

# Draft Descriptor Fiche

## D1C6 and D6 Pelagic Habitats and Seafloor Integrity

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## INTRODUCTION

The Marine Strategy Framework Directive (MSFD) review will assess the state of play and progress on the different descriptors set out in Annex I to the Directive. The differences between descriptors are important when looking at the physical environment and different ecosystem components, and also when considering coherence with other legislation/policies, coordination mechanisms, and data collection. Describing the current situation of each descriptor as it relates to the strategic objectives of the MSFD review, in particular the evaluation, should result in a clear reference baseline. In addition, a dynamic baseline should be developed, showing how the situation is expected to evolve in respect of the policy framework, scientific developments linked to ongoing efforts, and wider trends such as climate change, markets, and future developments.

These descriptor fiches are the start of collecting that information. They will be used as working documents throughout the review and revised as the framework evolves and data are collected. Each fiche describes the general state of the descriptor, the marine strategy components, and looks forward at upcoming trends and developments.

Biodiversity as a whole is covered under the MSFD by three descriptors (D1 Biodiversity, D4 Food webs, D6 Seabed integrity) and the corresponding criteria. These are the only 'state' descriptors set out in the 2017 Good Environmental Status (GES) Decision, with the remaining descriptors covering 'pressures' affecting the marine environment. The 'state' descriptors are often assessed together due to the interlinkages between the biodiversity components. One descriptor fiche covers the criteria D1 (except for D1C6) and D4, i.e. species biodiversity and food webs. A separate descriptor fiche covers marine habitats, including D1C6 and D6.

## 1 GENERAL

### 1.1 What is the state of the environment regarding this Descriptor?

**D1C6:** concerns pelagic habitats. The status of these habitats is difficult to assess because of the diversity of the functional and structural characteristics of such habitats. Abiotic and biotic characteristics, (ocean currents and mobile fauna, respectively) interact at multiple spatio-temporal scales, contributing to the complexity of this criterion<sup>1</sup>. Little data are available on the current state.

**D6** concerns sea-floor integrity and benthic habitats. It covers the physical loss of the seabed (due to permanent change of seabed substrate or morphology and to extraction of seabed substrate, D6C1), the extent of pressures causing physical disturbance (either temporary or reversible disturbance, D6C2), and the extent of each habitat type affected by physical disturbance (D6C3). D6C4 and D6C5 address the overall assessment of benthic habitats under the MSFD<sup>2</sup>. The 2020 Review of the status of the marine environment in the EU<sup>3</sup> concluded that fewer than 50 % of the seabed habitat types have sufficient data to assess, but are nevertheless not considered to be in a good state. Roughly one-fifth of seabeds are threatened, with fisheries (North-East Atlantic, Baltic Sea, Mediterranean Sea) and dredging (Black Sea) presenting the biggest anthropogenic threats. Up to 86 % of the Greater North Sea and Celtic Seas are estimated to be affected by physical disturbance, chiefly by land claim, flood defence, port construction, solid waste disposal, renewable energy production and aquaculture.

<sup>1</sup> Magliozzi, C. et al., *Pelagic habitats under the MSFD D1: scientific advice of policy relevance*, European Commission, Publications Office of the European Union, Luxembourg, 2021.

<sup>2</sup> Boschetti, S. T., Palialexis, A. and Connor, D., *Marine Strategy Framework Directive Review and analysis of EU Member States' 2018 reports Descriptor 6: Sea-floor integrity and Descriptor 1: Benthic habitats*, 2021.

<sup>3</sup> European Commission, *Review of the status of the marine environment in the European Union: Towards clean, healthy and productive oceans and seas Accompanying the Report from the Commission to the European Parliament and the Council on the implementation of the Marine Strategy Framework Directive (Directive 2008/56/EC)*, SWD(2020) 61 final.

A 2016 European Red List assessment of [European Union] EU marine habitats<sup>4</sup> found that 19 % of the benthic habitats assessed were ‘critically endangered’, ‘endangered’ or ‘vulnerable’. A further 12 % were ‘near threatened’. The Mediterranean Sea had the highest proportion of threatened habitats (32 %), followed by the North-East Atlantic (23%), the Black Sea (13 %) and the Baltic Sea (8 %).

The European Red List report<sup>5</sup> identified 61 benthic habitats in the **Baltic Sea**, of which one-third were of concern. The majority were assessed as ‘near threatened’, with three others ‘vulnerable’ and two ‘endangered’. The 2018 Baltic Marine Environment Protection Commission (HELCOM) holistic assessment ‘HOLAS II report’<sup>6</sup> estimated seabed physical loss in less than 1 % for the entire Baltic Sea, with some areas experiencing slightly higher loss (1-5 %, for example the Øresund strait the Great Belt, the Arkona Basin and the Bay of Mecklenburg). Despite this, around 40 % of the Baltic seabed was estimated to have been disturbed between 2011-2016.

