MSP is based on sound environmental evidence; in turn, it is a way of ensuring that MSP is able to contribute to achieving the objectives of the MSFD. It makes sense to make this relationship explicit and to encourage countries to link their MSFD process to supplying physical and biological evidence for MSP, as a basis for implementing the Ecosystem Based Approach.*

***… moving from descriptive to strategic evidence***

Having said all this, the demand for actual data for MSP purposes is often overestimated. For actual planning, one does not need much data. What is needed, however, is knowledge about the underlying processes, knowledge to make sound judgements, which indirectly requires data.

What has come out of the study is almost self-evident: the majority of available evidence is descriptive. Strategic evidence is still rare, especially related to future uses and activities and the economic and environmental impact of activities.

*Concerning data and information gaps, the issue is not so much about data but more about aggregated data. In other words, it is not so much about* ***what data*** *but more* ***how to aggregate and interpret the data*** *in order to acquire the information needed by the planner.*

More attention should be paid to assessment methods including assessment and solutions to conflicts, analysis of the spatial dimension of future trends and building the core of an MSP evidence-base. It has to be noted that, especially at project level, some initial assessment tools have been developed, but it seems that those are a) either not

used as they may not fit the purpose of 'real' MSPlanners or b) that they are not known to MSPlanners or c) that the potential scope of how they could be used is not communicated sufficiently. It remains to be seen, how and whether tools, which are currently developed within the newest generation of projects, with strong involvement of the MSP authorities, will gain higher acceptance.

*It is clear that there is a need for more information about cause-effect relations as well as about cumulative effect of different pressures, for example, the effect of diverse uses of the marine space on the environment and ecosystems (e.g. in combination with climate change and other factors) as well as conflict analysis.*

**Countries are confident with stocktaking and the descriptive part of MSP status quo assessments. The challenge lies in developing second generation plans which require more analytical information and strategic evidence. There is a need for spatial evaluation tools for assessment, impact and conflict analysis purposes. Moreover more and better tools are needed for analysis of the spatial dimension of future trends and related future scenario planning.**

*Promote the exchange of practices, which relate to the aggregation and interpretation of data and information.*

*Promote the exchange on existing spatial evaluation tools for assessment, impact and conflict analysis.*

*As regards future scenario tools, it makes sense first to exchange existing as well as developing practices within currently ongoing projects.*

*In all cases, however, it is anticipated that it will not be sufficient to exchange 'existing' practices, but to make dedicated efforts to develop target oriented new tools.*

*Some Member States voiced the idea, that it would be useful to make European funding available to screen / audit the individual MSP processes established in some countries. The goal of this evaluation/audit should be to identify areas where these processes could be improved or even streamlined, at the discretion of the Member State.*

### *2. Transboundary data exchange*

#### *… across institutions as well as countries*

It should be highlighted that an integrated approach like MSP describes a new philosophy and practice of coastal and marine governance, demanding no less than a paradigm shift in marine management[27]. In order to achieve true integration, MSP requires unprecedented levels of collaboration - between national ministries and authorities,

[27] Kannen et al., 2012.

between MSP authorities and stakeholders, and between stakeholders. This is likely to require more than a little extra participation or a few added mechanisms for dialogue. **A paradigm shift is needed in how authorities and stakeholders work together**, based on an understanding of the complex processes involved in MSP, the timescale this requires and also the constraints and opportunities of collaboration within and across borders, especially also within a data and information context.

Moreover, MSP needs to strike a **balance** between **transnational and national concerns and scales, flexibility and stability, inclusiveness and exclusiveness, fast and slow action**, and **continuity and discontinuity**. All of these also apply to data and information exchange.

With regard to scale and speed of decision-making for example, strategic long-term planning needs to be combined with licensing decisions, each of which require different types of data at different levels. Shared visions for regional seas need to be translated into national and sub-national spatial policy, again requiring different data and levels of detail. Moreover, data cannot be separated from inclusiveness, where experience so far has shown that information needs to be inclusive rather than exclusive if conflicts are to be avoided. This not only means involvement of different stakeholders, but also acceptance of other beliefs, values and knowledge as legitimate contributions to the debate. This kind of inclusiveness and the acceptance of different types of knowledge can generate a sense of fairness and trust in data-related proceedings, which in turn increases support for decisions and the decision-making process (Kannen et al., 2012).

Last not least, it is worth remembering that tensions exist with respect to data continuity and flexibility. For example, sharing data between institutions and countries requires a certain level of trust and good faith. Building trust is a time-consuming process which requires continuity of institutions and also continuity within institutions (for example, regular meetings and staff continuity). At the same time, continuity can become an obstacle if it turns into inflexibility and procedural lock-in and the inability to respond to changing circumstances (Kannen et al., 2012).

**There is a need to regularly evaluate data collection procedures and the continued value of data and knowledge that is being collected.**

***… specifics of transnational data exchange***

**Transnational MSP data needs are different to national MSP data needs. The scope and level of detail of data needed is typically much simpler, however, ensuring its coherence and harmonisation across boundaries remains a challenge.**

Underlying issues with respect to transboundary MSP data exchange include limited data interoperability due to different data protocols and formats, different languages between countries, the need for high level political agreement as well as good cooperation between local and regional interest groups.

The study has shown that the Baltic Sea Region can be seen as a frontrunner with respect to transboundary MSP data exchange, which may be due to the long-term history of collaboration between institutions and even people involved – mainly gained at project level, which provides evidence in itself that data sharing requires a **high level of trust**.

At the same time it should be noted that even the Baltic Sea Region is only still at the beginning of true transboundary data exchange with a long road ahead before arriving at operational transboundary MSP data exchange in this region. Nevertheless, the example of the Baltic Sea Region does highlight the need for regions to develop strategic visions which can steer project development and ensure continuity and efficient use of resources and infrastructure, thus, securing that experiences are passed on from one project to another.

*Continue EU support for transboundary MSP projects and initiatives, especially applied projects, which are led by and involve MSP authorities. Even though such a project approach is recommended across all Sea Basins, this needs to be complemented by funding mechanisms, which support more longer term strategic networks (along the example of EMODNet), which provide for a systematic approach, while at same time making use of a variety of implementing parties.*

***3. The role of pan-European initiatives***

The INSPIRE spatial themes potentially provides a useful framework for establishing coherence and harmonisation of spatial data both sub-nationally between different agencies and on a transboundary level, but they are not exclusively the solution to resolving inter-agency or transboundary spatial needs for MSP.

Most of the MSP data themes can be mapped directly onto INSPIRE data themes, with a few exceptions found under fishing, renewable energies, tourism, ports and spatial policy.

