The ability of regional coordination and policy integration to produce coherent marine management: implementing the Marine Strategy Framework Directive in the North-East Atlantic

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Abstract

The transboundary nature of the marine environment requires concerted actions among neighbouring countries to improve its quality in an effective way. Coordination at international level is particularly important during the implementation of environmental policies aimed at reducing the widespread pressures derived from activities, such as shipping and fishing. The European Marine Strategy Framework Directive (MSFD) aims to protect and improve the status of a wide range of ecosystem components with a regional focus, promoting cooperation among countries and integration with other environmental policies. In 2014, the European Commission assessed the level of adequacy, consistency and coherence achieved by Member States during the implementation of the first phase of the MSFD and hence this paper focuses on the cross-border coherence and coordination within one marine region in order to achieve the goals of the Directive. In particular, it identifies and analyses the main differences among the results of the implementation of the first phase of the MSFD across the North-East Atlantic region. This analysis shows that, in general, the use of existing data, methodologies and targets from related environmental policies corresponds to the higher levels of coherence among countries while a limited use of such policies produces less coherence. This suggests that the European Commission, Regional Seas Conventions and Member States should work together to identify the real connection between the MSFD and other policies to make a proper use of existing data and approaches and to harmonise different policy objectives. In particular, the review shows what might be termed a 'paradox of coherence' amongst Member States where coherence of action has to be achieved within a European policy of subsidiarity, the act of Member States having control over the way they implement framework directives. This can be regarded as a fundamental flaw in having a 'Framework Directive' instead of the greater control in a 'Directive'.

Keywords: Marine Strategy Framework Directive, coherence, policy integration, regional coordination, cooperation.

1. Introduction

The growing importance of maritime activities such as fisheries, shipping, resource extraction, tourism and offshore renewable energy across European seas, requires strong political coordination among countries that share the same marine area to ensure a more sustainable management of the marine environment. The exchange of information and knowledge between countries can improve the understanding of ecosystem dynamics and the ability to solve problems through involving different actors. Moreover, coordination between different institutions responsible for developing and implementing environmental policies is essential to avoid contradicting policy outcomes and duplication of work (Maier, 2014). Management measures taken to meet the requirements of sectoral policies, their lack of coherence, the unclear definition of competencies and the consequent waste of resources are considered the main obstacles towards an effective implementation of marine legislation (COM (2002) 539:16; Juda, 2007; Bondareff, 2007; Koivurova, 2009).

The ecosystem-based approach to the management of marine environment underpins the Marine Strategy Framework Directive (MSFD, 2008/56/EC), which aims to achieve Good Environmental Status of all European marine regions, promoting cooperation and coordination between countries and integration with other environmental policies (Borja et al, in press). The four European regions are the Mediterranean Sea, North-East Atlantic Ocean, Black Sea and Baltic Sea, each of which has a Regional Sea convention, respectively the Barcelona, OSPAR, Bucharest and HELCOM Conventions. The MSFD framework has been transposed into national legislation by specific marine strategies whose preparation (the first phase), started with the assessment of the characteristics of marine waters (Article 8) including a detailed study of the main pressures and impacts and an economic and social analysis. On the basis of such an assessment, Member States defined what they consider Good Environmental Status (GEnS[1]) of their marine waters (Article 9) and established a set of environmental targets (Article 10) to achieve it. In 2014, monitoring programmes were established to assess the progress towards GEnS (Article 11) and during 2015-2016 Member States are developing and implementing a programme of measures (Article 12) to achieve GEnS. These five steps will be revised and repeated during the second cycle (2018-2021) taking into account the experiences gained.

During the MSFD legislative process, some Member States opposed a binding regional approach in the implementation phase (Maier, 2014). However, after a long consultation, the parties agreed to implement the MSFD with a regional focus (Article 4, 5 and 6) but specific governance structures were not stipulated (van Tatenhove et al., 2014). Regional coordination relies upon existing structures, including the four European Regional Sea Conventions, but decisions taken through these are not binding. However, these structures should allow an exchange of information and good practices related to approaches to assess status, environmental targets and management measures common to the entire region. This paper questions whether this is the case.

1 There is potential confusion between terms in using GES for Good Ecological Status in the Water Framework Directive and Good Environmental Status in the MSFD – Borja et al. (2010) and Mee et al. (2008) suggest a change of acronym respectively to GEcS and GEnS. Although this has not been widely adopted, the terms are used here for clarity.

European coordination structures have been analysed in relation to the implementation of the MSFD (Raakjaer et al., 2014) identifying the main strengths and weaknesses (Freire-Gibb et al., 2014) and developing alternative governance models (Van Tatenhoven et al., 2014; Van Tatenhoven, 2013). Van Hoof et al. (2014) analyse the aspects of integration and regionalisation of the Integrated Maritime Policy, the Marine Strategy Framework Directive and the Common Fisheries Policy, while Van Leeuwen et al. (2014) includes policy coordination as one of the key four potential impediments to implementing the MSFD.