In the **North-East Atlantic**, the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) 2017 intermediate assessment<sup>7</sup> showed that 86 % of the assessed seabeds in the Greater North Sea and the Celtic Seas were physically disturbed, with 58 % highly disturbed by bottom-contacting fishing gear. The European Red List assessment found that 60 % of benthic habitats assessed were data deficient. Of the remaining 40 %, 59 % were assessed as threatened (ranging from ‘vulnerable’ to ‘critically endangered’)<sup>8</sup>. The same study found that almost half of the 47 benthic habitats in the **Mediterranean Sea** were data deficient. Of those with data, 63 % were assessed as threatened to some degree (42 % ‘vulnerable’ and 21 % ‘endangered’)<sup>9</sup>. In the **Black Sea**, 83 % of the 53 benthic habitats assessed in Romania and Bulgaria were data deficient. Of the remainder, 78 % were threatened (11 % ‘critically endangered’)<sup>10</sup>. In addition, the Northwestern shelf of the Black Sea was severely impacted by eutrophication in the 1980s, causing hypoxia (low oxygen supply) that forms dead zones on the seabed where only bacteria and archaea can live. Although measures have been put in place to reduce inputs, hypoxia remains a problem in the area, exacerbated by the warming of the water due to climate change<sup>11</sup>.

## 1.2 To what extent is the Descriptor well communicated to the public?

Both pelagic and seabed habitats depend on highly technical terms and definitions. The general public are thus less familiar with these descriptors than with other aspects of biodiversity. However, the public generally understand the importance of ecosystem services and the main threats to marine ecosystems, e.g. pollution, fisheries and climate change<sup>12</sup>. In addition, there is broad support for increasing Marine Protected Areas (MPAs), which has direct implications for both D1C6 and D6<sup>13</sup>.

## 1.3 Which main EU policies regulate this Descriptor (if any)? Which ones have a strong influence?

- The **Maritime Spatial Planning Directive** (2014/89/EU) promotes sustainable growth of maritime economies, sustainable development of marine areas, and sustainable use of marine resources. Through the planning process, Member States should take into account all economic, social and environmental aspects, apply an ecosystem-based approach, and promote the coexistence of relevant activities and uses. The Directive should ensure that sufficient protected areas are created and monitored for conservation purposes, thus contributing to the status of marine habitats.

<sup>4</sup> Gubbay et al., *European red list of habitats. Part 1: Marine habitats*, Publications Office of the European Union, Luxembourg, 2016.

<sup>5</sup> Gubbay et al., 2016.

<sup>6</sup> Bergström, L. and Avellan, L. (Eds.), *State of the Baltic Sea: Second HELCOM Holistic Assessment 2011-2016*, Baltic Marine Environment Protection Commission, 2018.

<sup>7</sup> OSPAR assessment portal, available at: <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/key-messages-and-highlights/benthic-habitats-affected-by-bottom-fisheries/>

<sup>8</sup> Gubbay et al., 2016.

<sup>9</sup> Gubbay et al., 2016.

<sup>10</sup> Gubbay et al., 2016.

<sup>11</sup> Macias Moy, D., Garcia-Goriz, E. and Stips, A., *Report on the Kick-off workshop of the Network of Experts for ReDeveloping Models of the European Marine Environment*, JRC Technical Report, 2016.

<sup>12</sup> O'Connor, E., Hynes, S., Chen, W., Papadopoulou, N. and Smith, C., ‘Investigating societal attitudes toward marine ecosystem restoration’, *Restoration Ecology*, 29, 2021, e13239.

<sup>13</sup> Lotze, H. K., Guest, H., O’Leary, J., Tuda, A. and Wallace, D., ‘Public perceptions of marine threats and protection from around the world’, *Ocean & Coastal Management*, 152, 2018, pp. 14-22.

