Marine SDI, INSPIRE and the EU Marine Directives

Presenters:

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Draft Workshop Agenda

• Introduction to the Agenda and Workshop objectives – R Longhorn
• Brief introduction to EU Integrated Maritime Policy initiatives – R Longhorn
• Marine related themes in INSPIRE relevant to Marine SDI – R Longhorn
• The status of Marine Cadastre developments in Europe – E Balla and R Wouters
• Introduction to the EU Maritime Spatial Planning Directive (MSPD) - Links to INSPIRE harmonized data themes – R Longhorn

• Break

• Introduction to the EU Marine Strategy Framework Directive (MSFD) - Reporting requirements and links to INSPIRE harmonized data themes – R Longhorn
• Status of INSPIRE harmonized marine-related themes across the EU – R Longhorn
• Challenges in providing INSPIRE compliant data suitable for implementing MSFD reporting and MSPD plans – R Longhorn
• Q&A and Discussion period – All
EU Integrated Maritime Policy

• Integrated Maritime Policy (IMP) is ‘a holistic approach to all sea-related policies’ including:
  • fisheries and aquaculture
  • shipping and seaports
  • marine environment
  • marine research
  • offshore energy,
  • shipbuilding and sea-related industries
  • maritime surveillance
  • maritime and coastal tourism
  • employment
  • development of coastal regions
  • external relations in maritime affairs.
EU Integrated Maritime Policy

Policy Milestones

• March 2005: Communication on an IMP for the EU setting out the planned objectives for a Green Paper on the future of the EU maritime policy.


• December 2007: European Council welcomes the IMP and invites the Commission to report on progress achieved at the end of 2009.

• September 2010: Commission puts forward its proposal for a regulation establishing a programme for continued financial support to the IMP for the 2011-2013 period (COM(2010) 0494).

• December 2011: Parliament and European Council adopt the above regulation, forming the legal basis for the IMP.

• 8 October 2012: Marine and Maritime Agenda for Growth and Jobs adopted by European ministers for maritime policy and the Commission.
EU Integrated Maritime Policy

Policy Objectives

Provide a **framework** to facilitate development and coordination of diverse and often conflicting sea-based activities in order to:

- maximise **sustainable use** of the oceans and seas, to enable growth of maritime regions and coastal regions,
- build a **knowledge and innovation base** for maritime policy,
- improve **quality of life** in coastal regions,
- promote EU leadership in **international maritime affairs**,
- raise **visibility of maritime Europe**,
- create **internal coordinating structures** for maritime affairs,
- define the **responsibilities and competences** of coastal regions.
EU Integrated Maritime Policy

ACHIEVEMENTS (Part 1)

• COM (2008) 0534 proposed concrete measures and mechanisms to improve marine and maritime research,
• COM (2008) 0768 on offshore wind energy, identifying challenges to be tackled and stressing need for better industrial and technological solutions,
• COM (2009) 0008 on the strategic goals and recommendations for the EU’s maritime transport policy promoting safe, secure and efficient shipping,
• COM (2009) 0010 and action plan for establishing a European maritime transport space without barriers,
  • COM (2009) 0011 proposing a Directive on reporting formalities for ships using ports of Member States to reduce bureaucracy and facilitate maritime transport between EU ports,
• COM (2009) 0248 strategy for the Baltic Sea region, a first step towards the regional implementation of the IMP, including 80 flagship projects,
  • SWD (2014) 167 Commission EU Sustainable Blue Growth Agenda for the Baltic Sea Region,
• COM (2009) 0466 on IMP for better governance in the Mediterranean,
• COM (2009) 0536 on the international dimension of the IMP,
• COM (2010) 0461 on Marine Knowledge 2020 to improve use of scientific knowledge on Europe’s seas and oceans through a coordinated approach to data collection and assembly,
EU Integrated Maritime Policy

ACHIEVEMENTS (Part 2)