In 2014, the European Commission assessed the level of adequacy, consistency and coherence among Member States during the implementation of the first phase of the MSFD. The current paper focuses on the level of coherence across the North-East Atlantic region (hereinafter NEAR). In particular, it investigates whether the integration with existing environmental policies is related to the different levels of coherence and if a proper use of existing data, methodologies and targets has improved the coherence among countries. As such, this paper aims to identify impediments to a coherent implementation of the future phases of the MSFD in the NEAR.

2. Coordination structures in the North-East Atlantic Region (NEAR)

2.1 *OSPAR Commission*

The NEAR is the biggest sea region in Europe and has been subdivided into four according to its characteristics: the Greater North Sea, the Celtic Sea, the Bay of Biscay and the Iberian Coast and the Macaronesian subregions. These cover highly diversified marine landscapes with fjords, estuaries, bays and wetlands, which all support extremely productive ecosystems but also important human activities[2]. It encompasses OSPAR, an international convention ratified by fifteen NEAR countries to protect and improve the quality of the marine environment[3]. Although originating in 1972 to cover land and sea-based pollution, an annex on biodiversity and ecosystems was adopted in 1998 to cover non-polluting human activities that can adversely affect marine quality. To support the implementation of the MSFD in this region, in 2010 OSPAR adopted the North-East Atlantic Environmental Strategy (OSPAR, 2010a) which includes six thematic strategies to identify specific emerging issues such as Biodiversity and Ecosystem, Eutrophication, Hazardous Substances, Offshore Industry, and the Joint Assessment and Monitoring Programme (JAMP).

2.2 *The role of the European Commission*

The so-called Common Implementation Strategy (CIS), was established at European level to coordinate Member State actions. It was set up in 2001 under the Water Framework Directive (WFD) mainly to (*i*) develop a common understanding and approaches to improve the status of superficial waters; (*ii*) elaborate informal technical guidance including best practice examples; (*iii*) share experiences and resources, and (*iv*) avoid duplication of efforts (CIS, 2003). In the MSFD, the CIS comprises several Working Groups: the group on Good Environmental Status (WG GES) assists countries during the definition of GEnS; the group on Information Exchange (WG DIKE) supports countries in reporting data, and the working group on

2 http://www.ospar.org/convention/the-north-east-atlantic
3 http://www.ospar.org/convention

Economic and Social Analysis (WG ESA) develops common methodologies and approaches to carry out the socio-economic analysis of the activities affecting marine waters.

The Marine Strategy Coordination Group is responsible to oversee the work of these three Working Groups and to report the information to national Marine Directors. The Marine Directors give inputs to the documents prepared by the Marine Strategy Coordination Group and their role is focused on more political and technical issues that could not be resolved by the coordination group. During their informal meetings, Marine Directors exchange views, build trust and understanding and eventually consolidate the results of the CIS process (CIS, 2013). During these meetings Member State representatives also discuss how to integrate the work of existing European and international policies, but they cannot amend them, so coordinating different Directorates-General to harmonize different pieces of legislation remains a challenge (Boyes and Elliott, 2014; Van Leeuwen et al., 2014). Moreover, during the first phase of the MSFD, bilateral and trilateral meetings were organised at regional and subregional level, allowing Member States to exchange their knowledge (OSPAR, 2012). However, it is not clear to what extent the solutions proposed and discussed during these informal meetings were then considered during the development of national strategies.

3. Lesson learned on coordination during the implementation of relevant policies

Some of the problems facing the MSFD in relation to an effective regional coordination were already identified during the implementation of other European environmental policies. For example, coordination among countries to adopt coherent tools and approaches for the definition of Good Ecological Status was achieved during the WFD intercalibration exercises (Borja et al., 2010). This exercise also improved cooperation between scientists and managers responsible for surface water assessment (Borja et al., 2010). The MSFD does not require such intercalibration exercises, but it recommends adopting coherent methods and approaches that can be compared within the same region. The progress made during the implementation of the WFD in coordinating countries to develop common approaches and understanding could be used to improve coherence during the different phases of the MSFD. However, while the WFD was criticised for being the result of a bottom-up approach, which allowed Member States greater latitude in implementing it as they chose (termed subsidiarity by the EU), an approach which then required intercalibration (Hering et al, 2010), it was hoped that the MSFD would be stipulated in greater detail, and more as a top-down approach, thus reducing the need for the intercalibration necessary for coherence (Borja et al, 2010). This has not turned out to be the case.