**Most notably, however, economic data is not considered at all within the scope of the INSPIRE spatial themes.**

*There is a need to consider expanding the scope of INSPIRE spatial themes to allow for economic data and / or expand the definitions of INSPIRE data themes for MSP purposes, in particular with respect to fishing, renewable energies, tourism and ports.*

**Moreover, as MSP evolves, newer, more complex data categories may evolve which cannot be catered for within the INSPIRE framework.**

*As the two directives evolve in parallel, it would be useful to promote exchange of knowledge between the two, e.g. similar to work already undertaken with MSFD and INSPIRE through Marine Pilot Project.*

Other complementary initiatives should be considered in the context of transboundary spatial needs for MSP. For example, the **European Marine Observation and Data Network (EMODnet) already delivers harmonised transboundary marine spatial data for a number of relevant MSP data categories (i.e. bathymetry, geology, seabed habitats, chemistry, biology, physics, human activities and coastal mapping) covering all European sea-basins**. EMODnet is working closely with the Joint Research Centre (JRC) to ensure that the data portals are fully INSPIRE compliant, a process which has revealed some discrepancies in the data models which are being resolved.

The various EMODnet data portals developed as a series of projects under the DG MARE Marine Knowledge 2020 Strategy policy initiative illustrate the importance of long term data initiatives which not only provide access to data but also have a role to play as data stewards ensuring that the data generated through various means, including research projects, are safeguarded and made available for re-use beyond the life time of a project.

**The EMODnet data portals are all relevant for regional maritime spatial planning and transboundary data exchange. The recent addition of the EMODnet Human Activities data portal (www.emodnet-humanactivities.eu) is particularly relevant as it provides access to an expanding range of harmonised datasets covering human activities across all European Sea Basins. In the future, the EMODnet Human Activities data portal could also host national MSP data layers for visualisation and download.**

**The EMODnet Sea Basin Checkpoint results are all of high interest to MSP authorities.**

*Promote a wider dissemination of EMODnet Sea Basin Checkpoint results to MSP authorities.*

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## Annex 1: Sea Basin Overviews

1. **European**
2. **Baltic Sea**
3. **North Sea**
4. **Atlantic**
5. **Mediterranean Sea**
6. **Black Sea**

***European Overview***

**23 Member States with coastlines**

**MSP Data-Related Projects/Initiatives:**

- 3 ongoing and 6 complete projects

**Operational Marine Data Infrastructures:**

- 10 data infrastructures

**Ongoing MSP Data-Related Projects / Initiatives**

**1) Atlas of the Seas (2007 – ongoing)**

- **Stocktaking Maps:**
    - Maritime Europe
    - Tourism
    - Nature
    - Passenger transport
    - Energy
    - Wind
    - Security
    - Sea level rise
    - Sea bottom
    - Fisheries
    - Fish consumption
    - Arctic
- **Mapping Tools:**
    - Interactive mapping tool.

**2) CISE: Common Information Sharing Environment (2014 – 2017)**

- **Data Portal:**
    - specifics to be determined.
- **Transboundary Exchange:**
    - specifics to be determined.

**3) INSPIRE Marine Pilot Project (2015 – ??)**

- **Data Knowledge Gaps:**
    - Guidance and tools to facilitate improved understanding of INSPIRE in the management of Marine Strategy Framework Directive (MSFD)-related spatial information.

**Complete MSP Data-Related Project Outputs**

**1) PlanCoast (2006 – 2008)**

- **Data Knowledge Gaps:**

- All data gaps for the Gulf of Gdansk identified under the Polish Pilot Plan.

- **Data Policy:**
  - PlanCoast handbook called for improved quality, comparability and accessibility of spatial data by implementing EU INSPIRE Directive, systematic information exchange and needs-based data collection.

**2) SPICOSA (2007 – 2011)**

- **Data Portal:**
  - SPICOSA Online Data Portal.
- **Assessment Tools:**
  - SPICOSA Systems Analysis Framework Handbook.

**3) MESMA (2009 – 2013)**

- **Data Portal:**
  - MESMA Geoportal: Metadata database of uses and spatial data sets
- **Assessment tools:**
  - MESMA Central Exchange: application tool to evaluate marine spatially managed areas
  - MESMA Framework and Governance Analysis
  - Comprehensive reference list of available tools for ecosystem based assessments and management

**4) ESaTDOR (2010 – 2013)**

- **Stocktaking Maps:**
  - Maritime economy, employment vs. maritime activities
  - Shipping routes, port traffic, cruise and ferry routes
  - Fishing (fleet and volume of catch)
  - Sailing (fleet and ports)
  - Energy and undersea infrastructures
  - Environment, i.e. protected areas, invasive species, organic & inorganic inputs, bathing sites, sea surface temperature
  - Population by catchment area, density in coastal regions
  - Marine eco-regions
- **Data Knowledge Gaps:**
  - Availability of suitable data sets in consistent manner across sea basins / regions
  - No statistical unit for sea space
  - Difficult to disaggregate information between land and sea
  - Paucity of data or information on land-sea interactions
- **Assessment Tools:**
  - Developed maritime region typology for sea uses and land-sea interactions (i.e. economic significance, flow and environmental pressures)

- **Data Policy:**
    - More consistent data collection and mapping of maritime resources required
    - EU should develop common framework for the collection of maritime data to facilitate harmonisation and consistency of spatial data across maritime regions
    - Scope of maritime data collection should be broadened thematically, spatially and beyond the current ESPON boundaries to develop more comprehensive understanding of land- sea interactions
    - Existing maritime data sources should be made more widely accessible
    - Adopt a 10x10km grid square framework as a marine equivalent to the NUTS units used on land to facilitate more consistent approach to mapping land-sea interactions

**5) CoExist (2010 – 2013)**

- **Stocktaking Maps:**
    - Suitability maps of coastal marine ecosystems for different aquaculture activities
    - Matrices of interactions aquaculture vs. fisheries
    - Matrices of interactions aquaculture and fisheries vs. other activities
    - Stakeholder maps
    - Characterization of ecosystems
- **Assessment Tools:**
    - Population models for finfish, bivalves and crustaceans
    - Economic analysis of coastal fisheries
    - Coastal fisheries fleet model
    - Farm-scale model for aquaculture
    - Assessment of aquaculture and fisheries production scale effect on environment
    - Combined local-scale and system-scale models
    - Aquaculture siting and risk analysis
    - GeoReference Interaction Database: conflict and synergy interactions analysis tool
    - Framework for multi-objective quantitative and qualitative evaluation of marine spatial management in coastal zones.

**6) Options for Coastal Information Systems (2011)**

- **Data Knowledge Gaps:**
    - Data gaps and weaknesses related to (i) historical time series, (ii) climate change related data, (iii) 3D data
    - Limited social, economic and governance data found in coastal information systems
- **Assessment Tools:**

  - In-depth analysis of 40 illustrative cases of coastal information systems, scope of functionality, strengths of systems and underuse or improper use with ICZM process at various scales
- **Data Policy:**
  - Improve data and information base specifically related to socio-economic and governance data, integrated information (i.e. indicators, indexes or maps generated through the integrated analysis of different data typologies), multi-time data (i.e. historical series) and climate change data.