• TA (2011) 0025 an EU Strategy for the Black Sea,
• COM (2011) 0782 on a Maritime Strategy for the Atlantic to promote job creation and growth in the Atlantic area,
  • Atlantic Forum Action Plan adopted on 13 May 2013 allowing strategic use of EU structural funding to support maritime growth for the period 2014-2020,
• COM (2012) 0494 on Blue Growth for a joint initiative with Member States, regions, and all relevant stakeholders to unlock the potential of the blue economy,
• Regulation (EU) No 1052/2013 establishing the European Border Surveillance System (Eurosur),
• 2 July 2013: Parliament adopted a resolution on Blue Growth, stressing that the Blue Growth Strategy, as part of the IMP, will encourage development of synergies and coordinated policies, generating European added value,
• Directive 2014/89/EU establishing a framework for maritime spatial planning to promote the sustainable growth of maritime economies and the use of marine resources (Maritime Spatial Planning Directive),
• COM (2014) 0451 on the Common Information Sharing Environment (CISE) to improve efficiency and cost-effectiveness of maritime surveillance,
• COM (2014) 0357 EU Strategy for the Adriatic and Ionian Region and Action Plan,
• 16 April 2014: Parliament plenary vote on the Regulation on the European Maritime and Fisheries Fund (EMFF) endorsed a budgetary allocation of 5% of the total volume of the EMFF for the IMP for the 2014-2020 period, representing a four-fold increase for the IMP.
• JOIN (2016) 002 joint communication on an integrated EU policy for the Arctic,
EU Integrated Maritime Policy

ACHIEVEMENTS (Part 3)


Challenges related to Maritime Policy Implementation

• Different levels of legislation apply to many different aspects of stated ‘policy objectives’ – Directives, Decisions, Regulations, e.g. for maximising sustainable use of the oceans and seas, building a knowledge and innovation base for maritime policy, improving quality of life in coastal regions, creating internal coordinating structures for maritime affairs, defining the responsibilities and competences of coastal regions, etc.

• The policies impact on, and require input from, a wide and diverse range of stakeholders and government agencies – and non-governmental organisations in many cases – at all levels of government.

• The legislation changes over time, e.g. Directive 2017/845/EU of 17 May 2017 amending Directive 2008/56/EC (MSFD) regarding the indicative lists of elements to be taken into account for the preparation of marine strategies – Annex III of the original MSFD.

• Both the MSFD and MSP Directive refer to making use of existing “relevant instruments and tools”, including specific reference to the INSPIRE Directive …

• ... yet, especially in the case of monitoring Good Environmental Status (MSFD), the reporting requirements of Directive 2008/56/EC pre-date the availability of even the final data specifications (and ensuing Regulations) defining many of the data themes relevant to the marine environment …

• ... and the MSP Directive does not refer to specific data types at all, just types of ‘activities’ that should be considered when creating a maritime spatial plan, including land-sea interaction.

• So the big question – Is INSPIRE implementation helping with implementation of those marine/maritime legislative instruments, and their related reporting requirements, or not – yet?
Now let’s have a quick look at INSPIRE data themes relevant to the marine/coastal environment.

- The theory (plan?) is that, if data needed to satisfy the monitoring and reporting requirements of MSFD and maritime plan development for the MSF Directive exist in a harmonized, accessible and interoperable way (INSPIRE?), then implementing these two marine-related Directives will be more effectively achieved, especially where cross-border issues arise.
- The marine environment famously disrespects national boundaries!
Marine related themes in INSPIRE

INSPIRE

  • 34 data themes, of which 11 relate directly to the marine environment, 11 indirectly, and 10 are relevant in the coastal zone - spread across the three Annexes (with a direct impact on data availability).

• INSPIRE data availability issues:
  • Where data appeared in the three Annexes determined when it was to be made available.
  • Detailed (legally binding) data specifications were delivered in EC Regulations at different times and were sometimes delayed.
  • After publication of the Regulations, many complexities have been found in meeting the standards for harmonization of the data, especially where single datasets contain many themes (common in the marine environment).
  • Not all Member States have been able to meet the timelines for ensuring data availability, especially for Annex III data themes.
INSPIRE Data Themes with direct Marine links

Annex I

Hydrography - Hydrographic elements, including marine areas.

Geographical grid systems - Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells. [Agreed grid systems are needed for off-shore and near-shore information purposes, i.e. meshes, etc. for MSFD reporting.]

Protected sites - Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives. [Many protected sites exist in the off-shore and near-shore marine environment + new drive for Marine Protected Areas offshore.]

Annex II

Elevation - Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.
INSPIRE Data Themes with direct Marine links

Annex III

Area management/restriction/regulation zones and reporting units – “Areas managed, regulated or used for reporting at international, European, national, regional and local levels. ... regulated fairways at sea ... areas for the dumping of waste, river basin districts ... and coastal zone management areas.”

• Many waste dumping areas are located offshore, river basin districts extend into near-shore coastal waters, etc.