The Common Fisheries Policy (CFP) established in the early 1970s, is one of the first environmental policies adopted in the European Union. The CFP governance system includes three main politico-administrative levels: the European Commission, the Regional Advisory Councils and the Member States (Hegland et al., 2012). Therefore, the CFP and MSFD are also considered bottom-up hierarchical policies, both characterised by a decentralised (regional) authority but with several differences in the role that Member States and the European Commission play as competent authorities. Coordinated actions between countries of the North-East Atlantic region have contributed to achieve a more sustainable fishing activity for an increasing number of stocks since 2007 (EEA, 2015). This experience could be used as reference to

set common targets and establish coordinate measures to reduce the pressure of fisheries in the context of the MSFD (Descriptor 3).

The European Habitats and Birds Directives are considered as two of the most well-developed international legal tools for nature conservation (Pullin et al., 2009, Evans, 2012). The Natura 2000 is the result of the combination between these two directives and its implementation aimed for the creation of a network of protected areas across Europe (Boyes and Elliott, 2014) which also contributes to achieving the United Nation Convention on Biological Diversity objectives (Popescu et al., 2014). The Natura 2000 designation may represent the best comparator for the implementation of the MSFD since its Directives (for Habitats and Wild Birds) already encounter policy integration and Member State coordination. Member States have attempted to adopt common criteria and to identify the levels of coverage of species and habitat types for meeting the obligations of the Habitats Directive (Evans, 2012). In 2012 the European Commission launched the Natura 2000 Biogeographical Process to support the exchange of information and experiences between countries, as well as to establish common objectives for a more coherent management of the Natura 2000 Network with the view of achieving a Favourable Conservation Status in the context of the Habitats Directive.

4. **Integration of the MSFD with relevant policies**

Despite the considerable connections between the MSFD with other European and international pieces of legislation (Boyes and Elliott, 2014), limited indications are given in the MSFD to what extent existent data, approaches and objectives have to be taken into account. More specific recommendations on how Member States should integrate other policies are given in the COM Decision 2010/477/EU (COM, 2010) and in the reports prepared by different task-groups for each qualitative descriptor (listed in Annex I of the MSFD, except for D7 for which there was no task-team) (Table 1). It is this valuable to illustrate the similarity between the MSFD and relevant policies and how the work already carried out in these contexts can be integrated in the MSFD.

----------[TABLE 1 HERE]----------

4.1 The MSFD and the Water Framework Directive (WFD)

The Ecological Quality Status in the WFD expresses the structure of aquatic biological quality elements (WFD Art. 2(21)) while in the MSFD, the concept of Good Environmental Status takes into account a wide range of environmental pressures (i.e. fishing, marine litter and introduction of energy) and components (i.e. seafloor and food-webs). The WFD is limited to coastal waters (to 1 nm, and internal waters) while the MSFD is exclusively for marine waters from the coastline (and estuarine bay-closing lines) out to the Economic Exclusive Zone (200 nm) (Borja et al., 2010). Despite these differences, the two frameworks share several common aspects. The methodologies developed to assess the Ecological Quality Status in the WFD, the data collected since 2000 and the definitions of Good Ecological Status if used, would ensure a better comparability of results among countries in the MSFD. The definitions of Good Ecological Status and 'reference conditions' (conditions with very low human pressure) were harmonised during the WFD intercalibration process, where Member States held a common view and so similar levels of ambition of

water quality in the regions. Such harmonised definitions could be used as reference to set environmental targets and to define Good Environmental Status in the context of the MSFD (Borja et al., 2010). Despite this, the actions during the implementation of the WFD need to be adapted to a more oceanic context to be applicable to the MSFD (Borja et al., 2010).

4.2 The MSFD, the Common Fisheries Policy and the International Council for the Exploration of the Sea.

The reformed Common Fisheries Policy (CFP) is the main policy instrument for sustainably managing fish stocks in European seas and it could play a critical role in supporting a coherent implementation of the MSFD across Europe, as both policies aim to achieve a sustainable exploitation of fish stocks. Given that the descriptors of the MSFD are correlated to each other and hierarchical (Borja et al, 2010), the work already developed under the CFP could help Member States to achieve GEnS for D3-commercial fish and shellfish, which will also reduce the impacts of fishing activities on D1-biodiversity, D4-food-webs and D6-seafloor integrity. The International Council for the Exploration of the Seas (ICES) has also developed advice to ensure consistency across Europe on the assessment of the status of D1-biodiversity and D3-commercial fish and shellfish.

4.3 The MSFD, the Birds and Habitats Directives and the Convention on Biological Diversity

The Natura 2000 Directives (Habitats and Birds), together protect all wild birds present in Europe, more than 1000 other species and over 230 habitats both terrestrial and marine (EC, 2012). The integration of these policies with the MSFD is essential to achieve a comprehensive GEnS for biodiversity, food-webs and seafloor integrity descriptors, but it is necessary to have a clear understanding of the potential synergies between them and how they complement each other. For example, the main aim of the MSFD is to achieve and maintain GEnS of all the components of marine environment, while the Habitats and Birds Directive objectives are to achieve Favourable Conservation Status (FCS) of particular habitats and species in the whole European territory (not only the marine environment). However, while the GEnS will refer to all features in an area, FCS only refers to the conservation elements (species, habitats) for which an area was designated.

