

Draft Descriptor Fiche

D1 and D4 – Biodiversity and Food Webs

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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?

D1: Understanding and knowledge of biodiversity and human pressures has improved since the MSFD came into force. Bird populations have decreased by 20 % in the North-East Atlantic and 31 % in the Baltic in the last 25 years. Elasmobranchs, cephalopods and reptiles are generally poorly monitored, unless the species are threatened/vulnerable. The state of marine mammals is particularly difficult to assess, as many are highly mobile. The European Commission's Review of the status of the marine environment in the European Union¹ concluded that biodiversity loss was not halted in Europe's seas during the first cycle of the MSFD.

The quality status reports published by the Regional Sea Conventions (RSCs) support these findings. For many species, insufficient data was gathered. For a large number, the trends were not clear or were mixed (e.g. for seals, assessed by the Baltic Marine Environment Protection Commission (HELCOM) and Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)), while the trend was positive for bony fish in the North-East Atlantic. Nevertheless, for a substantial number of assessments, the trends were negative, especially the European Red List assessment².

D4: For food webs, the only information available was on coastal and shelf ecosystems. Of these, many trophic guilds were found to show deteriorating trends. For example, the fishing and hunting of apex predators 'release' their prey (usually other fish), putting considerable pressure on their consecutive prey and creating a cascading effect³. The abundance of trophic guilds, as well as their productivity, are also impacted by anthropogenic pressures. Although most of these anthropogenic pressures are indirect and it is hard to directly link them to food

¹ 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.

² European Commission, SWD(2020) 61 final.

³ European Commission, SWD(2020) 61 final.

webs⁴, 2021 research⁵ revealed that some spatial differences can be designated: fishing was a pressure found throughout Europe, the southern Bay of Biscay and Iberian coast (west of southern France and Spain) suffered from climatic impacts, and eutrophication and chemical contamination had effects on trends in the Celtic Sea and the North Sea.

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

In general, the public are aware of anthropogenic pressures on marine biodiversity. Research shows that 70 % of the general public believe that the marine environment is threatened by human activities. However, only 15 % consider ocean health to be poor or threatened. Pollution, fishing, habitat alteration, and climate change were seen as major threats to the oceans⁶ and drivers of biodiversity loss⁷.

The public seems to understand the importance of biodiversity in relation to ecosystem services and benefits for human well-being. Various non-governmental organisations (NGOs)⁸ have launched campaigns focusing on specific species, such as dolphins, sharks and sea turtles. This raises awareness for these species (only), and although protection work may benefit the ecosystem as a whole, the narrow focus may lead to oversimplification of the topic.

The general public support Marine Protected Areas (MPAs) in general and are aware of the term. They are less aware of detailed knowledge on habitats (i.e. what precisely it means to be protected)⁹. D4, in particular, uses technical terminology, making it less accessible to the general public.

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

- The **Maritime Spatial Planning (MSP) Directive** (2014/89/EU) promotes sustainable growth of maritime economies, sustainable development of marine areas, and sustainable use of marine resources. Throughout 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 MSP Directive should ensure that sufficient protected areas are created and monitored for conservation purposes, thereby contributing to the status of marine species.
- The **Habitats Directive** (92/43/EEC) ensures the conservation of a range of rare, threatened or endemic animal and plant species, many which are found in the marine environment. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right. D1C4 and D1C5 specifically concern species listed in the Annexes to this Directive.
- The **Birds Directive** (2009/147/EC) aims to protect wild bird species in Europe, including a number found in marine environments. Birds play a large role in marine biodiversity, and are one of the species groups listed in the 2017 GES Decision for D1C2. D1C1, on by-catch, specifically refers to birds.
- 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. The status of marine species, especially those found within 1 nautical mile of land, is directly impacted by the biological and chemical environmental quality standards set and monitored under the WFD. In addition, WFD measures in inland waters directly affect coastal and wider marine habitats. Other EU

⁴ International Council for the Exploration of the Sea (ICES), *ICES Special Request Advice - EU request on revisions to Marine Strategy Framework Directive manuals for Descriptors 3, 4, and 6*, ICES Advice No Book 1, International Council for the Exploration of the Sea (ICES), Copenhagen, Denmark, 2015, available at: http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2015/Special_Requests/EU_Revisions_to_MSFD_manuals_for_Descriptors_346.pdf.

