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Marine Strategy Framework Directive

Review and analysis of Member States' 2018 reports Descriptor 1: Species biological diversity

Assessment (Art. 8), Good Environmental Status (Art. 9) and Targets (Art. 10)

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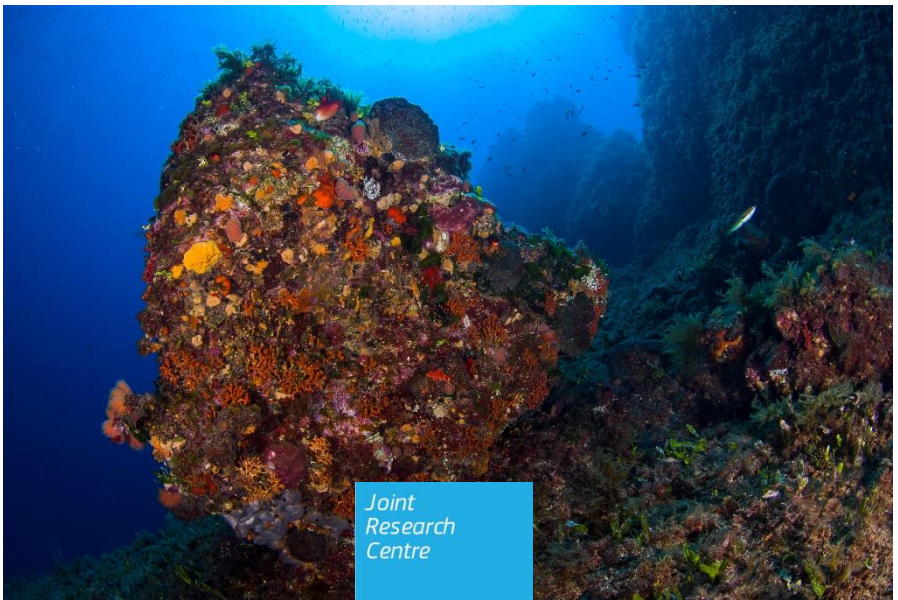

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IDA D1 species

Contents

Foreword

The Marine Directors of the European Union and all EU Member States have jointly developed a common strategy for supporting the implementation of the “Marine Strategy Framework Directive” (MSFD), 2008/56/EC, amended by Commission Directive (EU) 2017/845 of 17 May 2017.

The European Commission Joint Research Centre is delivering thematic technical reports to support MSFD implementation, such as guidance documents, technical background reports and analyses related to EU Member States reporting. These thematic reports are targeted at experts who are directly or indirectly implementing the MSFD and support the further development of the Directive.

The JRC's technical report series “Marine Strategy Framework Directive - Review and analysis of EU Member States' 2018 reports”, analyse, from a technical point of view, the MSFD reports submitted by EU Member States pursuant to MSFD Article 17. The analysis includes the Good Environmental Status Assessment (Article 8), the determination of Good Environmental Status (Article 9) and the Targets setting (Article 10). The outcome provides information for the further development of the policy implementation, supported by the EU Member States through established MSFD Technical Groups and Expert Networks.

Abstract

The report analyses the information provided by the European Union's Member States (MS) for the species theme of Descriptor 1 (D1) – species groups of birds, mammals, reptiles, fish and cephalopods (relating to Descriptor 1) – of the Marine Strategy Framework Directive (MSFD). The reported information by the MS follows the MSFD Article 17 requirement to update Articles 8, 9 and 10 of the Directive, for the current 6-year MSFD reporting cycle. By September 2020, 20 MS reported on D1 in electronic format. The MS made a huge and respectable effort to fulfil the demanding requirements of an environmentally ambitious Directive like the MSFD. The second reporting obligation for Art. 8, 9 and 10 was remarkably improved compared to the 2012 reporting, especially regarding the regional coordination, the consistency in the reporting (which can be further improved) and good understanding of the reporting and assessing requirements.