**Operational Marine Data infrastructures used by Planners**

1) ESPON 2013 Database
2) EEA Database
3) EMODnet thematic lots
4) SeaDataNet
5) European Atlas of the Sea
6) PANGAEA
7) Eurostat Database
8) INSPIRE Geoportal
9) ICES Data Portal
10) Copernicus MEMS

**Applied Assessment tools for MSP (not necessarily used by planners yet)**

- MESMA Central Exchange: application tool to evaluate marine spatially managed areas
- MESMA Framework and Governance Analysis
- SPICOSA Systems Analysis Framework Handbook
- Maritime region typology for sea uses and land-sea interactions (i.e. economic significance, flow and environmental pressures)
- Population models for finfish, bivalves and crustaceans
- Economic analysis of coastal fisheries
- Coastal fisheries fleet model
- Farm-scale model for aquaculture
- Assessment of aquaculture and fisheries production scale effect on environment
- Combined local-scale and system-scale models
- Aquaculture siting and risk analysis
- GeoReference Interaction Database: conflict and synergy interactions analysis tool
- Framework for multi-objective quantitative and qualitative evaluation of marine spatial management in coastal zones

***Baltic Sea Overview***

**8 Member States**: SE, FI, EE, LV, LT, PL, DE, DK

**MSP Data Issues:**

- Cross-border cooperation across different countries
- Spatial evaluation / assessment tools
- Developing country wide and sea basin wide visions
- Cross-sector integration of MSP
- MSP for Blue Growth, assessment of future uses
- Indicators and measurements for MSP
- Taking into account land-sea interface for MSP
- Applying Ecosystem Based Approach
- Strategic Environmental Assessment
- Integrating Climate Change aspects into MSP
- Data for MSP

**MSP Data-Related Projects/Initiatives:**

- 10 ongoing and 8 complete projects

**Operational Marine Data Infrastructures:**

- 12 data infrastructures

**Ongoing MSP Data-Related Projects / Initiatives**

**1) BaltCoast (2015 – 2018)**

- **Assessment Tools:**
    - Systems Approach Framework for science and policy integration.

**2) BaltSpace (2015 – 2018)**

- **Assessment Tools:**
    - MARXAN site selection tool weighing costs and benefits
    - Spatial costs-benefit analysis analysing the distribution of the economic value of maritime sectors across a country
    - Integrated indicator system to assess the cumulative impacts of maritime uses and MSP
    - Bow-tie approach designed to help planners analyse risks and consequences of these risks as well as prevention and mitigation factors of different planning decisions in a structured way.
- **Transboundary Exchange:**
    - specifics to be determined

**3) Baltic Scope (2015 – 2017)**

- **Stocktaking Maps:**
    - Joint maps for specific areas as well as topics
- **Mapping Tools:**
    - Tool to compare traffic intensity and ship types over time

- **Assessment Tools:**
    - specifics to be determined
- **Data Policy:**
    - specifics to be determined
- **Transboundary Exchange:**
    - Planning solutions to transboundary issues and improve MSP processes

**4) HELCOM-VASAB MSP Data Expert Sub-Group (2015 – 2017)**

- **Data Knowledge Gaps:**
    - Assessment of Data Availability for Transboundary MSP in the BSR
- **Transboundary Data Exchange:**
    - Guideline on Data Availability for Transboundary MSP in the BSR (in preparation)

**5) Baltic Sea EMODnet Checkpoint (2015 – 2016)**

- **Data Knowledge Gaps:**
    - Data availability and adequacy reports responding to commercial and policy stress tests (i.e. wind farm siting, marine protected areas, oil platform leak, climate and coastal protection, fisheries management, marine environmental management, river inputs to coastal environments).
- **Data Policy:**
    - specifics to be determined
- **Transboundary Data Exchange:**
    - Sea basin exercise

**6) BalticLINES (2016 – 2019)**

- **Stocktaking Maps:**
    - specifics to be determined
- **Data Knowledge Gaps:**
    - Identifying and addressing data gaps for shipping and energy
- **Data Portal:**
    - Spatial Data Infrastructure for shipping and energy infrastructure
- **Assessment Tools:**
    - Simulation MSP Challenge
- **Data Policy:**
    - Policy recommendations.
- **Transboundary Exchange:**
    - Transnational coherence of shipping routes and energy corridors in MSPs in BSR

**7) SECOS II Synthesis: the Service of Sediments in German Coastal Seas (2016 – 2019)**

- **Mapping Tools:**
    - Baltic Sea Atlas

**8) SmartSea (2016 – 2021) Gulf of Bothnia**

- **Stocktaking Maps:**
    - specifics to be determined
- **Data Knowledge Gaps:**
    - specifics to be determined
- **Mapping Tools:**
    - specifics to be determined
- **Assessment Tools:**
    - specifics to be determined
- **Data Policy:**
    - specifics to be determined

**9) VELMU (2013 – ongoing) Finland**

- **Data Portal:**
    - Species and habitat database
- **Mapping Tools:**
    - Map portal of Finnish underwater marine environmental data including human activities and pressures.

**10) SeaGIS (2015 – 2018) Sweden-Finland Kvarken Region**

- **Mapping Tools:**
    - webGIS of data on the environment, infrastructure and socio-economics in the Kvarken region.

**Complete MSP Data-Related Project Outputs**

**1) BaltSeaPlan (2009 – 2012)**

- **Stocktaking Maps:**
    - Pilot SEA for the Western Gulf of Gdansk
    - Preparing MSP at the Danish Straights
    - Towards a Pilot MSP for the Paarnu Bay
    - Towards a Pilot MSP for the Saaremaa and Hiumaa Islands
    - A Pilot MSP for the Western Coast of Latvia
    - Pilot Maritime Spatial Plan for the Western Coast of Latvia
    - SEA for the Western Gulf of Gdansk
    - Seabed and habitat mapping in the Hatter Barn area
- **Data Knowledge Gaps:**
    - Data exchange structure for MSP
- **Mapping Tools:**
    - BaltSeaPlan web-advanced tool to support MSP

- **Assessment tools:**
    - Modelling for MSP
    - MARXAN applications:
    - Systematic site selection for offshore wind power
    - Site selection of fisheries areas for MSP
- **Data Policy:**
    - Integrated Pan-Baltic Data Infrastructure for MSP - Framework Analysis and Recommendations for an MSP Data Model, Data Exchange and Good Governance
- **Transboundary Exchange:**
    - BaltSeaPlan Vision 2030 - Towards the sustainable planning of the Baltic Sea Space
    - Towards a Pilot MSP for the Lithuanian Sea
    - Pilot MSP for the Pomeranian Bight and Arkona Basin
    - Pilot MSP for the Middle Bank