4.4 The MSFD and the OSPAR strategies

The major contribution to a coherent implementation of the MSFD in the North East Atlantic comes from the OSPAR Convention and both have the same objectives and principles, with the implementation of the ecosystem-approach at their core (OSPAR, 2012). The ICG-COBAM (Intersessional Correspondence Group-Coordination of Biodiversity Assessment and Monitoring) provides technical support to the development of common approaches and methods to assess the status of biodiversity descriptors. ICG Eutrophication, ICG Marine Litter, ICG Environmental Assessment Criteria, ICG on Cumulative Impacts of Human Activities and ICG Socio-Economic Analysis are other OSPAR expert groups through which Contracting Parties cooperate for determining GEnS, setting targets and associated indicators (OSPAR, 2012).

The six parts of the OSPAR North-East Atlantic Environment Strategy (see section 2.1) encompasses the MSFD objectives. Since 2010, the OSPAR monitoring and assessment has been guided by the Strategy for

the Joint Assessment and Monitoring Programme (JAMP) which includes, in particular, the Coordinated Environmental Monitoring Programme (CEMP). More support to a comprehensive assessment of the main environmental issues in the NEA comes from OSPAR Quality Status Report (OSPAR, 2010b). Moreover, OSPAR adopted a number of Ecological Quality Objectives (EcoQOs) and also a set of common indicators for some of the MSFD descriptors. Finally, the OSPAR Intersessional Correspondence Group for the Implementation of the Marine Strategy Framework Directive coordinates the OSPAR role with respect to the regional implementation of the MSFD.

5. **Levels of coherence in the NEAR during the first phase**

During the first phase of MSFD implementation, several meetings were organised both by the European Commission (by the CIS) and OSPAR where the parties exchanged their views and provided guidelines to support a common understanding of initial assessment, determination of GEnS and establishment of environmental targets. However, the outcomes of the first phase show that both GEnS and environmental targets have been defined at different levels, from descriptor level to indicator level, making their comparison difficult across the region. Moreover, the methodologies and approaches adopted in the initial assessment in some cases are not consistent among Member States. Among the three subregions, the lowest levels of coherence were identified in the Bay of Biscay and Iberian Coasts during the three phases.

It is of value to identify here the main differences between approaches adopted by countries of the NEAR, on the basis of the assessment carried out by the European Commission under Article 12 on the level of adequacy, consistency and coherence in the four regions (EC, Annex 2014) and on the Member States reports prepared by Milieu Ltd. (2014a-k)

5.1 The initial assessment (Article 8)

According to the Directive (Article 8.3(a)), when preparing the assessment on the status of marine waters, Member States have to make every effort to ensure that the methodologies are consistent across the marine (sub)region. This phase is an important starting point which indicates the gap between the current state and the definition of GEnS, taking into account the essential features, pressures and impacts on the national marine environment.

Across the region, the levels of coherence during the initial assessment were considered low for the biodiversity-related descriptors (D1, D4, D6) and moderate for D3-exploited fish and shellfish and D7-alteration of hydrographical conditions (Table 2, columns 3 and 4). For biodiversity descriptors, the level of coherence among countries on pressures and impacts was relatively high, while it was low in the assessment on biological features. For example, to report on the status of highly mobile species groups (birds, mammals, reptiles, fish and cephalopods) two Member States reported only on species groups, one only on functional groups, one reported on individual species and the remainer used a mixture of these approaches.

For D3-exploited fish and shellfish, the level of coherence was moderate since Member States used different ICES reference points: one country used F (fishing mortality), six countries adopted F_{MSY} (Fishing mortality consistent with achieving Maximum Sustainable Yield) and two did not specify which ICES reference

253 points had been used. Moreover, six different reference points were used in relation to the assessment of
254 spawning stock.

255 The moderate level coherence on the assessment of D7-alteration of hydrographical conditions reflected the
256 fact that this descriptor has received low attention and support at European level (with no Task Group) and
257 by Member States (OSPAR, 2012). Some Member States have produced a very general assessment, focused
258 only on coastal areas and without a proper analysis on pressures and impacts (Milieu Ltd., 2014f).