- The **Habitats Directive** (92/43/EEC) ensures the conservation of a large number of plant and animal species, as well as habitat types, in particular rare, threatened or endemic habitats, with a considerable proportion found in the marine environment.
- The **Birds Directive** (2009/147/EC) aims to protect wild bird species in Europe. Several protected marine sites have been designated under the Birds Directive, and obligations applying to the areas indirectly affect benthic habitats. These sites can be extremely shallow, directly affecting the seabed.
- The **Water Framework Directive** (WFD) (2000/60/EC), includes inland waters and coastal waters out to 1 nautical mile and aims to have good qualitative and quantitative status of all water bodies. Its coverage and objectives overlap with those of the MSFD, and pressures such as dredging and waste disposal (covered under the WFD) directly affect benthic habitats. The status of pelagic habitats, in particular, is directly impacted by the biological and chemical environmental quality standards set and monitored under the WFD, and, WFD measures in inland waters may ultimately affect coastal and wider marine habitats.
- The **Common Fisheries Policy** (CFP) (1380/2013) aims to conserve fish stocks and reduce overfishing in order to provide EU citizens with a long-term stable, secure and healthy food supply. Restrictions of benthic trawling fleets and advances in methodologies are key aspects for this Descriptor, while species composition also contributes to the status of pelagic habitats. The **EU Regulation on the Sustainable Management of External Fishing Fleets (SMEFF)** (2017/2403) regulates EU vessels fishing outside EU waters, however, it may not yield good results when other international fleets are poorly regulated.
- The **Deep Sea Access Regulation** (EU/2016/2336) aims to end bottom fishing in protected deep-sea ecosystems in EU waters, recognising it as a direct pressure on benthic habitats.
- The **Regulation on Invasive Species** (1143/2014) sets measures to be taken in relation to invasive alien species that cause damage to native ecosystems in Europe. It covers species composition, which may have a direct impact on benthic and pelagic marine habitats.
- The 2019 **European Green Deal**<sup>14</sup> is a package of policy initiatives to promote the green transition and make the EU climate-neutral by 2050. It aims to restore aquatic ecosystems through the various actions/deliverables relevant to D1/4/6.
- In the **Biodiversity Strategy for 2030**, the EU aims to increase the amount of MPAs to 30 %, with 10 % strictly protected, in a coherent network.
- **EU Strategy on Offshore Renewable Energy** (COM(2020)741) proposes ways to support long-term sustainable development. It sets targets to increase offshore wind and energy production, which may positively or negatively impact marine habitats. Wind farms, for example, provide hard structures that are beneficial for certain species and reduce fishing impacts (notably from trawling). However, habitats can be severely disturbed, especially during construction, and electromagnetic fields around cables can negatively impact the habitats of certain species, such as sharks.
- The **Farm to Fork Strategy** concerns the sustainability of fishery and aquaculture products along the whole value chain, including reducing impacts of farmed fish/seafood. For example, aquaculture producers aim to reduce benthic organic enrichment<sup>15</sup>.
- **Prospection, Exploration, and Production of Hydrocarbon Directive** (94/22/EC) and the **Raw Materials Initiative** COM (2008) 699 may potentially affect habitats through activities that disrupt or destroy the seafloor.

<sup>14</sup> European Commission, *A European Green Deal*, 2019, available at: [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en#documents](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en#documents)

<sup>15</sup> Aquaculture Stewardship Council, Benthic Technical Working Group, *Standards for Aquaculture Impacts on Benthic Habitat, Biodiversity and Ecosystem Function*, White Paper, 2022, available at: <https://www.asc-aqua.org/wp-content/uploads/2022/02/Whitepaper-on-Standards-for-Aquaculture-Impacts-on-Benthic-Habitat-Biodiversity-and-Ecosystem-Function.pdf>

At regional level, HELCOM<sup>16</sup> and OSPAR<sup>17</sup> aim to ensure that effective MPAs (or other effective area-based conservation measures) cover at least 30 % of their respective marine areas by 2030. HELCOM requires at least one-third of this area to be strictly protected. In the Mediterranean Sea, the MEDFISH4EVER Declaration<sup>18</sup> sets ambitious targets for equality in fisheries management, data collection and conservation measures over the coming decade, aiming to establish fisheries-restricted areas for 10 % of the Mediterranean. A similar declaration<sup>19</sup> was signed for the Black Sea in 2018, but its effectiveness in tackling the damage on benthic habitats has been criticised<sup>20</sup>.

Internationally, both the United Nations Sustainable Development Goals (UN SDGs)<sup>21</sup> and the Convention on Biological Diversity (CBD)<sup>22</sup> aim to conserve at least 10 % of coastal and marine areas. The EU participates in Regional Fisheries Management Organisations (RFMOs) and is one of the most prominent RFMO actors worldwide<sup>23</sup>.

#### **1.4 How are data collected now? To what extent are data available in national/regional/EU databases?**

Many data relevant for D1C6 and D6 are collected under the Habitats Directive and the [Natura 2000 network](#). Under the MSFD, the most commonly-reported criteria for D6 are D6C1 (physical loss) and D6C2 (physical disturbance), reported by 75 % of Member States in 2018 (second cycle Article 8 MSFD reporting)<sup>24</sup>. For pelagic habitats, plankton communities (e.g. abundance, biomass and diversity) are most often used as proxies, using both in situ sampling and satellite monitoring<sup>25</sup>.

- The International Council for the Exploration of the Sea ([ICES data portal](#)) hosts information on vulnerable marine ecosystems (VMEs) and organisms and habitats in the North Atlantic. Datasets on marine seabed habitats, MPAs, and different components of the pelagic system are also available.
- The European Marine Observation and Data Network ([EMODnet Seabed Habitats](#)) is a permanent public portal to access harmonised data on seabed and marine habitats (e.g. European Nature Information System (EUNIS), Habitats Directive Annex 1 and Regional Sea Conventions (RSC) lists and classifications). It draws from multiple sources, including national monitoring programmes, RSCs, EU platforms and the outcomes of various research projects.
- The [European Multidisciplinary Seafloor and water column Observatory \(EMSO\)](#) aims to explore the oceans and build knowledge. It provides data and services to various users, based on results from various observatories and test sites.
- WISE Marine visualises information reported by MSs under their MSFD obligations.