**2) Hispares (2010 – 2012)**

- **Mapping Tools:**
    - Web Map Services on field mapping activities: underwater video, photographs
    - Web Map Service on spatial modelling and remote sensing products of marine ecosystem elements

**3) PartiSEApate (2012 – 2014)**

- **Data Knowledge Gaps:**
    - Report on BSR MSP Data Group
- **Data Policy:**
    - Setting up a pan-Baltic Spatial data Infrastructure
    - Establish HELCOM-VASAB expert sub-group on MSP Data
- **Transboundary Exchange:**
    - Lithuanian case report
    - Middle Bank case report
    - Pomerian Bight case report
    - Report on lessons learnt from bilateral consultations

**4) EcoDump (2011 – 2014) Lithuania / Poland**

- **Assessment tools:**
    - Guideline for the location of new dumping sites using ecosystem based approach
    - Monitoring and control programme of dumping sites

**5) Gulf of Finland, Spatial Data Inventory (2014)**

- **Data Knowledge Gaps:**
    - Metadata inventory of Estonian, Finnish and Russian data coverage of boundary, environmental and human activity data in the Gulf of Finland.

6) **Plan Bothnia (2010 – 2012) Bothnian Sea**
   - **Stocktaking Maps:**
     - Maps of Marine Traffic, Fishing and Aquaculture, Energy, Protected Areas, Military Practice, Scientific Monitoring, Sand and Gravel Extraction, Tourism and Recreation, Cultural Heritage for the Bothnian Sea.
     - Pilot Plan Map for Bothnian Sea.
   - **Mapping Tools**
     - Web-based map service tool
   - **Transboundary Exchange**
     - Planning the Bothnian Sea: Outcome of Plan Bothnia '96 a transboundary Maritime Spatial Planning pilot in the Bothnian Sea
7) **ArtWei (2010 – 2013) South Baltic Sea**
   - **Stocktaking Maps:**
     - Maps of bathymetry, sediments, restricted areas, protection areas, navigation routes, dumping sites, fishing zones, harbours, average temperature, topography for Curonian-Vistula lagoons, Oresund Sound and Szczecin (Stettin) Oder lagoon.
   - **Mapping Tools:**
     - Open-source knowledge exchange platforms for three sites.
   - **Transboundary Exchange:**
     - Transboundary management of Transitional Waters Code of Conduct and Good Practice examples.
8) **Study of Conditions of Spatial Development of Polish Sea Areas (2016) Poland**
   - **Stocktaking Maps:**
     - Maps of bathymetry, physical, biological, geological conditions, as well as sea uses, current and planned.

**Operational Marine Data infrastructures used by Planners**

1) HELCOM Map and Data Service (Regional)
2) Baltic Sea Bathymetry Database (Regional)
3) SMHI Open Data Catalogue (SE)
4) VELMU Data Portal (FI)
5) SYKE Metadata Portal (FI)
6) SeaGIS (SE)
7) Estonian Land Board Geoportal (EE)
8) Lithuanian Planning Portal (LT)
9) GeoSea Portal (DE)
10) Marine Data Infrastructure Germany (DE)
11) CONTIS (DE)

12) Marine Spatial Data Infrastructure Denmark (pre-operational, 2017 launch) (DK)

**Applied Assessment tools for MSP (not necessarily used by planners yet)**

- Baltic NEST System
- MSP Challenge
- Systems Approach Framework for science and policy integration MARXAN site selection tool weighing costs and benefits
- Spatial costs-benefit analysis analysing the distribution of the economic value of maritime sectors across a country
- Integrated indicator system to assess the cumulative impacts of maritime uses and MSP
- Bow-tie approach designed to help planners analyse risks and consequences of these risks as well as prevention and mitigation factors of different planning decisions in a structured way.
- Modelling for MSP
- MARXAN applications:
    - Systematic site selection for offshore wind power
    - Site selection of fisheries areas for MSP

***North Sea Overview***

**6 Member States**: SE, DK, DE, NL, BE, UK

**MSP Data Issues:**

- Comparative analysis of MSP systems
- Developing country wide and sea basin wide visions
- Cross-sector integration of MSP
- MSP for Blue Growth, assessment of future uses
- Indicators and measurements for MSP
- Taking into account land-sea interface for MSP
- Applying Ecosystem Based Approach
- Cross-border cooperation and consultation across different countries

**MSP Data-Related Projects/Initiatives:**

- 2 ongoing and 2 complete projects

**Operational Marine Data Infrastructures:**

- 10 data infrastructures

**Ongoing MSP Data-Related Projects / Initiatives**

**1) North Sea EMODnet Checkpoint (2013 – 2016)**

- **Data Knowledge Gaps:**
  - Data availability and adequacy reports responding to commercial and policy stress tests (i.e. wind farm siting, marine protected areas, oil platform leak, climate and coastal protection, fisheries management, marine environmental management, river inputs to coastal environments).
- **Data Policy:**
  - Policy issues arising from data availability and adequacy reports.
- **Transboundary Exchange:**
  - Sea basin exercise

**2) NorthSEE (2016 – 2019)**

- **Stocktaking Maps:**
  - Environment, shipping routes and energy infrastructure.
- **Data Knowledge Gaps:**
  - Identifying and addressing transboundary data gaps for shipping and energy.
- **Assessment Tools:**
  - Simulation MSP Challenge
- **Transboundary Exchange:**
  - Identify current and future synergies and mismatches in national planning solutions, aiming for greater coherence in MSP across NSR.

**Complete MSP Data-Related Project Outputs**

**1) C-Scope (2008 – 2011)**

- **Stocktaking Maps:**
    - The Geo-marine resources of the South Dorset Coast
    - C-Scope Marine Plan for Dorset
    - Data used to inform the C-Scope Dorset Marine Plan
    - Belgian Coastal Atlas
- **Mapping Tools:**
    - Belgian Coastal Atlas
- **Assessment tools:**
    - Data Confidence Assessment Methods
    - Spatial Analysis Methods
    - Sensitive Seabed Habitats
    - FOCI Habitat Maps and Sensitivity Tables
    - Sectoral Interactions Matrix
    - Constraints Mapping Methods
    - Seabed Mapping Methods
    - Multi-objective indices for C-Scope Marine Plan

**2) Blast (2009 – 2012)**

- **Stocktaking Maps:**
    - Sea level rise projects for Belgium, Sweden, Schleswig-Holstein, The Netherlands, Norway, UK, Denmark
- **Data Knowledge Gaps:**
    - State of the art and data audit for the North Sea Region: Understanding the present state of geographic data and metadata in the North Sea Region
- **Assessment Tools:**
    - Harmonization of nautical information
- **Transboundary Exchange:**
    - Data harmonization between land-sea and between countries