⁵ Machado, I., Costa, J.L. and Cabral, H., 'Response of Food-Webs Indicators to Human Pressures in the Scope of the Marine Strategy Framework Directive', *Front. Mar. Sci.*, Vol. 8, 2021, 699566, doi: 10.3389/fmars.2021.699566.

⁶ 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*, Vol. 152, 2018, pp. 14-22.

⁷ Pellens, N., Boelee, E., Veiga, J. M., Fleming, L.E. and Blauw, A., 'Innovative actions in oceans and human health for Europe', *Health Promotion International*, 2021.

⁸ See, for example: [Seas at risk campaign for dolphins](#), a [campaign to stop shark fin trade from the EU](#) and a [collective of action to save the sea turtle](#).

⁹ Tonin, S. and Lucaroni, G., 'Understanding social knowledge, attitudes and perceptions towards marine biodiversity: The case of tegnuè in Italy', *Ocean & coastal management*, Vol. 140, 2017, pp. 68-78.

water policy, such as the Urban Waste Water Treatment Directive (UWWTD) (91/271/EEC) and the Nitrates Directive (91/676/EEC) aim to improve water quality, primarily by removing nutrient contamination. This will contribute to marine biodiversity.

- The **Renewable Energy Directive** (2009/28/EC) was revised in 2018. In July 2021, the Commission proposed a further revision (COM/2021/557 final), with an increased 40 % target as part of the package to deliver the European Green Deal. That revision is expected to be adopted by the end of 2022. The Directive sets a common target – currently 32 % – for the proportion of renewable energy of total EU energy consumption by 2030. An increase in offshore hydro, wind, and solar energy production may negatively affect species in areas subject to such activities, both during construction and operation.
- **Prospection, Exploration, and Production of Hydrocarbon Directive** (94/22/EC). Article 6 of the Directive concerns environmental protection, but does not specify how this should be done. Offshore installations can impact the environment¹⁰ and potentially species, as they may result in activities that disrupt or destroy habitats, or directly contribute to species injury and mortality.
- 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. D1C3 specifically covers commercially-exploited fish and cephalopods.
- The **EU Regulation on the Sustainable Management of External Fishing Fleets (SMEFF)** (2017/2403) regulates EU vessels fishing outside EU waters. The **Deep Sea Access Regulation** (EU/2016/2336) aims to end bottom-fishing in protected deep-sea ecosystems in EU waters, which places a direct pressure on marine species, in particular commercial stocks and by-catch.
- The **Regulation on Invasive Species** (1143/2014) sets measures to manage invasive alien species causing damage to native ecosystems in Europe. Invasive species can directly compete with indigenous species and disrupt food webs.
- The 2019 **European Green Deal** (COM/2019/640 final) 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 actions/deliverables relevant to D1/4/6.
- In the **Biodiversity Strategy for 2030** (COM/2020/380 final), the EU aims to increase the amount of MPAs to 30 %, with 10 % strictly protected, in a coherent network.
- The **Farm to Fork Strategy** (COM/2020/381 final) aims to ensure the sustainability of fishery and aquaculture products along the whole value chain. It will affect both commercial species and by-catch.
- The **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. This infrastructure can provide hard structures that benefit certain species and reduce fishing activities in the area, but may also disturb species during construction, while electromagnetic fields around cables can negatively impact certain species (e.g. sharks).

At regional level, HELCOM¹¹ and OSPAR¹² 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 Declaration¹³ sets ambitious targets for equality in fisheries management, data collection and conservation measures in the coming decade, aiming to establish fisheries-restricted areas for 10 % of the Mediterranean Sea. A similar declaration¹⁴

¹⁰ Cordes et al., 'Environmental impacts of the deep-water oil and gas industry: a review to guide management strategies', *Frontiers in Environmental Science*, Vol. 4, 2016, p. 58.