For the North-East Atlantic, the [OSPAR Data portal \(odims\)](#) hosts data on benthic habitats. For example, mapping the OSPAR habitats and ‘threatened’ or ‘declining’ habitats based on data from [EMODnet Seabed Habitats](#). In addition, key components of the pelagic system, such as biomass, abundance and diversity changes of phytoplankton and zooplankton communities, are also available. The [HELCOM Data and Maps Service](#) hosts data on the state of the Baltic Sea (including benthic and pelagic habitats), submitted by HELCOM Contracting Parties. Similarly, HELCOM data services store data on planktonic communities and surface productivity. Data on benthic marine habitats, photic zones, and seabed physical characteristics (e.g. salinity, sediment,

<sup>16</sup> HELCOM, Baltic Sea Action Plan (BSAP), p.14, available at: <https://helcom.fi/baltic-sea-action-plan/>

<sup>17</sup> OSPAR, North-East Atlantic Environment Strategy 2030, p. 11, available at: <https://www.ospar.org/convention/strategy>

<sup>18</sup> European Commission, ‘European Commission secures 10-year pledge to save Mediterranean fish stocks’, Press release, 20 March 2017, available at: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_17\\_770](https://ec.europa.eu/commission/presscorner/detail/en/IP_17_770)

<sup>19</sup> High Level Conference on Black Sea fisheries and aquaculture, *Sofia Ministerial Declaration*, Sofia, 7 June 2018, available at: [https://oceans-and-fisheries.ec.europa.eu/system/files/2018-06/2018-06-07-sofia-declaration\\_en.pdf](https://oceans-and-fisheries.ec.europa.eu/system/files/2018-06/2018-06-07-sofia-declaration_en.pdf)

<sup>20</sup> Oceana, ‘Oceana criticises UN and EU’s failure to protect areas for young fish in the Mediterranean, the world’s most overfished sea’, Press release, 29 October 2018, available at: <https://europe.oceana.org/press-releases/oceana-criticises-un-and-eus-failure-protect-areas-young-fish/>

<sup>21</sup> UN, *Transforming our world: the 2030 Agenda for Sustainable Development*, p.24, available at: <https://sdgs.un.org/2030agenda>

<sup>22</sup> CBD, Aichi Target 11, <https://www.cbd.int/aichi-targets/target/11>

<sup>23</sup> European Commission, RFMOs, available at: [https://oceans-and-fisheries.ec.europa.eu/fisheries/international-agreements/regional-fisheries-management-organisations-rfmos\\_en](https://oceans-and-fisheries.ec.europa.eu/fisheries/international-agreements/regional-fisheries-management-organisations-rfmos_en)

<sup>24</sup> Boschetti et al., 2021.

<sup>25</sup> Magliozzi et al., 2021.

(temperature) are also available. No comparable databases are publicly available for the Mediterranean or Black Seas.

## 2 MARINE STRATEGY COMPONENTS

### 2.1 How is GES currently defined in relation to this descriptor? Have TVs been set and are they regionally coherent? (Article 9 MSFD)

GES is described for D1C6 as ‘The condition of the habitat type, including its biotic and abiotic structure and its functions is not adversely affected due to anthropogenic pressures’; and for D6 as ‘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’<sup>26</sup>.

For **D6**, the EU Overview report of the second cycle Article 12 assessment<sup>27</sup> found persistent gaps in reporting GES determinations, covering the multiple required criteria for GES. Regional differences were noted when assessing the coherence of GES determinations for primary criteria reported by Member States, with the Baltic Sea presenting the lowest coherence for D6 (65 %). Member State reporting on the qualitative determination of GES for D6 was assessed as good or very good for only around 55 % of Member States. When looking at qualitative determinations regionally, clear differences were evident: coherence in the qualitative determination of GES was found to be very poor within the Baltic Sea and poor within the North-East Atlantic and Mediterranean Sea regions.

The JRC report on thresholds for MSFD criteria<sup>28</sup> found that no TVs were required for D6C1 and D6C2, and no agreed threshold methods nor TVs existed for D6C3 and D6C4. Work is ongoing within the Technical Group on seabed habitats and sea-floor integrity (TG Seabed) to develop and approve TVs for these two criteria.

The JRC technical report on Member States’ 2018 reports<sup>29</sup> found that very few Member States reported quantitative GES determinations for D6. Member States pointed to the lack of data and agreed methods to explain the lack of a criterion and TVs for the GES assessment. The JRC assessment concluded that GES determinations should be harmonised at regional level to ensure comparable assessments.

For **D1C6**, methods for estimating TVs have yet to be agreed at habitat, regional and European level. Accordingly, reporting under Article 9 was assessed as good or very good for 30 % of Member States in respect of the quantitative determination of GES<sup>30</sup>. Reporting on pelagic habitats generally lacked quantitative definitions of GES. According to the JRC report on threshold for MSFD criteria<sup>31</sup>, few regional indicators had agreed methods and TVs.