**Operational Marine Data infrastructures used by Planners**

1) GeoSea Portal (DE)
2) Marine Data Infrastructure Germany (DE)
3) CONTIS (DE)
4) Marine Spatial Data Infrastructure Denmark (pre-operational, 2017 launch) (DK)
5) Flemish Banks Monitoring Network (BE)
6) Marine Atlas (BE)
7) Belgian Coastal Atlas (BE)

8) Noordzeeloket (NL)
9) informatiehuis marine (Marine Information House) (pre-operational) (NL)
10) MMO Marine Planning Evidence (UK)

**Applied Assessment tools for MSP (not necessarily used by planners yet)**

- Simulation MSP Challenge
- Data Confidence Assessment Methods
- Spatial Analysis Methods
- Sensitive Seabed Habitats
- FOCI Habitat Maps and Sensitivity Tables
- Sectoral Interactions Matrix
- Constraints Mapping Methods
- Seabed Mapping Methods
- Multi-objective indices for C-Scope Marine Plan
- Harmonization of nautical information

***Atlantic Overview***

**5 Member States**: IE, UK, FR, ES, PT

**MSP Data Issues:**

- Spatial evaluation / assessment tools
- MSP for Blue Growth, assessment of future uses
- Indicators and measurements for MSP
- Taking into account land-sea interface for MSP
- Applying Ecosystem Based Approach
- Cross-border cooperation and consultation within one country

**MSP Data-Related Projects/Initiatives:**

- 4 ongoing and 2 complete projects

**Operational Marine Data Infrastructures:**

- 3 data infrastructures[28]

**Ongoing MSP Data-Related Projects / Initiatives**

**1) Atlantic EMODnet Checkpoint (2015 – 2017)**

- **Data Knowledge Gaps:**
    - Data availability and adequacy reports responding to commercial and policy stress tests (i.e. wind farm siting, marine protected areas, oil platform leak, climate and coastal protection, fisheries management, marine environmental management, river inputs to coastal environments).
- **Data Policy:**
    - Policy issues arising from data availability and adequacy reports
- **Transboundary Exchange:**
    - Sea basin exercise

**2) SimCELT (2016 – 2017)**

- **Data Knowledge Gaps:**
    - Identifying and addressing transboundary data gaps
- **Transboundary Exchange:**
    - Support the coherence of data analysis across marine area boundaries

**3) SNIMar Project (2016 - ??**

- **Data Portal:**
    - Preparation of Integrated Geographic Information for the Management of Marine and Coastal Waters in Portugal.

**4) SimNorAt (2017 – 2018)**

[28] Only reflects those verified through interview process and those already in public domain.

- **Data Knowledge Gaps:**
    - Identifying and addressing transboundary data gaps
- **Transboundary Exchange:**
    - Support the coherence of data analysis across marine area boundaries

**Complete MSP Data-Related Project Outputs**

**1) MESH (2004 – 2008)**

- **Stocktaking Maps:**
    - Maps of seabed habitats for Atlantic area
- **Data Portal**
    - EMODnet Seabed Habitat interactive portal
- **Mapping Tools:**
    - EMODnet Seabed Habitat interactive portal
- **Assessment tools:**
    - MESH Confidence assessment tool
    - MESH Survey scoping tool

**2) TPEA (2013 – 2014)**

- **Mapping Tools:**
    - Geoportal transboundary mapping tool for Gulf of Cadiz
- **Transboundary Exchange:**
    - Good practice guide for transboundary planning.
    - Transboundary pilot area reports.

**Operational Marine Data infrastructures used by Planners**

1) Spanish Harbours Authority (ES)
2) MMO Marine Planning Evidence (UK)
3) SHOM Marine Spatial Data Portal: data.shom.fr (FR)

**Applied Assessment tools for MSP (not necessarily used by planners yet)**

- MESH Confidence assessment tool
- MESH Survey scoping tool

***Mediterranean Sea Overview***

**8 Member States**: ES, FR, IT, SI, HR, EL, MT, CY

**MSP Data Issues:**

- Developing the MSP General Strategy at National Level
- Cross-sector integration of MSP
- Spatial evaluation / assessment tools
- MSP for Blue Growth, assessment of future uses
- Taking into account land-sea interface for MSP
- Applying Ecosystem Based Approach
- Strategic Environmental Assessment
- Cross-border cooperation across different countries
- Integrating Climate Change aspects into MSP
- Data for MSP

**MSP Data-Related Projects/Initiatives:**

- 3 ongoing and 6 complete projects

**Operational Marine Data Infrastructures:**

- 8 data infrastructures

**Ongoing MSP Data-Related Projects / Initiatives**

**1) RITMARE (2012 – 2016)**

- **Stocktaking Maps:**
  - specifics to be determined
- **Data Knowledge Gaps:**
  - specifics to be determined
- **Assessment Tools:**
  - specifics to be determined

**2) Mediterranean EMODnet Checkpoint (2015 – 2017)**

- **Data Knowledge Gaps:**
  - Data availability and adequacy reports responding to commercial and policy stress tests (i.e. wind farm siting, marine protected areas, oil platform leak, climate and coastal protection, fisheries management, marine environmental management, river inputs to coastal environments).
- **Data Policy:**
  - Policy issues arising from data availability and adequacy reports.
- **Transboundary Exchange:**
  - Sea basin exercise

**3) SimWestMed (2017 – 2018)**

- **Data Knowledge Gaps:**

    - Identifying and addressing transboundary data gaps
- **Transboundary Exchange:**
    - Support the coherence of data analysis across marine area boundaries

**Complete MSP Data-Related Project Outputs**

**1) SHOCMed (2008 – 2014)**

- **Data Knowledge Gaps:**
    - Identified knowledge gaps and priority issues on site selection and carrying capacity for sustainable coastal marine aquaculture in the Mediterranean.
- **Data Policy:**
    - Guide to Aquaculture Site Selection and Site Management.

**2) MAREMED (2010 – 2013)**

- **Data Knowledge Gaps:**
    - MAREMED Report on data and cartographic tools: Proposal on standardisation and harmonisation of coastline datasets.
- **Data Policy:**
    - MAREMED Report on Adaptation to Climate Change on Coastal Areas: Implementation of a coastal observatory network in the Mediterranean Basin.
- **Assessment Tools:**
    - Shared tools for the forecast and management of the climate change effects along the coast.

**3) PEGASO (2010 – 2014)**

- **Mapping Tools:**
    - PEGASO Spatial Data Infrastructure geoportal.
- **Transboundary Exchange:**
    - Report on the Mediterranean and Black Sea SDI assessment including existing viewers, their strengths and limits, and the characteristics of PEGASO geoportal development.