¹¹ HELCOM, Baltic Sea Action Plan (BSAP), p. 14, available at: <https://helcom.fi/baltic-sea-action-plan/>

¹² OSPAR, North-East Atlantic Environment Strategy (NEAES) 2030, p. 11, available at: <https://www.ospar.org/convention/strategy>

¹³ https://ec.europa.eu/commission/presscorner/detail/en/IP_17_770

¹⁴ 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

was signed for the Black Sea in 2018, but its effectiveness in tackling the damage to benthic habitats has been criticised¹⁵.

Internationally, both the United Nations Sustainable Development Goals (UN SDGs)¹⁶ and the Convention on Biological Diversity (CBD)¹⁷ 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 worldwide¹⁸.

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

The majority of relevant data for D1 and D4 are collected under the Birds and Habitats Directives, including spatial data compiled under the [Natura 2000 network](#).

- The International Council for Exploration of the Sea ([ICES](#)) [data portal](#) hosts information on seabird and mammal abundance and distribution records; fish and planktonic species distribution and abundance.
- The [EEA hosts datasets](#) of marine biodiversity compiled from diverse sources, such as the Nature Directives and Red List species. It covers mammals, invertebrates, birds, reptiles, amphibians and fish species.
- The Biodiversity Information Systems for Europe ([BISE](#)) holds an updated catalogue of data sources and platforms offering reference data related to European biodiversity.
- The European Nature Information System ([EUNIS](#)) hosts data on species, habitat types and protected sites, compiled from Natura 2000 records.
- European Marine Observation and Data Network ([EMODnet](#)) [Biology](#) provides free interoperable data on temporal and spatial distributions of marine species and species traits. It uses data from multiples sources, such as the European Ocean Biogeographic data system ([EurOBIS](#)), national and monitoring programmes and campaigns, and data archaeology (e.g. datasets from scientists' personal files).
- WISE Marine visualises information reported by MSs under their MSFD obligations.

For the North-East Atlantic, the [OSPAR Data portal \(odims\)](#) hosts data on biological diversity and ecosystems. For the Baltic Sea, the [HELCOM Data and Maps services](#) hosts data on biodiversity components (species and habitats), data on protected areas and results from the State of the Baltic Sea assessments (based on data submitted by Contracting Parties). No comparable databases are publicly available for the Mediterranean Sea and Black Sea regions.

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 **D4** as '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', and for **D1** as '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'¹⁹.

¹⁵ 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/>

¹⁶ UN, *Transforming our world: the 2030 Agenda for Sustainable Development*, p.24, available at: <https://sdgs.un.org/2030agenda>

¹⁷ CBD, Aichi Target 11, <https://www.cbd.int/aichi-targets/target/11>

¹⁸ European Commission, RFMOs, available at: https://oceans-and-fisheries.ec.europa.eu/fisheries/international-agreements/regional-fisheries-management-organisations-rfmos_en

¹⁹ Commission Decision (EU) 2017/848.

For **D4**, the EU Overview report of the second cycle Article 12 assessment²⁰ found that several Member States struggled to define GES for both D4 primary criteria (D4C1 Trophic guild species diversity; D4C2 Abundance across trophic guilds). Regional differences were observed when assessing the use of these criteria across marine regions. In the Baltic Sea, Member States showed 100 % coherence when reporting GES for primary criteria, while the North-East Atlantic and the Mediterranean regions had coherence of only 75 %. Despite this, fewer than 50 % of Member States were assessed as reporting a good or very good qualitative determination of GES for D4. In addition, only about 20 % of Member States had set quantitative TVs for D4²¹, citing a lack of data. The JRC recommended that GES should be harmonised at regional level to prove comparable assessments using a common regional methodology for the assessment²².

According to COM Decision (EU) 2017/848, D4 TVs are to be established by Member States through regional or sub-regional cooperation. The JRC report on thresholds for MSFD criteria²³ found that few TVs were reported by Member States, with HELCOM being the main source. For the North-East Atlantic, only one Member State reported TVs, and none did for the Mediterranean region. The Black Sea was not assessed, due to late reporting. No TVs have been agreed across EU marine regions, nor any approach to setting them.