D1 Criterion	Agreed threshold methods	TVs available	Comments	Related regulations
D1C6	Some regional attempts	Only for some indicators/regions	There are some indicators with TVs in BAL, MED and BLK	WFD

### 2.2 What targets exist for this Descriptor? are those targets regionally coherent? (Article 10 MSFD)

The Commission’s Article 12 assessment on Member States’ reported information under Article 10 MSFD assumed that in order to be operational, an environmental target must specify the pressures and impacts addressed and quantify the amount of reduction needed to achieve GES. Targets that described an ideal

<sup>26</sup> Commission Decision (EU) 2017/848.

<sup>27</sup> Milieu et al., *Overview of the Commission assessment of the Member States’ reported information to the Commission on the implementation of the MSFD*, forthcoming

<sup>28</sup> Vasilakopoulos et al., *Marine Strategy Framework Directive, Thresholds for MSFD criteria: state of play and next steps*, Publications Office of the European Union, Luxembourg, 2022.

<sup>29</sup> Boschetti et al., 2021.

<sup>30</sup> Milieu et al., forthcoming.

<sup>31</sup> Vasilakopoulos et al., 2022.



environmental state and/or only set out quantifiable threshold value without specifying what needed to be done to reach that state or threshold were not considered operational<sup>32</sup>.

The Commission's assessment of Member State reporting under Article 10 found that only 40 % of Member States established measurable targets for **D6**. The JRC report on Member States 2018 reporting<sup>33</sup> confirmed a lack of measurable targets with associated target values, making it impossible to measure progress towards GES. It also noted a significant lack of regional coordination when setting targets for D6. A more recent JRC report found that only about 6 % of the reported targets for D1, D4 and D6 could be considered truly quantitative targets, and most targets did not quantify the gap between the current environmental status and GES<sup>34</sup>.

Regarding **D1C6**, the most recent JRC report<sup>35</sup> found that all Member States assessed specified targets for pelagic habitats, across all regions. More than 80 % of the targets aimed to reduce anthropogenic and environmental pressures, but, in practice, were often qualitative targets that did not detail the amount of reduction and distance to achieving GES. The report found that the Baltic and North-East Atlantic regions reported the most targets (39 and 44, respectively), while few were reported in the Mediterranean (three). The Commission's assessment of Member State reporting under Article 12 concluded that there was a poor level of coherence in how Member States address similar pressures/impacts through operational targets for D1C6<sup>36</sup>.

Several targets concerning habitats exist outside the MSFD, and are described in Box 1.3. Targets of note include<sup>37</sup>:

- D6C1: Legally protect a minimum of 30 % of the EU's land area and 30 % of the EU's sea area and integrate ecological corridors, as part of a true Trans-European Nature Network (EU Biodiversity Strategy);
- D6C1/D6C4: Strictly protect at least one-third of the EU's protected areas (EU Biodiversity Strategy);
- D6C4: Natural distribution, occurrence and quality of habitats and associated communities by 2030 (HELCOM, BSAP).

### 2.3 How are marine waters currently assessed? Is GES achieved/not achieved? (Article 8 MSFD)

For **D6**, the second cycle reporting in 2018<sup>38</sup> showed that GES was reported as 'achieved by 2018' in 15 % of benthic broad habitats and 8 % of other benthic habitats<sup>39</sup>. The remaining assessments were reported as 'not achieved by 2018' (33 % and 67 %, respectively) or 'not assessed' (52 % and 25 %, respectively). For the criterion covering 'Physical loss of the seabed' and 'Physical disturbance to seabed', fewer assessments reported GES as 'not achieved by 2018' (6 % for both criteria), although more were reported as 'not assessed' (67 % and 68 %, respectively). Looking at the overview tables presented in the JRC technical reports, no clear trends by region were identified<sup>40</sup>.

For **D1C6**, the second reporting cycle<sup>41</sup> showed that only 7 % of assessments reported GES as achieved, while 50 % reported 'GES not achieved by 2018'. 43 % of assessments did not assess the achievement of GES. Again, no clear trends were evident per region<sup>42</sup>.

In general, the Commission assessment noted that Member States were unable to draw conclusions on the achievement of GES in respect of descriptors where they struggled to define threshold values<sup>43</sup>.

<sup>32</sup> Milieu et al., forthcoming.

<sup>33</sup> Boschetti et al., 2021.

<sup>34</sup> Palma et al., *Targets under the Marine Strategy Framework Directive: A compilation of information, analysis results, discussions and resulting recommendations on targets under the MSFD*, Publications Office of the European Union, Luxembourg, JRC131053, 2022.

<sup>35</sup> Palma et al., 2022.

<sup>36</sup> Milieu et al., forthcoming.

<sup>37</sup> Taken from the target mapping exercise.

<sup>38</sup> WISE Marine dashboard, available at: <https://water.europa.eu/marine/data-maps-and-tools/msfd-reporting-information-products/ges-assessment-dashboards/general-dashboards>

<sup>39</sup> The report included data on only 10 Member States; information on WISE Marine covers 20 Member States.

<sup>40</sup> Boschetti et al., 2021, Table 15, pp 38-39.

<sup>41</sup> WISE Marine dashboard, available at: <https://water.europa.eu/marine/data-maps-and-tools/msfd-reporting-information-products/ges-assessment-dashboards/general-dashboards>

<sup>42</sup> Based on the overviews in Magliozzi et al., 2021, p. 16.