**4) SHAPE (2011 – 2014)**

- **Stocktaking Maps:**
    - Maps of Adriatic Uses.
- **Data Knowledge Gaps:**
    - Definition of most relevant topics and data for ICZM and MSP.
- **Mapping Tools:**
    - Adriatic Atlas.
- **Data Policy:**

    - Holistic management of the Adriatic Sea: Approaching to a common and legally binding MSP in Adriatic area: an integrated analysis of the legal framework, policies and planning instruments.
- **Transboundary Exchange:**
    - Definition of the Adriatic ecosystem quality as basis for MSP.

**5) ADRIPLAN (2013 – 2015)**

- **Stocktaking Maps:**
    - Coastal defense and sand extraction
    - Energy
    - Environment and ecosystems
    - Environmental protection
    - Fisheries and aquaculture
    - Maritime transport and tourism
- **Data Knowledge Gaps:**
    - Developing a maritime spatial plan for the Adriatic-Ionian Region: 2.1.3 Data Collection.
- **Mapping Tools:**
    - ADRIPLAN Data Portal.
- **Assessment Tools:**
    - MSP tools: cumulative impact and conflict score tools.
- **Transboundary Exchange:**
    - Developing a maritime spatial plan for the Adriatic-Ionian Region: 3.5 Transboundary MSP and cross-border cooperation.

**6) THAL-CHOR (2013 – 2015)**

- **Stocktaking Maps:**
    - Maps of uses for Lesvos, Rhodes and Cyprus (Limassol area).
- **Mapping Tools:**
    - Web-GIS platform for implementing MSP in Greece and Cyprus.

**Operational Marine Data infrastructures used by Planners**

1) Spanish Harbours Authority (ES)
2) Balearic Islands Coastal Observing and Forecasting System (ES)
3) SHAPE Adriatic Atlas (IT)
4) ADRIPlan Data Portal (IT)
5) THAL-CHOR web-GIS (EL/CY)
6) Cyprus Coastal Ocean Forecasting Observing System (CY)
7) Poseidon (EL)
8) SHOM Marine Spatial Data Portal: data.shom.fr (FR)

**Applied Assessment tools for MSP (not necessarily used by planners yet)**

- Cumulative impact assessment and conflict score tools.
- Shared tools for the forecast and management of the climate change effects along the coast.

***Black Sea Overview***

**2 Member States:** RO, BG

**MSP Data Issues:**

- Developing the MSP General Strategy at National Level
- Cross-sector integration of MSP
- MSP for Blue Growth, assessment of future uses
- Applying Ecosystem Based Approach
- Cross-border cooperation across different countries

**MSP Data-Related Projects/Initiatives:**

- 2 ongoing and 2 complete projects

**Operational Marine Data Infrastructures:**

- 1 data infrastructure (pre-operational)

**Ongoing MSP Data-Related Projects / Initiatives**

**1) MARSPLAN (2015 – 2017)**

- **Stocktaking Maps:**
  - specifics to be determined
- **Data Knowledge Gaps:**
  - specifics to be determined
- **Data Portal:**
  - specifics to be determined
- **Transboundary Exchange:**
  - specifics to be determined

**2) Black Sea EMODnet Checkpoint (2015 – 2017)**

- **Data Knowledge Gaps:**
  - Data availability and adequacy reports responding to commercial and policy stress tests (i.e. wind farm siting, marine protected areas, oil platform leak, climate and coastal protection, fisheries management, marine environmental management, river inputs to coastal environments).
- **Data Policy:**
  - Policy issues arising from data availability and adequacy reports.
- **Transboundary Exchange:**
  - Sea basin exercise

**Complete MSP Data-Related Project Outputs**

**1) PEGASO (2010 – 2014)**

- **Mapping Tools:**

- PEGASO Spatial Data Infrastructure geoportal.

- **Transboundary Exchange:**
  - Report on the Mediterranean and Black Sea SDI assessment including existing viewers, their strengths and limits, and the characteristics of PEGASO geoportal development.

**2) MISIS (2012 – 2014)**

- **Stocktaking Maps:**
  - Bathymetry, biology, chemistry, monitoring networks, maritime borders, MPAs, MISIS cruise data.
- **Data Knowledge Gaps:**
  - Diagnostic Report II - Guiding improvements in the Black Sea integrated monitoring system (including capacity building and utilization of equipment), data management, and assessments.
- **Mapping Tools:**
  - MISIS Black Sea Marine Atlas.

**Operational Marine Data infrastructures used by Planners**

1) MISIS Black Sea Marine Atlas (BU/RO) – pre-operational

**Applied Assessment tools for MSP (not necessarily used by planners yet)**

## Annex 2: Overview of operational marine data infrastructures with potential relevance to the MSP process

| NAME | URL | TYPE | MSP THEMES | SCOPE | SCOPE KEYWORDS e.g. physics, chemistry, biology, fish stocks, habitats, ... | COVERAGE |
|---|---|---|---|---|---|---|
| **World Ocean Database** | http://www.nodc.noaa.gov/OC5/WOD/pr_wod.html | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics, Chemistry, Biology | Global |
| **Ocean Tracking Network** | http://oceantrackingnetwork.org | Data Catalogue | Describing the marine area | State of the biological, physical and chemical environment | Fish Tracking Data | Global |
| **GEBCO** | http://www.gebco.net | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Bathymetry | Global |
| **GLOSS** | http://www.gloss-sealevel.org | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics (sea level) | Global |
| **ESPON 2013 Database** | http://database.espon.eu/db2/home | Data Portal<br><br>GIS Mapping Tool | Describing the marine area | Distribution of human activities | Human Activities | European |
| **EEA Database** | http://www.eea.europa.eu/data-and-maps | GIS Mapping Tool<br><br>Data Portal<br><br>Data | Describing the marine area<br><br>Interactions in the marine area | Distribution of human activities<br><br>State of the biological, physical and chemical environment | Diverse | European |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Catalogue | | | | |
| **EMODnet Thematic lots** | http://www.emodnet.eu | Data Portal<br><br>GIS Mapping Tool | Describing the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Physics, Chemistry, Biology, Geology, Bathymetry, Human Activities | European |
| **SeaDataNet** | http://www.seadatanet.org | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics , Chemistry, Biology, Geology, Bathymetry | European |
| **European Atlas of the Sea** | http://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/ | Data Portal | Describing the marine area | Distribution of human activities<br><br>State of the biological, physical and chemical environment | Mostly Human Activities | European |
| **PANGAEA** | https://www.pangaea.de/about/ | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics, Chemistry, Biology, Geology | European |
| **Eurostat Database** | http://ec.europa.eu/eurostat/data/database | Data Portal | Describing the marine area | Economic value of human activities and the environment | Human Activities | European |
| **INSPIRE Geoportal** | http://inspire-geoportal.ec.europa.eu | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Diverse | European |