D1: D1 includes five criteria elements (birds, mammals, reptiles, and non-commercially exploited species of fish and cephalopods). Each criterion element includes species groups set out in COM Decision (EU) 2017/848²⁴. For bycatch (**D1C1**), not all groups of species are relevant. For most of the relevant species or species groups, no TVs are available. However, there are TVs for certain marine mammals (e.g. harbour porpoise in the Baltic and North Seas). Methods of setting TVs vary from the number of animals caught, to models like the Catch Limit Algorithm²⁵.

Population abundance (**D1C2**) is the best-established criterion because most methods for setting TVs – and TVs themselves – are set by the Birds and Habitats Directives (e.g. for some mammals and species). However, gaps persist for the groups for which TVs are not available. Methods to set thresholds for fish and cephalopods are being tested (e.g. reference point B_{MSY}), as well as for birds (i.e. HELCOM GAM approach, instead of TRIM)²⁶.

Population demographics on commercially-exploited fish and cephalopods, in particular, are used for **D1C3**. TVs are only set for some seal species²⁷. Gaps for D1C3 are due to a lack of indicators for each species or species group, as well as a lack of any harmonised method for setting TVs.

Species distribution range (**D1C4**) covers some groups of species, e.g. mammals, reptiles and some fish species. TVs are available only for some mammals covered by the Habitats Directive.

Species habitats (**D1C5**) covers mammals, reptiles, and some fish species. It is somewhat less reported under both the Habitats Directive and the MSFD. No TVs are available for any of the species groups²⁸.

The Overview report of the second cycle Article 12 assessment²⁹ found that not all primary criteria were reported for D1 (in particular for D1-Fish). Regional coherence in the use of criteria was generally high for D1-mammals, but the Baltic Sea region lacked coherence in the use of D1-Fish, while the Mediterranean region lacked coherence in the use of D1-Fish and D1-Cephalopods. The qualitative determinations of GES reported by Member States were assessed as good or very good for fewer than 50 % of Member States across marine regions for D1.

²⁰ Milieu et al., *Overview of the Commission assessment of the Member States' reported information to the Commission on the implementation of the MSFD*, forthcoming.

²¹ Boschetti, S.T., Piroddi, C., Druon, J-N. and Palialexis, A., *Marine Strategy Framework Directive, Review and analysis of Member States' 2018 reports. Descriptor 4: Food webs*, Publications Office of the European Union, Luxembourg, 2021.

²² Boschetti et al., 2021.

²³ 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.

²⁴ Vasilakopoulos et al., 2022.

²⁵ Vasilakopoulos et al., 2022.

²⁶ Vasilakopoulos et al., 2022.

²⁷ Vasilakopoulos et al., 2022.

²⁸ Vasilakopoulos et al., 2022.

²⁹ Milieu et al., forthcoming.

For the quantitative determination of GES, fewer than 30 % of Member States defined any TVs for D1, although more TVs were reported for D1-Mammals. Across marine regions, coherence in defining (and reporting) TVs for all D1 criterion was assessed as poor or very poor³⁰.

2.2 What targets exist for this Descriptor? (Article 10 MSFD), are those targets regionally coherent? How are waters assessed/how is GES achieved?

The Overview report of the second cycle Article 12 assessment³¹ 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 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.

The targets reported for **D1** was assessed as poor. For D1-Birds and D1-Mammals, six Member States were assessed as good or very good, while for D1-Fish, only five Member States were assessed as good. The remaining Member States' assessments were concluded as poor, very poor or not reported. Target setting for **D4** was assessed as extremely poor. The targets reported were not directly relevant to food webs, and were rarely quantitatively measurable or associated with specific thresholds, pressures, and measures³². There was a lack of coherence between Member States and little evidence of regional coordination in target setting.

Target-setting varied considerably between Member States: 75 % of the targets reported for D4 were set by two Member States in the second cycle, similar to the first cycle. Setting targets for D4 is generally more difficult than for the other Descriptors, as food webs can have a complex structure and also consider cumulative pressures to the ecosystem³³.

Several targets for D1 and D4 can be found outside the MSFD and the EU.