Agricultural and Aquaculture facilities

• Near-shore and off-shore aquaculture facilities will almost certainly have far different data needs (features, location grids, etc.) than on-shore farming.

Environmental monitoring facilities –

• Marine and Coastal environmental monitoring is the focus of numerous actions at the EU level, especially the Marine Strategy Framework Directive for GES.

Natural risk zones

• Coastal flood plains are an obvious ‘risk zone’ for which various combinations of data are needed for planning, monitoring and mitigation, e.g. DTM, bathymetry, meteorological models, etc.

Bio-geographical regions - Areas of relatively homogeneous ecological conditions with common characteristics.
INSPIRE Data Themes with direct Marine links

Annex III (continued)

Habitats and biotopes - Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.

Species distribution - Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit. [Species distribution in the marine and coastal environment is not only an important topic, but one that is the focus of various national, regional and international biodiversity laws and conventions.]

Oceanographic geographical features – “Physical conditions of oceans (currents, salinity, wave heights, etc.)”.

Sea regions - Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.

Energy resources – “... including depth/height information on the extent of the resource”.

Mineral resources

• Mineral abstraction is another coastal and off-shore process that has can have serious negative impact on coastal regions.
INSPIRE Data Themes with indirect Marine links

Annex I
Coordinate reference systems - Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum. [What about off-shore and near-shore vertical datums pertinent to coastal information?]

Annex II
Land cover - Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-) natural areas, wetlands, water bodies. [Terrestrial land cover often has a direct impact on health and use of coastal zones, as is especially true for coastal wetlands and water bodies located near to the coast. Also important is the definition of a ‘water body’.]

Geology - Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology. [What about coastal geomorphology?]
INSPIRE Data Themes with indirect Marine links

Annex III

Land use - Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational). [Many of these types of ‘land use’ directly or indirectly impact on, or occur in, the coastal zone.]

Human health and safety - Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment. [Pathogens occurring off-shore, for example in shell fish, have a direct impact on ‘health and safety’, as does general coastal water pollution.]

Utility and governmental services - Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals. [All of the underlined facilities have coastal implications when the facilities occur in coastal zones.]

Production and industrial facilities - Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites. [Pollution prevention and control is a serious issue for many coastal regions and managers, especially where heavy industry or dense population centres are situated near to coastlines.]
Data Themes relevant in the coastal zone

Annex I

**Geographical names** - Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest. [Of concern here should be ensuring that geographical names can be attached to relevant boundaries, even where the named region occurs offshore, i.e. where land-based boundary descriptive means may not apply.]

**Administrative units** - Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.

**Addresses** - Location of properties based on address identifiers, usually by road name, house number, postal code.

**Cadastral parcels** - Areas defined by cadastral registers or equivalent.

**Transport networks** - Road, rail, air and water transport networks and related infrastructure. Includes links between different networks.
Data Themes relevant in the coastal zone

Annex II

Orthoimagery - Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.

Annex III

Statistical units - Units for dissemination or use of statistical information.

Buildings - Geographical location of buildings.

Soil - Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.

Population distribution - demography - Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.
Marine Cadastre Developments in Europe

• What is marine cadastre?
• Why do we need marine cadastre in Europe?
• What is the state of play?
• How could well-developed marine cadastre aid in meeting EU Integrated Maritime Policy, especially in regard to the Maritime Spatial Planning Directive?

Over to Evangelia and Rik!
Maritime Spatial Planning Directive & INSPIRE

Benefits of maritime spatial planning?

• **Reduces conflicts** - between sectors.

• **Creates synergies** - between different activities.

• **Encourages investment** – by creating predictability, transparency and clearer rules.

• **Increases cross-border cooperation** – between EU countries to develop energy grids, shipping lanes, pipelines, submarine cables and other activities, but also to develop coherent networks of protected areas.

• **Protects the environment** – through early identification of impact and opportunities for multiple use of space.
Maritime Spatial Planning Directive & INSPIRE

• Directive 2014/89/EU establishing a framework for maritime spatial planning to promote the sustainable growth of maritime economies and the use of marine resources (Maritime Spatial Planning Directive)

• Timeline for the Directive:
  • 2014: Adoption of the Directive
  • 2016: Deadline for transposition and designation of competent authorities
  • 2021: Deadline for the establishment of maritime spatial plans

• What does a maritime plan look like on the map?
Figure 15: OWF leased areas, agreements for lease (WIND1) and areas under exclusive zone (WIND2)

POLICY MAP. This map highlights the area where policies WIND1 and WIND2 apply. This area may be reviewed as necessary during the life of the Marine Plans. The reader should check for any updates via the link provided in paragraph 102.
MSP Directive - Preamble

• (24) With a view to ensuring that maritime spatial plans are based on reliable data and to avoid additional administrative burdens, it is essential that Member States make use of the best available data and information by encouraging the relevant stakeholders to share information and by making use of existing instruments and tools for data collection, such as those developed in the context of the Marine Knowledge 2020 initiative and Directive 2007/2/EC of the European Parliament and of the Council (INSPIRE).