<sup>43</sup> Milieu et al., forthcoming.



#### **2.4 To what extent are measures appropriate? Are they regionally coherent? What is the status of the implementation of the Programmes of Measures (PoMs)? (Articles 13 and 18 MSFD)**

The Commission assessment of the reporting for the first cycle (2015) of the PoMs<sup>44</sup> indicated that across the EU, only 28 % were new measures linked to seabed habitats. Most Member States reported existing measures from the Habitats Directive (92/43/EEC) to protect seabed habitats, such as the implementation of the Natura 2000 network, management plans for MPAs and additional spatial protection measures required by national legislation<sup>45</sup>. Most Member States also reported measures from the CFP, mostly related to regulating bottom-contacting fishing gears. Other measures concerned the Environmental Impact Assessment (EIA) Directive (2011/92/EU), e.g. construction plans for projects potentially impacting seabed habitats, the Maritime Spatial Planning (MSP) Directive (2014/89/EU) and the WFD<sup>46</sup>.

The new measures reported by Member States during the first cycle (2015) often aimed to improve management in MPAs to protect vulnerable habitats, to restrict or ban seabed-damaging fishing gears and recreational activities, as well as to reduce pollution or nutrient levels from activities such as aquaculture<sup>47</sup>. Data from the Water Information System for Europe (WISE) Marine shows that approximately 44 % of reported measures<sup>48</sup> related to D6 and habitats have started, while implementation has yet to begin for about 10 % of measures. Only about 8 % of the measures are already implemented<sup>49</sup>. No information was reported on the implementation status for the remaining measures (38 %).

#### **2.5 How well-established are the monitoring systems in place in Member States with regard to this Descriptor? What mechanisms are in place to monitor progress toward GES? (Article 11 MSFD)**

Results from the JRC's assessment on the 2020 Article 11 reporting<sup>50</sup> show that for D6, 51 % of the reported monitoring programmes were modified from 2014, 28 % were new programmes, and 21 % were the same programme as in 2014. Across all descriptors, D6 had significantly more new programmes and fewer programmes modified from 2014.

The report<sup>51</sup> concluded D1C6 was overall well monitored across Member States and regions regarding the required elements and compared to other biodiversity themes (species, food-webs and benthic habitats), and in-situ monitoring was mostly used. However, it noted that the MSFD expert network on pelagic habitats has only recently started the work harmonising elements, assessments and monitoring and the outcome of this work is not yet reflected in the monitoring. Similarly, the report concluded that generally, the elements and criteria for D6 are well covered by the MS. Not all MS reported all criteria, however, it noted that ongoing work of TG Seabed aims to further harmonise the monitoring and assessment of the agreed criteria, including regional cooperation.

The JRC report on 2018 MSFD reporting<sup>52</sup> indicated that, in the context of the Article 8 assessments, further clarification was needed in the monitoring guidance to harmonise Member States' reporting.

#### **2.6 What is the current state of work of the CIS and RSCs in relation to the different components of the marine strategies?**

Commission Decision (EU) 2017/848 indicates that for **D6**, seabed habitats should be assessed at biogeographically relevant scales within each MSFD region or subregion. This is done through the Common Implementation Strategy (CIS) by TG Seabed, which has the mandate from the Marine Strategy Coordination

<sup>44</sup> Milieu et al., *Article 16 Technical Assessment of the MSFD 2015 reporting on Programmes of Measures: European Report*, 2019.

<sup>45</sup> Milieu et al., 2019.

<sup>46</sup> Milieu et al., 2019.

<sup>47</sup> Milieu et al., 2019.

<sup>48</sup> The updating exercise does not require existing measures (1a and 1b) to be included.

<sup>49</sup> WISE Marine dashboard, available at: <https://water.europa.eu/marine/data-maps-and-tools/msfd-reporting-information-products/msfd-reporting-data-explorer/programmes-of-measures-progress-of-pom>

<sup>50</sup> Tornero V., Palma M., Boschetti S.T., Cardoso A.C., Druon J.-N., Kotta M., Louropoulou, E., Magliozzi C., Palialexis A., Piroddi C., Ruiz-Orejón L.F., Vasilakopoulos P., Vighi M., Hanke G., Marine Strategy Framework Directive Review and analysis of EU Member States' 2020 reports on Monitoring Programmes, (MSFD Article 11), EUR 31181 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-55778-4, doi:10.2760/8457, JRC129363.

<sup>51</sup> Tornero V. et al., 2022

<sup>52</sup> Boschetti et al., 2021.

Group (MSCG) to propose TVs for D6 by the end of 2022. The work is in progress and a revised document will be submitted to MSCG for consideration<sup>53</sup>.