EU-wide targets in other EU legislation:

- **D1C2 and D1C3:** The EU will apply zero tolerance in the fight against illegal, unreported and unregulated fishing (IUU) and combat overfishing, promote sustainable management of fish and seafood resources, and strengthen ocean governance, marine cooperation and coastal management (Farm to Fork Strategy);
- **D1 and D4:** 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);
- **D1 and D4:** Strictly protect at least one-third of the EU's protected areas (EU Biodiversity Strategy);
- **D1 and D4:** Integrate ecological corridors, as part of a true Trans-European Nature Network (EU Biodiversity Strategy);
- **D1 and D4:** The Habitats Directive lists nine marine habitat types and 16 species requiring marine site designation, while the Birds Directive lists a further 60 bird species whose conservation requires marine site protection (Birds and Habitats Directives).

Regional targets:

- **D1C1:** Achieve the close to zero target for by-catch rates of relevant species by 2024, especially the Baltic Proper population of harbour porpoise by 2022 (HELCOM, BSAP);
- **D1C2:** Viable populations of all native species by 2030 (HELCOM, BSAP);
- **D4C1:** Functional, healthy and resilient food webs by 2030 (HELCOM, BSAP);
- **D1 and D4:** By 2020, conserve at least 10 % of coastal and marine areas, consistent with national and international law and based on the best available scientific information (UN Environment Programme-Mediterranean Action Plan (UNEP-MAP), MSSD);
- **D1 and D4:** By 2030 at the latest, establish a resilient, regionally coherent, effectively and equitably managed, ecologically representative and well-connected system of MPAs that cover at least 30 % of

³⁰ Milieu et al., forthcoming.

³¹ Milieu et al., forthcoming.

³² Boschetti et al., 2021.

³³ Boschetti et al., 2021.

the marine area of the Baltic Sea, of which at least one-third will be strictly protected (HELCOM, BSAP);

- **D1 and D4:** By 2030, OSPAR will further develop its network of MPAs and other effective area-based conservation measures (OECMs) to cover at least 30 % of its maritime area (OSPAR, NEAES).

Relevant targets from international agreements outside Europe:

- **D1 and D4:** By 2020, conserve at least 10 % of coastal and marine areas, consistent with national and international law and based on the best available scientific information (UN SDG);
- **D1 and D4:** By 2020, at least 10 % of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes (CBD, Aichi Target 11).

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

Information on whether or not GES is achieved is reported as part of Member States' Article 8 reporting. The information below summarises the results of the second cycle of reporting (2018).

D1: For mammals, most of the criteria were assessed and reported. For population abundance (D1C2), around 35 % was good and 30 % was not; for population distribution (D1C4) 50 % was good and more than 20 % not good; for habitat condition (D1C5), 35 % was good and over 30 % was not good. The rest was not assessed or was not known³⁴.

For birds, there were large differences between species groups. Of grazing birds, around 60 % achieved GES, compared to almost 50 % of pelagic feeding birds. For benthic feeding birds and wading birds, only two assessments had achieved GES. For by-catch (D1C1), population distribution (D1C4) and habitat condition (D1C5), the majority was not assessed or was unknown³⁵.

For fish, only population abundance were assessed as good for almost 30 %, and not good for more than 30 %, the remainder were primarily not assessed. There were very few reports on cephalopods and reptiles³⁶.

D4: The only information available is for coastal and shelf ecosystems. For abundance across trophic guilds (D4C2), 30 % was assessed as good. The rest of this descriptor was generally not good (20-35 %) or unknown/not assessed.

Overall, it can be concluded that the majority of the assessments were not assessed or were unknown. If assessments took place, the amount classified as 'not good' often outweighed those classified as 'good'³⁷.

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

The Commission assessment of the reporting for the first cycle (2015) of the PoMs³⁸ grouped D1 and D4 measures for its assessment. Similarly, this section will cover D1 and D4 together. The first cycle Commission assessment of the POMs indicated that measures for D1 and D4-Birds across the EU were mostly (approx. 74 %) existing measures from the Birds and Habitats Directives. These measures included Special Protection Areas (SPAs) and MPAs under these directives. Member States also reported measures from the WFD (e.g. improving water quality in bird habitats) and from the CFP (e.g. address by-catch). New measures focused on specific species, extending protected areas, and promoting selective gear to reduce by-catch.