• (16) Marine and coastal activities are often closely interrelated. In order to promote the sustainable use of maritime space, maritime spatial planning should take into account land-sea interactions. For this reason, maritime spatial planning can play a very useful role in determining orientations related to sustainable and integrated management of human activities at sea, preservation of the living environment, the fragility of coastal ecosystems, erosion and social and economic factors. Maritime spatial planning should aim to integrate the maritime dimension of some coastal uses or activities and their impacts and ultimately allow an integrated and strategic vision.

• (17) This framework Directive does not interfere with Member States’ competence for town and country planning, including any terrestrial or land spatial planning system used to plan how land and coastal zone should be used. If Member States apply terrestrial planning to coastal waters or parts thereof, this Directive should not apply to those waters.
Article 10 - Data use and sharing

1. Member States shall organise the use of the best available data, and decide how to organise the sharing of information, necessary for maritime spatial plans.

2. The data referred to in paragraph 1 may include, inter alia:
   (a) environmental, social and economic data collected in accordance with Union legislation pertaining to the activities referred to in Article 8;
   (b) marine physical data about marine waters.

3. When implementing paragraph 1, Member States shall make use of relevant instruments and tools, including those already available under the IMP (Integrated Maritime Policy), and under other relevant Union policies, such as those mentioned in Directive 2007/2/EC (INSPIRE).
Article 8 - Setting-up of maritime spatial plans

1. When establishing and implementing maritime spatial planning, Member States shall set up maritime spatial plans which identify the spatial and temporal distribution of relevant existing and future activities and uses in their marine waters, in order to contribute to the objectives set out in Article 5.

2. In doing so and in accordance with Article 2(3), Member States shall take into consideration relevant interactions of activities and uses.

• Note there is no mention of specific data to be used in preparing the plans, other than the earlier reference to para 24 in the Preamble - “make use of the best available data and information” and reference to INSPIRE.
Article 8 - Setting-up of maritime spatial plans

Maritime planning activities include:

• aquaculture areas,
• fishing areas,
• installations and infrastructures for the exploration, exploitation and extraction of oil, of gas and other energy resources, of minerals and aggregates, and for the production of energy from renewable sources,
• maritime transport routes and traffic flows,
• military training areas,
• nature and species conservation sites and protected areas,
• raw material extraction areas,
• scientific research,
• submarine cable and pipeline routes,
• tourism,
• underwater cultural heritage.
<table>
<thead>
<tr>
<th>Maritime Spatial Planning Directive Activities</th>
<th>Related INSPIRE Data Theme(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquaculture areas</td>
<td>Agricultural and Aquaculture facilities - <em>Near-shore and off-shore aquaculture facilities</em></td>
</tr>
<tr>
<td>Fishing areas</td>
<td><strong>Bio-geographical regions</strong> - Areas of relatively homogeneous ecological conditions with common characteristics.</td>
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<td><strong>Habitats and biotopes</strong> - Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes <strong>terrestrial and aquatic areas</strong> distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.</td>
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<td>--------------------------------</td>
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</tbody>
</table>
| **Installations and infrastructures** for the exploration, exploitation and extraction of oil, of gas and other energy resources, of minerals and aggregates, and for the production of energy from renewable sources | **Energy resources** – “... including depth/height information on the extent of the resource”.  
*Offshore and near-shore windfarms.*

**Mineral resources** – *Near-shore and off-shore oil and gas extraction.* |


**Transport networks** - Road, rail, air and water transport networks and related infrastructure. Includes links between different networks.  

**Maritime transport routes and traffic flows**
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<tr>
<td>Military training areas</td>
<td>Area management / restriction / regulation zones and reporting units – “Areas managed, regulated or used for reporting at international, European, national, regional and local levels.</td>
</tr>
</tbody>
</table>
| Nature and species conservation sites and Protected Areas | Protected sites - Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives. *Marine Protected Areas offshore.*  

Habitats and biotopes - Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.  