259 *5.2 The definition of GEnS (Article 9)*

260 For each marine (sub)region concerned, Member States have to determine a set of characteristics for GEnS
261 on the basis of the eleven qualitative descriptors (Art. 9.1). In the first cycle, GEnS should rely on existing
262 data and assessments (WG GES 2011) as well as on the criteria and indicators recommended in the
263 Commission Decision 2010/477/EU. As in the case of the initial assessment, the lower levels of coherence
264 among definitions were associated to biodiversity descriptors (D1, D4, D6), D2- non-indigenous species and
265 D11- introduction of energy (Table 2, column 3 and 4). For D1-biodiversity and D4-food-webs, the level of
266 coherence was low since none of the 10 Member States have defined the GEnS in the same way (or even
267 similarly) (Milieu Ltd., 2014f). In fact, GEnS definitions were made on the bases of different species and
268 habitats and also the level of details varied greatly from descriptor to indicator level and the chosen criteria
269 and indicators. As for D1 and D4, GEnS definition of D6-seafloor integrity varied largely among countries:
270 most Member States defined GEnS using at least one of the two criteria of the Common Decision, while two
271 Member States reproduced the text of Annex I of the MSFD (descriptor level). Only one Member State
272 included a quantitative indicator, the Benthic Quality Index, related to the WFD and other two countries
273 referred to this directive more in general (Milieu Ltd., 2014f). GEnS for D2 and D11 was defined in a rather
274 vague way and with differences in the level of detail and focus.

275 *5.3 The establishment of environmental targets (article 10)*

276 Environmental targets should be based primarily on pressure and impact since this is the most effective way
277 to achieve GEnS (WG GES, 2011). The MSFD requires environmental targets be SMART (Specific,
278 Measurable, Achievable, Realistic and Time-bound) and associated to the indicators outlined in the COM
279 Decision 2010/477/EU. If targets are not sufficiently well-defined then monitoring for compliance with
280 those targets is inherently difficult (Elliott, 2011).

281 There were significant differences between the approaches used to set environmental targets for each
282 descriptor and, in some cases, Member States reports did not demonstrate that their targets are suitable to
283 achieve GEnS. Moreover, despite the considerable importance to establish environmental targets in a
284 coordinated way across the region, the level of coherence was considered high only for three of the eleven
285 descriptors: D7-alteration of hydrographical conditions, D8-Contaminants, D9-contaminants in fish, (Table
286 2, column 3 and 4). For example, the set of environmental targets established for D8 across the region was
287 consistent although the number of targets varied greatly as well as the level of detail. Most Member States
288 used Environmental Quality Standards and/or OSPAR work (Ecological Quality Objectives (EcoQOs) or
289 Environmental Assessment Criteria) as reference levels. All Member States (but one) set a target on acute

pollution events, targeting illegal discharges and oil spills (Milieu Ltd., 2014f). Six Member States have used the common OSPAR target on the minimisation of acute pollution events and their impacts on biota or a similar target (Milieu Ltd., 2014f).

Targets defined for D8, were applied to D9 as they address the same sources of contamination. During the set of targets for D9, Member States referred to the concentration levels to comply with EU Regulation 1881/2006 on contaminants in foodstuffs. Sometimes, however, the reference to relevant legislation was implicit in expressions such as 'national and international legislation', 'Community legislation', 'EU limits', etc. A few Member States have also included compliance with the Shellfish Water Directive (repealed in 2013 and subsumed into the WFD) to encompass microbial pathogens (Milieu Ltd., 2014f). Some countries did not set any targets for D6, D7 and D11.

----------[TABLE 2 HERE]----------

6. Relationship between policy integration and coherence among countries

It is of value to compare the results on the level of coherence with the level of policy integration in the NEAR during the first phase. Countries should refer to the work carried out in the WFD in seven of the eleven descriptors (Table 1). However, good and clear reference to the WFD was made only for D1-biodiversity, D5-eutrophication, where in many cases Member States used GEcS to define GEnS, and for D8-contaminants, where most countries have referred to the WFD monitoring methodology (Milieu Ltd., 2014f) (Table 2, column 5). Reference to the WFD for the D7-hydrological condition was quite limited and vague.

Member States should consider data and approaches developed in the context of the CFP and ICES in four descriptors (Table 1). However, references to the CFP was minimal in the region, where just one country mentioned this policy in its initial assessment, another one in its definition of GEnS, while three countries considered the CFP in their targets (Table 2, column 5).

The Natura Directives were often mentioned in the Member States national reports although it was expected (EC JRC, 2014) that a much larger use of the work already occurred in the context of the two directives. The reference to these directives and the Convention on Biological Diversity varied largely among countries and among descriptors and within the same descriptor among criteria and indicators considered (Table 2, column 5). Only half of the Member States in the region referred to specific habitats and species in their GEnS definitions (Milieu Ltd., 2014f), while others generally included species/habitats covered by relevant international and European legislation without specifying which legislation.

The wide reference to the OSPAR work in national reports reflects the considerable effort the OSPAR Commission made in supporting Member States in all the phases of the implementation of the MSFD (column 5, Table 2). However, the use of data, approaches, indicators and targets from OSPAR work varied largely between countries and descriptors (column 5, Table 2).