The assessment of measures for D1 and D4-Fish/D4-Cephalopods showed that about 69 % of the measures reported in 2015 were existing measures, primarily from the CFP. Some Member States reported measures from the WFD that aimed to improve habitat connectivity for migratory fish species. Most of the new measures were intended to increase sustainable fishing gear, extend MPAs, develop management plans for MPAs, and set spatial fishing restrictions.

³⁴ Milieu et al., forthcoming.

³⁵ Milieu et al., forthcoming.

³⁶ Milieu et al., forthcoming.

³⁷ Milieu et al., forthcoming.

³⁸ Milieu et al., Article 16 EU Overview, Publications Office of the European Union, 2019.

For D1 and D4-Mammals and reptiles, most of the measures reported were existing measures (about 71 %), usually from the Habitats Directive and primarily spatial protection measures, such as MPAs. In addition, Member States reported measures under the CFP that aim to reduce incidental by-catch, as well as measures from the MSP Directive and the Environmental Impact Assessment (EIA) (2011/92/EU) Directive aiming to reduce pressures on mammals, such as underwater noise and collisions with vessels. The new measures reported in 2015 focused on spatial protection and reducing underwater noise.

Measures linked to D1 and D4 reported during the first cycle POMs were mostly direct measures (about 80 %) ³⁹.

Data from Water Information System for Europe (WISE) Marine shows that approx. 43 % of reported measures ⁴⁰ related to D1 and D4 have started, with implementation still to begin for about 8 % of the measures. Only about 8 % of the measures are already implemented ⁴¹. No information was reported on the implementation status for the remaining measures.

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 ⁴² show that for D4, 61 % of the reported monitoring programmes were modified from 2014, 16 % were new programmes, and 23 % were the same programme as in 2014. Across all descriptors, D4 had significantly more programmes modified from 2014 and fewer programmes which were the same as in 2014. For D4, the report concluded that the number of elements reported differs across Member States, but also within marine regions. The report concluded that for D1 generally, Member States should map the common or missing species within each species group (through the regional cooperation and the MSFD Biodiversity expert network). The JRC noted this will fill the monitoring gaps and improve regional harmonisation.

2.6 What is the current state of the CIS and RSCs?

The Common Implementation Strategy (CIS) does not have a Working Group on biodiversity, but the Working Group on Good Environmental Status (WG GES) supports Member States in the determination of GES. As achieving GES is in line with EU policies such as the Biodiversity Strategy and the Birds and Habitats Directives, the objectives of WG GES contribute to biodiversity targets. Its objectives include continuing the development of common approaches for determining GES, with a guidance document on Article 8 MSFD published in 2022 ⁴³.

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) ⁴⁴. HELCOM's State & Conservation ⁴⁵ group covers monitoring and assessment functions, as well as issues related to nature conservation and biodiversity protection. The Expert Group on Marine Mammals ⁴⁶ (EG MAMA) focuses on the protection and management of marine mammals in the Baltic Sea, as does the HELCOM Expert Group on Sturgeon Remediation ⁴⁷ (EG STUR) for the conservation of sturgeon species. The HELCOM-OSPAR-ICES Joint Working Group on seabirds ⁴⁸ (JWG Bird) is a platform for experts from the Baltic Sea and North-East Atlantic regions to work on seabird issues. In the **Mediterranean basin**, the Ecosystem Approach Correspondence Groups on Monitoring (CORMON) has been set up, while the Biodiversity and Fisheries of the UNEP-MED

³⁹ Milieu et al., Article 16 EU Overview, Publications Office of the European Union, 2019.

⁴⁰ The updating exercise does not require existing measures (1a and 1b) to be included.

⁴¹ WISE Marine, Programmes of Measures and progress on POMs, 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>.

⁴² 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.

⁴³ European Commission, *MSFD CIS Guidance Document No. 19*, Article 8 MSFD, May 2022.

⁴⁴ OSPAR, available at: <https://www.ospar.org/work-areas/bdc>

⁴⁵ HELCOM, available at: <https://helcom.fi/helcom-at-work/groups/state-and-conservation/>

⁴⁶ HELCOM, available at: <https://helcom.fi/helcom-at-work/groups/state-and-conservation/eg-mama/>

⁴⁷ HELCOM, available at: <https://helcom.fi/helcom-at-work/groups/state-and-conservation/eg-stur/>

⁴⁸ HELCOM, available at: <https://helcom.fi/helcom-at-work/groups/state-and-conservation/jwg-bird/>

addresses issues on habitats and species status and protection, including Specially Protected Areas (SPAs)⁴⁹. The **Black Sea Convention** lacks working groups for specific species groups, but its biodiversity protocols refer to the protection of species and their habitats from human activities and pollution. Annex 2 presents a list of species of importance, while Annex 3 sets out guidance for the conservation of species and management of their habitats⁵⁰.