| | | | | | | |
|---|---|---|---|---|---|---|
| **ICES Data Portal** | http://www.ices.dk/marine-data/data-portals/Pages/default.aspx | Data Portal<br><br>GIS Mapping Tool | Describing the marine area | State of the biological, physical and chemical environment | Biology, Chemistry, Physics | European |
| **Copernicus MEMS** | http://marine.copernicus.eu | Information Service | Describing the marine area | State of the biological, physical and chemical environment | Physics (data and models) | European |
| **Ireland's Digital Ocean** | http://www.marine.ie/Home/site-area/data-services/marine-data-centre | Data Catalogue<br><br>Data Portal<br><br>Information Service | Describing the marine area | State of the biological, physical and chemical environment | Physics, Chemistry, Biology, Geology, Bathymetry, Human Activities | Atlantic<br><br>National |
| **Marine Economic Data Portal** | http://www.nuigalway.ie/semru/marine_economic_data.html | Data Portal | Describing the marine area | Social value of human activities and the environment<br><br>Economic value of human activities and the environment | Human Activities | Atlantic<br><br>National |
| **Portuguese Hydrographic Monitoring Network** | http://www.hidrografico.pt | Information Service | Describing the marine area | State of the biological, physical and chemical environment | Physics (data and models) | Atlantic<br><br>National |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Spanish Harbours Authority** | http://www.puertos.es/es-es/oceanografia/Paginas/portus.aspx | GIS Mapping Tool<br><br>Information Service | Describing the marine area | State of the biological, physical and chemical environment | Physics (data and models) | Atlantic<br><br>Mediterranean Sea<br><br>National |
| **HELCOM Map and Data Service** | http://maps.helcom.fi/website/mapservice/index.html | GIS Mapping Tool<br><br>Data Portal | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities<br><br>Sensitivities<br><br>Pressures resulting from human activities<br><br>Social value of human activities and the environment<br><br>Economic value of human activities and the environment | Physics, Chemistry, Biology, Geology, Human Activities | Baltic Sea<br><br>Regional |
| **Baltic Sea Bathymetry Database** | http://data.bshc.pro/about | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Just bathymetry | Baltic Sea<br><br>Regional |
| **SMHI Open Data Catalog** | http://www.smhi.se/en/services/open- | Data Portal | Describing the marine area | State of the biological, physical and chemical | Physics | Baltic Sea |

| | | | | | | |
|---|---|---|---|---|---|---|
| | data | | | environment | | National |
| **VELMU Dataportal** | http://paikkatieto.ymparisto.fi/velmu/ | Data Portal<br><br>Data Catalogue | Describing the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Diverse | Baltic Sea<br><br>National |
| **SYKE Metadata portal** | http://metatieto.ymparisto.fi:8080/geoportal/catalog/main/home.page;jsessionid=A611DE63E57530D36718810C8B4B15AF | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Diverse | Baltic Sea<br><br>National |
| **SEAGIS** | http://maps.seagis.org/ | GIS Mapping Tool | Describing the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Diverse | Baltic Sea |
| **Estonian Land Board Geoportal** | http://geoportaal.maaamet.ee/eng/Map-Server-p35.html | GIS Mapping Tool | Describing the marine area | Distribution of human activities | Human Activities | Baltic Sea<br><br>National |
| **Lithuanian Planning** | https://map.tpdr.lt/tpdr- | Data Portal | Describing the | State of the biological, physical and chemical | Diverse | Baltic Sea |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Portal** | gis/index.jsp?action=tpdrPortal&reg_tpd_id=78440 | | marine area | environment<br><br>Distribution of human activities | | National |
| **Baltic Nest** | http://www.balticnest.org/balticnest/thenestsystem.4.2beb0a011325eb5811a8000127598.html | Modelling Decision Support Tool | Describing the marine area<br><br>Interactions in the marine area<br><br>Integrated management | State of the biological, physical and chemical environment<br><br>Economic value of human activities and the environment<br><br>Sensitivities<br><br>Potential impacts and effects of human activities<br><br>Interaction pathways<br><br>Integrated assessments to information management approaches | Models for management | Baltic Sea<br><br>National |
| **Geoseaportal** | https://www.geoseaportal.de/gdi-bsh-portal/ui | Data Portal<br><br>GIS Mapping Tool | Describing the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Diverse | Baltic Sea<br><br>North Sea<br><br>National |

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| **Marine Data Infrastructure Germany** | www.mdi-de.org | Data Portal<br><br>GIS Mapping Tool | Describing the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Diverse | Baltic Sea<br><br>North Sea<br><br>National |
| **COSYNA** | http://codm.hzg.de/codm/ | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics, Chemistry, Biology | North Sea<br><br>National |
| **CONTIS** | http://www.bsh.de/en/Marine_uses/Industry/CONTIS_maps/index.jsp | Data Portal | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | pdf maps-BSH | Baltic Sea<br><br>North Sea<br><br>National |
| **DMI** | http://www.dmi.dk/en/vejr/ | Information Service<br><br>Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics | Baltic Sea<br><br>North Sea<br><br>National |

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| **Marine Spatial Data Infrastructure Denmark** | http://msdi.dk | Data Portal | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Human Activities,Physics, Chemistry, Biology, Geology, Bathymetry | Baltic Sea<br><br>North Sea<br><br>National |
| **Balearic Islands Coastal Observing and Forecasting System** | http://www.socib.es | Data Portal<br><br>Information Service | Describing the marine area | State of the biological, physical and chemical environment | Physics (data and models) | Mediterranean Sea<br><br>National |
| **MAPAMED** | http://www.mapamed.org | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Just Marine Protected Areas | Mediterranean Sea<br><br>Regional |
| **Mediterranean Marine Data** | http://www.mediterranean-marinedata.eu | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics, Chemistry | Mediterranean Sea |
| **Adriatic Atlas** | http://atlas.shape-ipaproject.eu | GIS Mapping Tool<br><br>Data Portal | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment | Human Activities,Physics, Chemistry, Biology, Geology, Bathymetry | Mediterranean Sea<br><br>Regional |

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| **AdriPlan Data Portal** | http://data.adriplan.eu/ | Data Catalogue<br><br>GIS Mapping Tool | Describing the marine area<br><br>Interactions in the marine area | Distribution of human activities<br><br>State of the biological, physical and chemical environment | Human Activities,Physics, Chemistry, Biology, Geology, Bathymetry | Mediterranean Sea |
| **THAL-CHOR WebGIS** | http://www.mspcygr.info/# | GIS Mapping Tool | Describing the marine area<br><br>Interactions in the marine area | Distribution of human activities<br><br>Pressures resulting from human activities | Human Activities | Mediterranean Sea |
| **ADRIBLU** | http://mapserver.arpa.fvg.it/adriblu/map.phtml | GIS Mapping Tool | Describing the marine area<br><br>Interactions in the marine area | Distribution of human activities<br><br>Economic value of human activities and the environment | Human Activities | Mediterranean Sea |
| **Cyprus Coastal Ocean Forecasting Observing System** | http://www.oceanography.ucy.ac.cy/cycofos/ | Information Service<br><br>Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics (data and models) | Mediterranean Sea<br><br>National |
| **GNOO** | http://gnoo.bo.ingv.it/static/GNOO_Services.htm | Data Portal<br><br>Information | Describing the marine area | State of the biological, physical and chemical environment | Physics, Chemistry, Biology, Geology | Mediterranean Sea |