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<tr>
<td>Raw material extraction areas</td>
<td>Mineral resources – <em>Near-shore and off-shore oil and gas extraction</em>.</td>
</tr>
<tr>
<td>Submarine cable and pipeline routes</td>
<td><strong>Utility and governmental services</strong> - Includes utility facilities such as sewage, waste management, <em>energy supply</em> and water supply.</td>
</tr>
<tr>
<td>Underwater cultural heritage</td>
<td><strong>Protected sites</strong> - Areas designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives. <em>Marine Protected Areas offshore</em>.</td>
</tr>
</tbody>
</table>
## Adopted MSP Plans

<table>
<thead>
<tr>
<th>Adopted Plan</th>
<th>Country</th>
<th>Area covered</th>
<th>Year of Adoption</th>
<th>Revision Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maritime Spatial Plan for the Belgian Part of the North Sea</td>
<td>Belgium</td>
<td>Belgian Part of the North Sea (3,454 km²)</td>
<td>2014</td>
<td>The plan will be revised every 6 years.</td>
</tr>
<tr>
<td>Zadar county integrated sea use and management plan</td>
<td>Croatia</td>
<td>The entire marine area of Zadar County (3,643 km²)</td>
<td>2001</td>
<td>Amended in 2004, 2005, 2006 and 2014.</td>
</tr>
<tr>
<td>Hiiu island maritime spatial plan</td>
<td>Estonia</td>
<td>Internal waters and territorial sea around Hiiu island (3786,3 km²)</td>
<td>2016</td>
<td>The plan will be evaluated every 7 years. If changes are necessary, a new plan must be initiated and adopted.</td>
</tr>
<tr>
<td>Pärnu Bay area maritime spatial plan</td>
<td>Estonia</td>
<td>Internal waters and territorial sea in Pärnu Bay area (2594,3 km²)</td>
<td>2017</td>
<td>The plan will be evaluated every 7 years. If changes are necessary, a new plan must be initiated and adopted.</td>
</tr>
<tr>
<td>Regional land use plan for the Sea, Kymenlaakso Region</td>
<td>Finland</td>
<td>Kymenlaakso Region including the Territorial Sea (1,822 km²)</td>
<td>2013</td>
<td>The plan will be revised whenever deemed necessary.</td>
</tr>
<tr>
<td>Maritime Spatial Plan for the EEZ of the Baltic Sea</td>
<td>Germany</td>
<td>German EEZ in the Baltic Sea (4,500 km²)</td>
<td>2009</td>
<td>The Plan will be reviewed during the next legislative period in 2017/8.</td>
</tr>
<tr>
<td>Maritime Spatial Plan for the EEZ of the North Sea</td>
<td>Germany</td>
<td>German EEZ in the North Sea (28,600 km²)</td>
<td>2009</td>
<td>The Plan will be reviewed during the next legislative period in 2017/8.</td>
</tr>
<tr>
<td>Maritime Spatial Plan for the Territorial Sea of the Baltic and North Sea –</td>
<td>Germany</td>
<td>The plan covers the land as well as the marine areas of Schleswig-Holstein as far as the territorial sea border. Inland Waters and Territorial</td>
<td>2010</td>
<td>The State Development Plan was last amended in 2015. The start of the consultation for this plan is anticipated for 2015.</td>
</tr>
</tbody>
</table>

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Adopted MSP Plans, Version: August 2017
Learn more at the European MSP Platform

MSP in Europe

The European Maritime Spatial Planning Platform provides a single interface to draw together experience and expertise from across Europe and make it available in a readily accessible, implementation-oriented format. It serves as the gateway and exchange forum for all involved in MSP throughout Europe.

Visit http://www.msp-platform.eu/

MSP Database

Search for MSP implementation experiences in the Practices Database and to take a look at the comprehensive MSP Projects database. You can also explore the extensive FAQ page, or Submit a question.

MSP FAQ: http://www.msp-platform.eu/faq

- The MSFD requires Member States to adopt **Programmes of Measures** (Article 13) to achieve **good environmental status (GES)** in their **marine waters by 2020** (Article 3(1)) ... (including) spatial protection measures contributing to coherent and representative networks of marine protected areas (MPAs) (Article 13(4)).

- The Marine Directive aims to achieve **Good Environmental Status (GES)** of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend ... with the explicit regulatory objective that "biodiversity is maintained by 2020", as the cornerstone for achieving GES.