There was, in general, a higher level of coherence between countries when they referred clearly to relevant policies. In fact, the levels of coherence were higher for D5-eutrophication, D7-alteration of hydrographical conditions, D8-contaminants, D9-contaminants in fish and D10-marine litter which also correspond to the major level of policy integration, where all countries of the region made reference to one or more related directive. On the other hand, significant differences in approaches were observed for D2 and D11, where six Member States did not mention any legislation in any of the three articles, while the rest of the countries mentioned the work of five different strategies/conventions, making results difficult to compare. The moderate level of coherence among results achieved for D3-exploitable fish and shellfish was probably the result of a different use of ICES reference points.

Despite the large reference made to relevant existing policies for the three biodiversity related descriptors (D1, D4, D6), these showed the lowest levels of coherence where no country defined the GEnS in the same way (Milieu Ltd., 2014f).

At the Member State level, there was also inconsistency among the three articles for the same descriptor, since GEnS was defined without fully considering the initial assessment and the environmental targets sometimes were not in line with GEnS definition (EC, 2014). For example, for D3-exploitable fish and shellfish there was a weak link between the baselines stated within the initial assessments and the targets to achieve GEnS (EC, Annex 2014). The consistency among articles was also rather low between the targets established for D1-biodiversity which, in some cases, were not linked to the specific pressures and impacts identified in the initial assessment (EC, Annex 2014). It should be highlighted, however, that a good level of consistency among the three articles was achieved for D5, which reflects the proper use of definitions, baseline and methodologies from the WFD and OSPAR.

7. Concluding Remarks

This review has shown that coordinated actions within regions during the implementation of the MSFD can produce a more effective improvement of European environmental quality, as well as the integration of sectoral policies and hence a more sustainable management of marine resources. Despite that, there are many examples where coordinated actions have not been made. Member States have recognised that some mistakes were made during the development and implementation of their national strategies and that, in some cases, the OSPAR and the CIS Working Groups work came too late (EC, 2014). In fact, only in 2012 did OSPAR publish advice documents on descriptors of GEnS (OSPAR, 2012) while the GES Working Group prepared a document with a clearer indication on how to implement the three articles at the end of 2011 (WG GES, 2011). These guidance documents, however, may produce a more coordinate implementation of the MSFD during the second cycle, starting in 2018.

It is concluded here that a way to gain coherence in the identification of a common list of marine species and habitat that have (sub)regional distribution (e.g. for highly mobile species) could be a more extensive use the work already carried out in the context of the Habitats and Birds Directive, Bern and Bonn Conventions, OSPAR Convention, Convention on Biological Diversity, Ramsar Convention, Common Fisheries Policy and ICES. Such a list will be extremely important not only to know the actual status of such species but also

362 to develop more effective protection actions. For the same reason, a common target list of non-indigenous
363 species and type of contaminants should be developed at the regional level.

364 Despite the above, it is not yet clear how countries can improve coherence in their GEnS definition and
365 targets for biodiversity-related descriptors. The implementation would benefit from a top-down (i.e. more
366 centralised) further specified extent to which countries have to be coordinated, for example, in the selection
367 of those species/populations, habitats (and related criteria and indicators) that are relevant at (sub)regional
368 scale, taking also in consideration national and local characteristics. However, such a centralisation may be
369 counter to the European principle of subsidiarity, i.e. the ability to take decisions at the level closest to the
370 people. This appears to be the central paradox here, what may be termed a 'paradox of coherence' amongst
371 Member States where coherence of action has to be achieved and balanced within a European policy of
372 subsidiarity, the act of Member States having control over the way they implement framework directives.
373 Thus the more freedom a Member State has to implement a directive in its own way then the greater scope
374 for anomalies and non-coherence (and thus the greater need for intercalibration and intercomparison
375 exercises). As shown largely by the Water Framework Directive and now, as indicated here possibly also by
376 the Marine Strategy Framework Directive, this can be regarded as a fundamental flaw in having a
377 'Framework Directive' instead of the greater control shown in a 'Directive'.

378 The pick-and-choose approach, shown in this paper, of the use of relevant legislation in the region during
379 the first phase, could be either the result of allowing Member States freedom to implement the Directive as
380 they want within the overall framework, or be the result of a limited knowledge of the real connection
381 between such policies and the MSFD. To avoid this occurring during the next phases, Member States
382 together with the Regional Seas Convention, should identify those policies that better fit with each of the
383 descriptors and phases to harmonise results and avoid duplication. Moreover, meetings at regional and
384 subregional level could be valuable to identify those gaps in data and knowledge that determined a different
385 selection of criteria and indicators and to communicate to OSPAR and to the European Commission if
386 further research is needed to fill such gaps. Given the above, considering the results of the present analysis,
387 strengthening the integration of the MSFD with relevant environmental policies remains a major challenge
388 for the European Commission, Regional Seas Convention and Member States.