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| | | Service | | | | National |
| **SINAnet** | http://www.mais.sinanet.isprambiente.it/ost/ | Data Portal<br><br>GIS Mapping Tool | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Diverse | Mediterranean Sea<br><br>National |
| **POSEIDON** | http://www.poseidon.hcmr.gr | Data Portal<br><br>GIS Mapping Tool<br><br>Information Service | Describing the marine area | State of the biological, physical and chemical environment | Physics | Mediterranean Sea<br><br>National |
| **Flemish Banks Monitoring Network** | http://www.meetnetvlaamsebanken.be | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics | North Sea<br><br>National |
| **Marine Atlas** | http://www.marineatlas.be/en/data | GIS Mapping Tool | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment | Human Activities,Physics, Chemistry, Biology, Geology, Bathymetry | North Sea<br><br>National |

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| **Belgian Coastal Atlas** | http://www.coastalatlas.be/map/?lan=en&theme_id=5 | GIS Mapping Tool | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities<br><br>Social value of human activities and the environment<br><br>Economic value of human activities and the environment | Human Activities,Physics, Chemistry, Biology, Geology, Bathymetry | North Sea<br><br>National |
| **Rikswaterstaat Water Data** | http://www.rws.nl/water/waterdata-en-waterberichtgeving/waterdata/index.aspx | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics | North Sea<br><br>National |
| **NL NODC Data Access Service** | http://www.nodc.nl/content/content.asp?lang=0&menu=3&submenu=19&html=16 | Data Catalogue<br><br>Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Physics, Chemistry, Biology, Geology | North Sea<br><br>National |
| **Open Data Portal of the Dutch Government** | https://data.overheid.nl/data/dataset?q=zee&sort=score+desc%2C+modified+desc%2C+metadata | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Human Activities, Physics, Chemistry, Biology, Geology | North Sea<br><br>National |

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| | _modified+desc | | | Distribution of human activities | | |
| **Noordzeeloket** | https://www.noordzeeloket.nl/ | Information Service | Describing the marine area<br><br>Interactions in the marine area | Distribution of human activities<br><br>State of the biological, physical and chemical environment | Human Activities, Physics, Chemistry, Biology, Geology | North Sea<br><br>National |
| **informatiehuis marine** | under development | Data Portal<br><br>GIS Mapping Tool<br><br>Information Service | Describing the marine area<br><br>Interactions in the marine area | Distribution of human activities<br><br>State of the biological, physical and chemical environment | Human Activities, Physics, Chemistry, Biology, Geology | North Sea<br><br>National |
| **Oceanographic Data Portal** | data.ifremer.fr | Data Catalogue | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Physics, Chemistry, Biology, Geology, Bathymetry, Human Activities | Atlantic<br><br>Mediterranean Sea<br><br>North Sea |
| **Coriolis** | http://www.coriolis.eu.org/ | Data Portal | Describing the marine area | State of the biological, physical and chemical | Physics mainly | Atlantic |

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| | | | | environment | | Mediterranean Sea<br><br>National |
| **Institute Marine Research** | http://www.imr.no/forskning/forskningsdata/en | Data Portal | Describing the marine area | State of the biological, physical and chemical environment | Biology, Physics, Geology, Fisheries | North Sea<br><br>National |
| **MAREANO** | http://www.mareano.no/en | GIS Mapping Tool | Describing the marine area | State of the biological, physical and chemical environment | Biology, Physics, Geology, Bathymetry | North Sea<br><br>National |
| **MEDIN** | http://www.oceannet.org | Data Catalogue | Describing the marine area<br><br>Interactions in the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities<br><br>Social value of human activities and the environment | Physics, Chemistry, Biology, Geology, Bathymetry, Human Activities | North Sea<br><br>Atlantic |
| **UKDMOS** | http://www.ukdmos.org | Data Catalogue | Describing the marine area | State of the biological, physical and chemical | Physics, Chemistry, Biology | North Sea |

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| | | | | environment<br><br>Distribution of human activities | | Atlantic |
| **MMO Marine Planning Evidence** | http://defra.maps.arcgis.com/apps/webappviewer/index.html?id=2c2f6e66c0464fa99d99fd6d8822ddef | GIS Mapping Tool | Describing the marine area | State of the biological, physical and chemical environment<br><br>Distribution of human activities | Human Activities | North Sea<br><br>Atlantic<br><br>National |

## Annex 3: MSP Data Study questions for semi-structured interviews with Member States

| **Spreadsheet questions** |
|---|
| **Worksheet Data Categories** |
| Do you use the same datasets? |
| Are there any categories or datasets missing from the table? Please specify. |
| Do you need this data category / dataset BUT it is not available? |
| **Worksheet Data Infrastructures** |
| Do you use this data infrastructure? |
| If YES, for which purpose? (please select from the list of MSP themes provided) |
| If NO, why not? e.g. data not relevant, access too complicated, … |
| Are you contributing to any of these data infrastructures? |
| **Worksheet Complete Projects / Initiatives** |
| Have you used any of the outputs from the projects / initiatives list in your planning process? If YES: follow up in telephone meeting* |
| Are there any complete projects or initiatives that should be removed from the list? If YES: please elaborate why, follow up in telephone meeting* |
| Worksheet Ongoing Projects / Initiatives |
| Are you interested in any of the potential outputs from the projects / initiatives for your future planning processes? If YES: follow up in telephone meeting* |
| Are there any ongoing projects or initiatives that should be added to the list? If YES: please elaborate, follow up in telephone meeting* |
| **Telephone Meeting** |
| Discuss which categories of data and information are most used / relevant for your planning purposes and why. |
| Do you consider any of the outputs from the projects / initiatives review potentially interesting for your planning purposes? * |
| Are there any projects or initiatives (complete or ongoing) that you are aware of that |

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| should be added?* |
| In your expected/current/most recent planning process, what are/were the main knowledge deficiencies you encountered and how do you deal with them? (might be tacit knowledge, precautionary principle etc.) |
| Who are the main stakeholders you are involving in your planning process as data providers? |
| Where do you rely on your own or local knowledge and where do you have access to objective data (i.e. acquired from monitoring or statistical measurements)? |
| Do you have a dedicated evidence strategy/plan for MSP, especially for filling data gaps? |
| Does your country keep a national data repository related to marine planning? If so, are the spatial themes described in the INSPIRE directive considered? Are you collating an interactive GIS-based evidence base for your planning process? |
| Are you contributing to other data infrastructures not listed in the data infrastructures review list? |

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