3 LOOKING FORWARD

3.1 How do climate change and this Descriptor interact?

Climate change is expected to have profound effects on marine biodiversity. Hydrological changes such as rising water temperature and increased acidification affect biodiversity⁵¹. Climate change alters the species distribution of many different types of organisms, such as fish and plankton, but also seaweeds, corals and mammals⁵². Climate change should be taken into account when considering the state of the marine environment (i.e. so-called shifting baselines and the natural dispersal and migration of certain mobile species), particularly when monitoring GES⁵³. Climate change is already affecting European fisheries, changing fish distribution and reducing productivity. Research suggests that effective fisheries management could offset some of these changes⁵⁴.

As the ocean is a relatively open system, increases in water temperature will cause species migration from the equator to the poles, especially in the Greater North Sea. The Baltic Sea is highly influenced by river runoff and is expected to have an increase in freshwater due to enhanced rainfall, and thus have more brackish water and more freshwater species. The Black Sea and Mediterranean Sea are semi-enclosed and if they lose their endemic species, the associated niches will probably be filled by species originating from adjacent waters and, possibly, species transported from one region to another via ballast water and the Suez Canal⁵⁵. Marine systems will respond differently to climate change depending on their abiotic and biotic characteristics. This univocally affects food webs, as well as the biodiversity of each system⁵⁶.

3.2 What are the upcoming policy trends?

- A **Nature Restoration Law (NRL)** was proposed in mid-2022⁵⁷, 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 dolphins and porpoises, sharks and seabirds, and spawning and nursery habitats of commercial fish. The NRL proposal sets out restoration measures to improve areas of habitat types to good condition: at least 30 % of the area of each group of habitat types by 2030, at least 60 % by 2040, and at least 90 % by 2050. These challenging targets for the near future have been questioned with regard to the designation of key biodiversity areas⁵⁸. Nevertheless, the NRL is expected to drive action to improve habitats, and thus encourage biodiversity.

⁴⁹ Specially Protected Areas Regional Activity Centre, available at: <http://www.rac-spa.org/>

⁵⁰ Commission on the Protection of the Black Sea Against Pollution, available at: <http://www.blacksea-commission.org/convention-protocols-biodiversity.asp>

⁵¹ European Commission, SWD(2020) 61 final.

⁵² Worm, B. and Lotze, H.K., 'Marine biodiversity and climate change', *Climate Change*, 2021, pp. 445-464).

⁵³ Elliott et al., 'Force majeure: will climate change affect our ability to attain Good Environmental Status for marine biodiversity?', *Marine Pollution Bulletin*, Vol. 95, No 1, 2015, pp. 7-27.

⁵⁴ Aranda, M., Ulrich, C. and Le Gallic, B., *EU fisheries policy: Latest developments and future challenges*, Brussels: European Parliament, Policy Department for Structural and Cohesion Policies, 2019.

⁵⁵ Philippart et al., 'Impacts of climate change on European marine ecosystems: observations, expectations and indicators', *Journal of Experimental Marine Biology and Ecology*, Vol. 400, No 1-2, 2011, pp. 52-69.

⁵⁶ Philippart et al., 2011.

⁵⁷ 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

⁵⁸ International Union for Conservation of Nature (IUCN), Crossroads blog, 21 August 2021, available at: <https://www.iucn.org/crossroads-blog/202108/we-need-protect-and-conserve-30-planet-it-has-be-right-30>

- 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 closures, gear changes and mitigation measures for sensitive species. It will affect both commercial species and by-catch.