- MSFD establishes **European marine regions and sub-regions** based on geographical and environmental criteria, namely the Baltic Sea, the North-east Atlantic Ocean, the Mediterranean Sea and the Black Sea - located within the geographical boundaries of the existing Regional Sea Conventions (RSC).

- Member States are required to develop a strategy for their marine waters (a ‘Marine Strategy’) which must be kept up-to-date and reviewed every 6 years – next review report is due 2018.
What does a Marine Strategy include?

- An **initial assessment** of the current environmental status of national marine waters and the **environmental impact and socio-economic analysis of human activities** in these waters.
- Determination of **what GES means** for national marine waters.
- Establishment of **environmental targets and associated indicators** to achieve GES by 2020.
- Establishment of a **monitoring programme** for the ongoing assessment and the regular update of targets.
- Development of a **programme of measures** designed to achieve or maintain GES by 2020.
- The process is cyclical and the **second cycle starts again in 2018**.
INSPIRE and the MSFD

• Annex III of the Directive - indicative lists of characteristics, pressures and impacts - was amended in 2017 to better link ecosystem components, anthropogenic pressures and impacts on the marine environment with the MSFD's 11 descriptors and with the new Decision on Good Environmental Status (GES).

Qualitative descriptors for determining GES

• Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.

• Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.

• Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.

• All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.

• Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
Qualitative descriptors for determining GES

- **Sea-floor integrity** is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.

- **Permanent alteration of hydrographical conditions** does not adversely affect marine ecosystems.

- **Concentrations of contaminants** are at levels not giving rise to pollution effects.

- **Contaminants in fish and other seafood** for human consumption do not exceed levels established by Community legislation or other relevant standards.

- **Properties and quantities of marine litter** do not cause harm to the coastal and marine environment.

- **Introduction of energy, including underwater noise**, is at levels that do not adversely affect the marine environment.
Annex III (2017) - Structure, functions and processes of marine ecosystems

<table>
<thead>
<tr>
<th>Theme</th>
<th>Ecosystem elements</th>
<th>Possible parameters and characteristics (Note 1)</th>
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</thead>
<tbody>
<tr>
<td><strong>Species</strong></td>
<td>Species groups (Note 4) of marine birds, mammals, reptiles, fish and cephalopods of the marine region or sub-region</td>
<td>Spatial and temporal variation per species or population: distribution, abundance and/or biomass; size, age and sex structure; fecundity, survival and mortality/injury rates; behaviour including movement and migration; habitat for the species (extent, suitability). Species composition of the group.</td>
</tr>
<tr>
<td><strong>Habitats</strong></td>
<td>Broad habitat types of the water column (pelagic) and seabed (benthic) (Note 5), or other habitat types, including their associated biological communities throughout the marine region or sub-region</td>
<td>Per habitat type: habitat distribution and extent (and volume, if appropriate); species composition, abundance and/or biomass (spatial and temporal variation); size and age structure of species (if appropriate); physical, hydrological and chemical characteristics. Additionally for pelagic habitats: chlorophyll a concentration; plankton bloom frequencies and spatial extent.</td>
</tr>
</tbody>
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## Annex III (2017) - Structure, functions and processes of marine ecosystems

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<th>Possible parameters and characteristics (Note 1)</th>
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</thead>
</table>
| **Ecosystems, including food webs** | Ecosystem structure, functions and processes, comprising:  
- physical and hydrological characteristics  
- chemical characteristics  
- biological characteristics  
- functions and processes | **Spatial and temporal variation** in:  
temperature and ice;  
hydrology (wave and current regimes upwelling, mixing, residence time, freshwater input; sea level);  
bathymetry;  
turbidity (silt/sediment loads), transparency, sound;  
seabed substrate and morphology; salinity, nutrients (N, P), organic carbon, dissolved gases (pCO2, O2) and pH;  
links between habitats and species of marine birds, mammals, reptiles, fish and cephalopods;  
pelagic-benthic community structure  
Productivity. |
MSFD Monitoring and Reporting

MSFD monitoring and reporting is not implemented in a policy or information systems vacuum:

- Habitats Directive
- Birds Directive
- Bathing Water Directive
- Water Framework Directive
- Nitrates Directive
- Common Fisheries Policy Regulation
- SEIS – Shared Environmental Information System
- WISE – Water Information System for Europe
- Reportnet 2.0 – Management system for environmental reporting for the EEA and DG Environment (see https://www.eionet.europa.eu/reportnet)
- Eionet – EEA’s European Environment Information and Observation Network
- INSPIRE
MSFD Reporting
Structure of reporting (sheets) on the initial assessment of the MSFD, with reporting sheets relating to specific elements of Articles 8(1a) on characteristics, 8(1b) on pressures and impacts and 8(1c) on economic and social uses. These three main elements are linked via standardised lists of ecosystem components, pressures and activities (central boxes).
All thematic data needed for MSFD monitoring and reporting is **spatially referenced**, requiring data from these INSPIRE themes:

- **Hydrography** - Hydrographic elements, including *marine areas*.
- **Elevation** - Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, *bathymetry and shoreline*.
- **Oceanographic geographical features** – Physical conditions of oceans (currents, salinity, wave heights, etc.). – *Required in MSFD4_GeographicalAreasDescription*.  
- **Sea regions** - *MSFD4_GeographicalAreasID* - Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.
- **Geographical grid systems** - Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells. *Grid systems are key to reporting spatial data in MSFD*.
- **Area management/restriction/regulation zones and reporting units** – “Areas managed, regulated or used for reporting at international, European, national, regional and local levels. ... regulated fairways at sea ... areas for the dumping of waste, river basin districts ... and coastal zone management areas.”
Other INSPIRE themes that relate to MSFD reporting requirements include:

- **Geographical names** - Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.
  
  - Need to ensure that geographical names can be attached to relevant boundaries, even where the named region occurs offshore, i.e. where land-based boundary descriptive means may not apply.

- **Administrative units** - Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries – *including in the marine environment*.

- **Transport networks** - Road, rail, air and water transport networks and related infrastructure. Includes links between different networks.
MSFD and INSPIRE

<table>
<thead>
<tr>
<th>MSFD Indicator</th>
<th>Associated INSPIRE Data Theme(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological diversity is maintained. The <strong>quality and occurrence of habitats and the distribution and abundance of species</strong> are in line with prevailing physiographic, geographic and climatic conditions.</td>
<td><strong>Hydrography</strong> - Hydrographic elements, including marine areas.</td>
</tr>
<tr>
<td></td>
<td><strong>Habitats and biotopes</strong> - Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes <strong>terrestrial and aquatic areas</strong> distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.</td>
</tr>
<tr>
<td></td>
<td><strong>Species distribution</strong> - Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.</td>
</tr>
<tr>
<td></td>
<td><strong>Bio-geographical regions</strong> - Areas of relatively homogeneous ecological conditions with common characteristics.</td>
</tr>
</tbody>
</table>
**Non-indigenous species** introduced by human activities are at levels that do not adversely alter the ecosystems.

**Populations** of all **commercially exploited fish and shellfish** are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.

All **elements of the marine food webs**, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.

<table>
<thead>
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<td><strong>Geographical grid systems</strong> - Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.</td>
</tr>
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</table>
Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.

Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.

<table>
<thead>
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<th>Hydrography - Hydrographic elements, including marine areas.</th>
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<td>Elevation - Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.</td>
</tr>
</tbody>
</table>
Marine and MSFD related codes in INSPIRE Registry

Quick search of the **INSPIRE Registry** identifies 75 entries for code lists, layer registration, feature concepts, themes and application schemas. For example, for **code lists**:

- Classification of habitats according to table 1 of Annex III to Directive 2008/56/EC (MSFD).
- A set of codes to be used for the Marine Strategy Framework Directive region classification.
- Classification of habitat types according to table 1 of Annex III to Directive 2008/56/EC (MSFD).
- Marine regions and their subregions are sea regions designated under international, Union, national or sub-national legislation for the purpose of assessment, management and regulation.
- **Marine** - An environment with marine water.
- **Habitats directive** - Classification of habitats according to Annex I to Directive 92/43/EEC.
- **Nature directives** - Names and taxonomic concepts as defined by the species lists in Directives 2009/147/EC (Birds Directive) and 92/43/EEC (Habitats Directive).
- **Marine setting** - Setting characterized by location under the surface of the sea.
Further **code list** entries:

- **Marine, littoral and coastal wetlands features** - Geomorphologic landscapes and landforms related to wave or tidal dynamics developed in marine, shallow marine, near-shore and littoral zone environments, and those related to vegetated and / or shallow wet areas.

- **Designated waters** - Marine, coastal or surface waters designated by Member States as needing protection or improvement in order to support fish life.


- **River basin district** - Area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, identified under Article 3(1) of Directive 2000/60/EC (WFD) as the main unit for management of river basins.

- **Zone Type** - Types of marine circulation zones.

- **Brackish Water** - An environment with a brackish water type.