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538 Table 1 List of key policies, regulations and conventions related to each Descriptor in the Marine Strategy Framework
539 Directive
540

Descriptor and reference	Related marine legislation
1 Biodiversity (Cochrane et al., 2010)	HD; BD; EU BS; WFD; CFP; Bern Convention; Bonn Convention; OSPAR Convention; Ramsar Convention; CBD.
2 Non-indigenous species (Olenin et al., 2010)	CBD; Bern Convention; HD; ICES; Ramsar Convention; Bonn Convention; BWMC; Phytosanitary Directive; Regulation on wild species trade; WFD; Regulation for use of alien and locally absent species in aquaculture; OSPAR QSR 2010a
3 Exploited fish (Piet et al., 2010)	CFP; ICES
4 Food-webs	No reference
5 Eutrophication (Ferreira et al., 2010)	OSPAR Convention; UWWTD; WFD
6 Seafloor integrity (Rice et al., 2010)	WFD
7 Hydrographic conditions (COM, 2010)	WFD
8 Contaminants (Law et al., 2010)	WFD; EQS Directive; Quality Assurance Quality Control; EC Regulation REACH; OSPAR Convention; London Dumping Convention; Stockholm Convention on Persistent Organic Pollutants
9 Contaminants in seafood (Swartenbroux et al., 2010)	EQS Directive; OSPAR JAMP; ICES TIMES (Techniques in Marine Environment Series); Regulations No 333/2007; Regulation No 1883/2006.
0 Marine Litter (Galgani et al., 2010)	UNCLOS; MARPOL; London Convention; IMO Convention; Basel Convention; Agenda 21; CBD; OSPAR Convention; Directive 1999/31/EC; PRF Directive; Waste Framework Directive; HD; WFD
11 Introduction of energy (Tasker et al., 2010)	Bonn Convention; the International Whaling Commission; IUCN; IMO Convention; OSPAR Convention; HD (for Article 12)

541
542 Abbreviations: BD= Birds Directive; BWMC= Ballast Water Management Convention; CBD= Convention of
543 Biological Diversity; CFP= Common Fisheries Policy; CITES= Convention on International Trade in Endangered
544 Species of Wild Fauna and Flora; EU BS= European Biodiversity Strategy; EIA= Environmental Impact Assessment
545 Directive; EQS= Environmental Quality Standard Directive; EUNIS= European Nature Information System; HD=
546 Habitats Directive: ICES= International Council for the Exploration of the Seas; IUCN= International Union for
547 Conservation of Nature; OSPAR EcoQOs= OSPAR Ecological Quality Objectives; OSPAR EAC= Environmental
548 Assessment Criteria; OSPAR QSR= OSPAR Quality Status Report; MARPOL= International Convention for the
549 Prevention of Pollution from Ships; MPS= Marine Spatial Planning; PRF= Port Reception Facilities Directive; SEA
550 Directive= Strategic Environmental Assessment; UNCLOS= United Nations Convention on the Law of the Sea;
551 UNEP= United Nations Environment Programme; UWWTD= Urban Wastewater Treatment Directive; WFD= Water
552 Framework Directive.

553 Table 2 Level of coherence and policy integration achieved in the NEAR and its subregions during the initial
554 assessment (art. 8), definition of GES (art. 9), establishment of targets (art. 10). Abbreviation: MS = Member States
555