OSPAR's Biodiversity Committee (BDC) is dedicated to issues related to biological diversity and ecosystems. The following Intersessional Correspondence Groups address different aspects involving marine habitats: Coordination of Biodiversity Assessment and Monitoring (ICG COBAM); Protection & Conservation of Species and Habitats (ICG POSH); and Marine Protected Areas (ICG MPA)<sup>54</sup>. Under HELCOM's State & Conservation group, there is a dedicated Expert Network for benthic habitats (EN BENTHIC)<sup>55</sup>. In the Mediterranean basin, the Ecosystem Approach Correspondence Groups on Monitoring (CORMON) has been set up, while the Biodiversity and Fisheries of the UN Environment Programme Mediterranean Action Plan (UNEP/MED) address issues related to habitats and species status and protection, including Specially Protected Areas (SPA)<sup>56</sup>. The Black Sea Convention lacks specific working groups on habitats and seabed, but the biodiversity protocols of the Convention refer to the protection of habitats from fishing and other human activities. Annex 1 to the protocol details the objectives and obligations of the Contracting Parties regarding MPAs<sup>57</sup>.

### 3 LOOKING FORWARD

#### 3.1 How do climate change and this Descriptor interact?

Climate change is expected to have profound effects on marine biodiversity, as well as marine habitats<sup>58</sup>. Hydrological effects such as water temperature and ocean acidification affect biodiversity and induce profound habitat changes<sup>59</sup>. Climate change alters the species distribution of many different types of organisms, such as fish and plankton, but also seaweeds and mammals<sup>60</sup>, while intense storms – which are expected to become more frequent – can physically disturb both pelagic and benthic habitats. For pelagic systems, climate change is expected to increase surface water temperature and modify stratification<sup>61</sup>. Many seabed habitats are natural carbon storage repositories. Physical loss and disturbance of these habitats release carbon into the atmosphere, exacerbating the adverse effects of climate change and decreasing the mitigation potential of ecosystems<sup>62</sup>.

#### 3.2 What are the upcoming policy trends?

- A **Nature Restoration Law** (NRL) was proposed in mid-2022<sup>63</sup>, with binding targets to restore degraded ecosystems with high potential to capture and store carbon. It aims to safeguard 20 % of Europe's nature by 2030, and all necessary ecosystems by 2050. For the marine environment, these include seagrass beds, sediment bottoms that deliver ecosystems services, and other habitats home to several key species, such as the dolphin, porpoise, shark and several sea birds. The NRL is thus expected to drive action to mitigate and improve pelagic and benthic habitats.
- The **Action Plan to conserve fisheries resources and protect marine ecosystems** (postponed from 2021) will address adverse impacts on sensitive habitats through technical measures such as area

<sup>53</sup> CIRCABC, Marine Strategy, available at: <https://circabc.europa.eu/ui/group/326ae5ac-0419-4167-83ca-e3c210534a69/library/b6c7fb2a-3ede-43c6-8f32-b929fb26e5b2>

<sup>54</sup> OSPAR, available at: <https://www.ospar.org/work-areas/bdc>

<sup>55</sup> HELCOM, EN BENTHIC, available at: <https://helcom.fi/helcom-at-work/groups/state-and-conservation/en-benthic/>

<sup>56</sup> Specially Protected Areas Regional Activity Centre, available at: <http://www.rac-spa.org/>

<sup>57</sup> Commission on the Protection of the Black Sea Against Pollution, available at: <http://www.blacksea-commission.org/convention-protocols-biodiversity.asp>

<sup>58</sup> Pachauri, R.K. and Meyer, L.A., *Climate Change 2014: Synthesis Report*, Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014, p. 151.

<sup>59</sup> European Commission, Commission Staff Working Document, *Background document for the Marine Strategy Framework Directive on the determination of good environmental status and its links to assessments and the setting of environmental targets Accompanying the Report from the Commission to the European Parliament and the Council on the implementation of the Marine Strategy Framework Directive (Directive 2008/56/EC)*, SWD 2020 (62) final, 2020.

<sup>60</sup> Worm, B. and Lotze, H.K., 'Marine biodiversity and climate change', *Climate Change*, 2021, pp. 445-464.

<sup>61</sup> Chust et al., 'Climate change impacts on coastal and pelagic environments in the southeastern Bay of Biscay', *Climate Research*, Vol. 48, No 2-3, 2011, pp. 307-332.

<sup>62</sup> Atwood, T. B., Witt, A., Mayorga, J., Hammill, E. and Sala, E., 'Global patterns in marine sediment carbon stocks', *Frontiers in Marine Science*, Vol. 7, 2020, p. 165.

<sup>63</sup> European Commission, *Green Deal: pioneering proposals to restore Europe's nature by 2050 and halve pesticide use by 2030*, available at: [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_3746](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3746)

closures, gear changes and mitigation measures for sensitive species. Bottom-trawling fisheries, in particular, will be managed through closures, technological advances and mitigation measures.

- The **EU Strategic Plan 2020-2024 on Research and Innovation**<sup>64</sup> addresses investment in marine environmental research. Future policy changes should be supported by quality science, including through further research and innovation.

The UN-led ‘Decade of ocean science for sustainable development 2021-2030’<sup>65</sup> promotes research in the marine environment. Continued focus on this issue at international level could lead to developments in policy.