- **Ocean highland setting** - Broad category for subaqueous marine settings characterized by significant relief above adjacent sea floor.

- **Subaqueous setting** - Setting situated in or under permanent, standing water. Used for marine and lacustrine settings, but not for fluvial settings.
From the feature concepts dictionary:

- **Marine Layer** - A Marine Layer describes any layer that may cover any part of a sea surface or sea bottom.

- **Marine Waterway** - Waterway which is defined at sea waters.

- **Marine Contour** - A set of isolines representing the value of some phenomenon at a particular time.

- **Marine Circulation Zone** - A sea area defined by its physical and chemical circulation patterns. Typically used for management and reporting of the marine environment or marine environmental classification.

- **Intertidal Area** - The part of the marine environment that is exposed (not covered in water) during a normal tidal cycle; defined as the difference between any high and any low water level.

- **Ocean Region** - One of the three large regions of the world-wide ocean, each with associated sub- and marginal areas and subject to an independent flow regime.
Marine and MSFD related codes in INSPIRE Registry

From the layer register:


• **Marine region** - This layer only applies to "ManagementRestrictionOrRegulationZone" spatial object types whose value from the "ZoneTypeCode" code list is "marineRegion".

• **Marine rescue station** - This layer only applies to "GovernmentalService" spatial object types whose value from the "ServiceTypeValue" code list is "marineRescueStation".

Status of MSFD Reporting (Jan 2017)

- Twenty Member States reported over 200 monitoring programmes, including nearly 1000 sub-programmes.
- Member States have generally linked their monitoring programmes to existing programmes required under other EU legislation.
- “majority of monitoring activities (73 %) are focused on assessing the environmental state of Member States’ marine waters and impacts from human activities.”
- “monitoring of biodiversity (Descriptors 1, 4 and 6) accounts for 41 % of the effort - explained by the work already being done on monitoring to implement other EU legislation, such as the Birds Directive, the Habitats Directive, the Water Framework Directive, the Bathing Water Directive, the Nitrates Directive and the Common Fisheries Policy Regulation.”
- Member States reported on the spatial distribution of their monitoring programmes, using the following geographic zones: terrestrial (land-based), transitional waters, coastal waters, territorial waters, the Exclusive Economic Zone (EEZ), the continental shelf area beyond the EEZ, and beyond Member States marine waters.
- The highest proportion (68 %) of Member State monitoring takes place in coastal waters, while a high proportion also occurs in territorial waters (57 %) and in the EEZ (51 %).
INSPIRE Harmonized Marine-related Datasets

Determining how many datasets needed and/or used for MSFD monitoring and reporting have been created according to the INSPIRE Directive and Regulations is extremely difficult for two main reasons:

1. Many existing datasets are created to serve multiple environmental monitoring and reporting purposes in regard to already existing EU environmental directives and/or national programmes.

2. Many such datasets, especially in the marine realm, are inherently multi-theme, i.e. containing features from several INSPIRE themes in one dataset.

3. Searching the INSPIRE EU Geoportal on the search term ‘marine strategy framework directive’ returns only 26 datasets: Belgium = 1, UK = 17 and Malta = 8 ... yet searching on the UK’s MEDIN portal (http://www.oceannet.org) on the term ‘species distribution’ returns details for 4363 datasets (many of which of course pre-date INSPIRE and its regulatory requirements).

4. Searching on ‘sea regions’ returns 251 datasets from 20 states, of which France = 148 and UK=49 -with all other states having typically 1 to 3 datasets for ‘sea regions’ (Portugal has 11, Norway has 9 and Belgium 6).

5. ‘Oceanographic geographical features’ returns 28 hits – France = 20, Portugal = 5, UK, Finland and Croatia = 1 each.
Challenges for MSFD & MSP Directive Implementation

• Different objectives across Directives (including others already in place for some years) leads to different implementation requirements (inputs) and outputs.

• Different focuses – environmental sustainability (via ecosystem monitoring), economic growth (via efficient and sustainable planning), land-sea interactions, ...

• Multiple agencies required to cooperate within difficult resource environments.

• Timelines for adoption, implementation and reporting for different Directives vary – especially difficult where input for one Directive requests linkage to outputs from another (INSPIRE being a typical case).
  • E.g. full interoperability for INSPIRE data in Annex 1 is required by 23/11/2017 and 21/10/2020 for Annex II and III data.

• Great variability across Member States on ability and resources to meet often ambitious implementation plans – and Regulations.