Descriptor	Article	Level of coherence NEAR	Level of coherence within sub-regions (1)	Level of policy integration (2)
D1 Biodiversity, D4 Food-webs, D6 Sea floor integrity	Art. 8	low/moderate	low/moderate in the three sub-regions	All but two countries made extensive reference to the HD and BD during the initial assessment and the definition of GES. During the initial assessment all countries also referred to the OSPAR work, while only six used the OSPAR EcoQOs to define GES and to establish targets. The Good Ecological Status definition of the WFD was largely used to define the baseline of GES. Other relevant policies/agreements were used during the three steps by one or two countries: EIA, ICES, Natural 2000, CITES, CFP, CBD, RAMSAR, IUCN, Bern and Bonn Convention and EUNIS. Only three countries referred to the HD and BD in their targets and other three to the WFD.
	Art. 9	low	low in IC/BB and NS; moderate for CS	
	Art. 10	low	low in the three sub-regions	
D2 Non-Indigenous Species	Art. 8	high	high in the three sub-regions	The integration between this descriptor and other pieces of legislation was quite low. During the initial assessment, only three MS mentioned the OSPAR work and two referred to ICES. One country referred to the IMO BWMC in its definition of GES. For the establishment of targets, one MS referred to OSPAR and to MSP, one mentioned the Natural 2000 and another one IMO Convention. Six MS did not mention any of these pieces of legislation in their targets and GES definitions.
	Art. 9	low	low in the IC/BB and NS, moderate in the CS	
	Art. 10	low	low in the IC/BB and the NS, moderate in the CS	
D3 Exploited fish and shellfish	Art. 8	moderate	moderate- high IC/BB and CS, moderate in the NS	Despite the connection between this descriptor, the CFP and the ICES, only one MS mentioned them in its initial assessment. Four MS referred at least to one of these pieces of legislation to define GES. During the establishment of targets, reference was made to the work of the CFP (3 MS) and ICES (3 MS), OSPAR (2 MS), Maritime Spatial Planning (1 MS). Two countries did not mention any of these policies/agreements at all.
	Art. 9	low/moderate	low in the IC/BB and NS, moderate in the CS	
	Art. 10	low	low in the IC/BB and NS, moderate in the CS	
D5 Eutrophication	Art. 8	high	high in the three sub-regions	In general, there was large reference to the WFD and OSPAR during the three phases; however, great divergence was found in the selection of the criteria and indicators. For the initial assessment, countries referred to the OSPAR Common Procedure, OSPAR QSR 2010 and the OSPAR EAC. GES definitions were, in many cases, in line with the OSPAR EcoQOs and the Good Ecological Status of the WFD.
	Art. 9	high	moderate in the IC/BB, high in the CS and NS	
	Art. 10	moderate	low in the IC/BB and NS, high in the CS	
D7 alteration of hydrographical conditions	Art. 8	moderate	high for IC/BB and CS, moderate for the NS	The integration with OSPAR's work was higher during the initial assessment (seven MS). Other relevant directives were considered during the initial assessment: HD (two MS) and BD (two MS), EIA (three MS), WFD (two MS). Three countries did not mention any related legislation in the definition of GES. When established targets, few countries considered the MSP (one), HD/BD (two), EIA (three), OSPAR (one), SEA (three).
	Art. 9	high	low for the IC/BB, high in the CS and NS	
	Art. 10	high	moderate in the IC/BB, high in the CS and the NS	
D8 Contaminants	Art. 8	high	moderate in the IC/BB, high in the CS and NS	The level of integration between this descriptor, the OSPAR and the WFD work was high during the three phases. Moreover, the EQS Directive was mentioned in the environmental targets of five MS. ICES, Shellfish Water Directive, Dangerous substances Directive, MSP, MARPOL, PRF Directive, UWWT Directive, REACH were also considered in the targets. However, the type of contaminants varied largely among countries.
	Art. 9	high	low in the IC/BB, high in the CS and NS	
	Art. 10	high	low in the IC/BB, high in the CS and NS	
D9 Contaminants in fish	Art. 8	high	moderate in the IC/BB, high in the CS and NS	In their initial assessment, MS mentioned at least one of these directives: Shellfish Water Directive, 1881/2006 Regulation, Bathing water Directive, OSPAR. Regulation 1881/2006 was used to define GES by eight MS. Three countries referred to the Shellfish Water Directive in their targets, while five included Regulation 1881/2006 work. The work of ICES, Common
	Art. 9	high	low for the IC/BB, high in the CS and NS	

	Art. 10	high	moderate in the IC/BB, high in the CS and NS	Agricultural Policy, Directive 2001/22/EC and MARPOL were also mentioned in one of the three phases.
D10 Marine Litter	Art. 8	high	high in the three sub-regions	All countries used OSPAR work in their initial assessment. An extensive use of OSPAR work was made also in the definition of GES (seven countries), but also MARPOL (one), PRF (one), ICES (two) and UNEP (two) were considered. Five MS used OSPAR to set their targets.
	Art. 9	high	moderate in IC/BB and CS, high in the NS	
	Art. 10	moderate	low in the IC/BB and the NS, moderate in CS	
D11 Introduction of Energy	Art. 8	high	moderate in the IC/BB, high in the CS and NS	The integration of this descriptor with relevant European and International legislation was very low in the three phases. Only two countries mentioned OSPAR work during the initial assessment and one country mentioned the IEA during the definition of GES and the targets.
	Art. 9	low	low in the IC/BB and NS, high in CS	
	Art. 10	low	moderate in the IC/BB, low in the CS and NS	

Source: column 3 and 4 EC, Annex (2014); information in column 5 has been obtained from the ten reports prepared by Milieu Ltd, 2014a-k

(1) Four subregions: Iberian Coasts and the Bay of Biscay (IC/BB which includes Portugal, Spain and France), Celtic Sea (CS which includes Ireland, UK and France), Greater North Sea (NS which includes France, Belgium, Denmark, German, Sweden, the Netherlands and UK) and the Macaronesia subregion (Atlantic islands of Portugal and Spain). The Macaronesia sub-region is not included in this analysis because the data were incomplete.

(2) See Table 1 for abbreviations