### 3.3 How is progress towards GES expected to evolve within the current MSFD?

The European Commission’s 2020 Review of the status of the marine environment in the European Union<sup>66</sup> noted that there are no available data to estimate temporal changes in physical disturbance or physical loss of Europe’s seabed. It highlighted that the human activities associated with this descriptor (e.g. dredging, extraction) are increasing in northern marine regions in recent decades, increasing the pressure on seabed ecosystems. For the southern EU marine regions, demersal trawling has declined since 2010, which might reduce the pressure on seabed habitats.

The adaption of operational definitions for ‘physical disturbance’ and ‘physical loss’ by ICES<sup>67</sup>, together with future agreement about methodologies and TVs (see Box 2.6) will allow assessment of the impacts on the seabed against GES<sup>68</sup>.

In 2018, the Commission updated the guidelines on conserving and managing the Natura 2000 network as part of the ‘EU Action plan for nature, people, and the economy’<sup>69</sup>. It focuses on Article 6 of the Habitats Directive and how Natura 2000 sites play a key role in the EU’s nature and biodiversity policy. There is a specific objective to complete the Natura 2000 network, especially to fill gaps for the marine environment, and to put in place the necessary conservation measures for all sites<sup>70</sup> that may drive progress towards GES.

### 3.4 Are there any other developments expected in the next 30 years?

There is general support for increasing MPAs and protection of marine habitats, including seabed ecosystems (see Box 1.2). General public concerns have translated into citizen science projects that support the accessibility of marine biodiversity information for outreach, such as Koster Seafloor Observatory (KSO)<sup>71</sup>, a system that combines citizen science and machine learning for automated analysis of subsea movies to identify species and habitats.

Developments in remote sensing are delivering new technologies for deep-sea exploration and monitoring of the seafloor<sup>72</sup>. In 2020, the National Aeronautics and Space Administration (NASA) developed a videogame that uses special lenses on drones to map and monitor coral reefs around the world<sup>73</sup>. Several examples of new technologies to improve seafloor mapping and monitoring have been tested in EU waters, such as Marine Gravimetry for estimation of seafloor topography<sup>74</sup>, and innovative opto-acoustic developed in the EU-funded

<sup>64</sup> European Commission, Strategic Plan 2020-2024 Research and Innovation, available at: [https://ec.europa.eu/info/publications/strategic-plan-2020-2024-research-and-innovation\\_en](https://ec.europa.eu/info/publications/strategic-plan-2020-2024-research-and-innovation_en)

<sup>65</sup> Ocean Decade website available at: <https://www.oceandecade.org/un-climate-change-conference-2022/>

<sup>66</sup> European Commission, 2020.

<sup>67</sup> Boulcott et al., Workshop on scoping for benthic pressure layers D6C2—from methods to operational data product, ICES WKBEDPRES1 Report, ICES CM 2018/ACOM: 59, 2018.

<sup>68</sup> European Commission, 2020.

<sup>69</sup> European Commission, ‘EU Nature Action Plan: revised guidance on managing protected Natura 2000 areas’, Press release, 21 November 2018, available at: [https://ec.europa.eu/info/news/eu-nature-action-plan-revised-guidance-managing-protected-natura-2000-areas-2018-nov-21\\_en](https://ec.europa.eu/info/news/eu-nature-action-plan-revised-guidance-managing-protected-natura-2000-areas-2018-nov-21_en)

<sup>70</sup> Fois, M., Bacchetta, G., Cogoni, D. and Fenu, G., ‘Current and future effectiveness of the Natura 2000 network for protecting plant species in Sardinia: a nice and complex strategy in its raw state?’ *Journal of Environmental Planning and Management*, Vol. 61, No 2, 2018, pp. 332-347.

<sup>71</sup> Koster Seafloor Observatory, available at: <https://eu-citizen.science/project/334>

<sup>72</sup> Liu, B., Liu, Z., Men, S., Li, Y., Ding, Z., He, J. and Zhao, Z., ‘Underwater hyperspectral imaging technology and its applications for detecting and mapping the seafloor: A review’, *Sensors*, Vol. 20, No 17, 2020, p. 4962.

<sup>73</sup> Garcia-Soto, C. et al., ‘Marine citizen science: Current state in Europe and new technological developments’, *Frontiers in Marine Science*, Vol. 8, 2021, p. 621472.

<sup>74</sup> Lu, B., Xu, C., Li, J., Zhong, B. and van der Meijde, M., ‘Marine Gravimetry and Its Improvements to Seafloor Topography Estimation in the Southwestern Coastal Area of the Baltic Sea’, *Remote Sensing*, Vol. 14, No 16, 2022, p. 3921.

BONUS project, ECOMAP<sup>75</sup>, which develops innovative methods for improved remote sensing of the seafloor in the Baltic Sea, particularly addressing the physical impact of benthic life on sensing procedures. These technological advances are likely to reduce the current data gaps and may raise public awareness of the problem of habitat degradation.

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<sup>75</sup> ECOMAP, available at: <http://www.bonus-ecomap.eu>