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

The MSFD Descriptors still require advances under the current policy framework. The 2021 regional technical assessments found that coherence was poor for a significant number of MSFD Descriptors, but some progress appears to have been made since 2012. The general EU picture of marine biodiversity is uncertain, due to numerous knowledge gaps (e.g. status of cephalopods and reptile populations) and overall negative trends or poor status for more of the species groups, with few exceptions (e.g. grey seal populations)⁵⁹. Full implementation of current and upcoming relevant policies will help to close the knowledge gaps and provide a more accurate picture of biodiversity status, which will, in turn, enhance the efficiency of the measures and actions. Achieving MPA targets and implementing an adequate MPA management plan will have a positive impact on the abundance and distribution of all species groups' populations.

The use of new emerging technologies, data science, better management, and citizen science initiatives can improve harmonisation, enhance observation capacity, and strengthen biodiversity observation across Europe in the coming years⁶⁰. In addition to extending the baseline knowledge, this may support the effective implementation of current and new policies, ultimately improving marine biodiversity.

In 2018, the Commission updated the guidelines on how to conserve and manage the Natura 2000 network of protected areas as part of the 'EU Action Plan for nature, people, and the economy'⁶¹. It focuses on Article 6 of the Habitats Directive and the key role of Natura 2000 sites in the EU's nature and biodiversity policy. There is a specific objective to complete the Natura 2000 network, particularly to close gaps for the marine environment and put in place the necessary conservation measures for all sites⁶². This, too, may drive progress towards GES.

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

The use of citizen science (collaboration between people and academic scientists) in biodiversity mapping is increasing worldwide⁶³ and has potential to increase in the EU. This should lead to increased scientific knowledge and citizen engagement⁶⁴. Examples include data on distribution and abundance of marine species, such as marine mammals (e.g. strandings), jellyfish and seaweed. Improvement of [ocean literacy](#) among the general public also has the potential to improve people's awareness and understanding of the ocean and its biodiversity.

By-catch is one of the main pressures affecting species groups covered by D1 and D4. Accordingly, several EU-funded projects aim to reduce the accidental kills produced by by-catch, such as: CIBBRiNA LIFE project⁶⁵, which aims to establish regional monitoring programmes for by-catch of sensitive species and implement mitigation measures; Horizon 2020 PISCES – Reducing by-catch⁶⁶ that developed SafetyNet Technologies (SNT) to increase selectivity in fishing gear; and the CetAMBICion project⁶⁷, which seeks to respond to the need to reduce cetacean by-catch in EU fisheries, in particular in the Bay of Biscay and on the Iberian Coast.

Similarly, remote-sensing technologies are developing quickly to support marine biodiversity monitoring, conservation and management. Several EU-funded projects are developing regional and pan-European

⁵⁹ European Commission, SWD(2020) 61 final.

⁶⁰ European Commission, SWD(2020) 61 final.

⁶¹ 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

⁶² 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.

⁶³ Pocock et al., 'A vision for global biodiversity monitoring with citizen science', *Advances in Ecological Research*, Vol. 59, 2018, pp. 169-223.

⁶⁴ Kelly, R., Fleming, A., Pecl, G. T., von Gönner, J. and Bonn, A., 'Citizen science and marine conservation: a global review', *Philosophical Transactions of the Royal Society B*, Vol. 375, No 1814, 2020, p. 20190461.

⁶⁵ North Sea Advisory Council, CIBBRINA, available at: <https://www.nsrac.org/projects/life-eu-bycatch-project-cibbrina/>

⁶⁶ CORDIS, Pisces project, available at: <https://cordis.europa.eu/project/id/790835>

⁶⁷ Cetambicion project, available at: <https://www.cetambicion-project.eu/>

approaches, such as EuropaBON⁶⁸ and MarBioME⁶⁹, which aim to improve biodiversity monitoring and support the MSFD and other relevant EU legislation. The EU-funded BioScal project⁷⁰ will estimate biodiversity based on functional diversity monitoring of different forest communities across Europe.

⁶⁸ Vito remote sensing, available at: <https://remotesensing.vito.be/new-pan-european-project-joint-biodiversity-monitoring>

⁶⁹ MARBIOME, available at: <https://www.aircentre.org/projects/marbiome/>

⁷⁰ CORDIS, Remote sensing data to estimate biodiversity, available at: <https://cordis.europa.eu/project/id/891592>