Regarding the species groups, marine mammals had more complete assessments and good regional coordination for the Good Environmental Status (GES) determination. For marine reptiles, there were no agreed methods for assessments and GES determination, and this was reflected in the poor reporting. Seabirds are well coordinated in terms of methods and assessment in the Baltic and North East Atlantic Seas, however important gaps exist in data availability in the Mediterranean and Black Sea. For fish and cephalopods reported under D1, critical gaps in assessment methods, species selection and data did not allow a comprehensive EU GES evaluation.

The input from other EU policies, mostly the Habitats and Birds Directives, and the Regional Sea Conventions (boosted by EU action and support stemming from MSFD requirements) was critical for the improvement between the two reporting cycles. However, there is still room for aligning the EU policies and further developing regional indicators and methods towards harmonised and comparable regional GES assessments for the highly mobile species.

With regards to Article 9, a general lack of harmonization in the GES determination was evident. In most cases, GES was not specified in a quantitative manner or associated to a threshold values to discriminate good from bad status. With regards to Article 10, discrepancies were observed in the way the Member States have set their targets, while many of the reported targets were not consistently assigned to the Descriptor and to the GES components. Targets were not harmonised across MS and they were rarely measurable and/or associated with specific thresholds.

The present report provides recommendations for the implementation of MSFD for D1 species. As an overarching recommendation for D1 species, the GES Common Implementation Strategy (CIS) should prioritise the work to harmonise the GES determination and the common understanding on how to develop quantitative GES description with agreed thresholds, which will be regionally coordinated. Although these key actions for the harmonised MSFD implementation are conceptually well developed in the GES Decision (2017/848/EU) and in the SWD(2020) 62, more should be invested to harmonise their operationalisation. This work will positively affect the target setting for Art. 10. Obviously, across the species groups, criteria and regions there are significant differences regarding the developed methodological standards for GES and data availability.

Introduction

The GES Decision (European Commission, 2017) in part II sets "*Criteria and methodological standards, specifications and standardised methods for monitoring and assessment of essential features and characteristics* ***and current environmental status of marine waters*** *under point (a) of Article 8(1) of Directive 2008/56/EC*". Then it specifies that "*Part II considers the descriptors linked to the relevant ecosystem elements:* ***species groups of birds, mammals, reptiles, fish and cephalopods*** *(Descriptor 1), pelagic habitats (Descriptor 1), benthic habitats (Descriptors 1 and 6) and ecosystems, including food webs (Descriptors 1 and 4), as listed in Annex III to Directive 2008/56/EC (1)".* The evaluation of the Member States (MS) reports in this work covers all species groups as they listed in Table 1 of the GES Decision (European Commission, 2017). For those species the MS need to assess five criteria:

Criterion **D1C1**: "*The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long- term viability is ensured*".

Criterion **D1C2**: "*The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured*".

Criterion **D1C3**: "*The population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a healthy population which is not adversely affected due to anthropogenic pressures*".

Criterion **D1C4**: "*The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions*".

Criterion **D1C5**: "*The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species*".

Moreover, the GES Decision (European Commission, 2017) specifies that the "*Member States shall establish threshold values for each species through regional or subregional cooperation, taking account of natural variation in population size and the mortality rates derived from D1C1, D8C4 and D10C4 and other relevant pressures. For species covered by Directive 92/43/EEC, these values shall be consistent with the Favourable Reference Population values established by the relevant Member States under Directive 92/43/EEC*". As such, the Habitats (HD, European Commission 1992) and Birds Directives (BD, European Commission 2009) and the developments of indicators and methods under the Regional Sea Conventions (RSC) are always considered in the evaluation of the MS reports. Another key aspect in the evaluation of the MS reports is that depending on the species group different criteria are considered primary and secondary.

The assessments of MSFD Descriptor 1 (D1), which represents the state of the marine environment should consider pressure assessments, more specifically: "*Assessments of the adverse effects from pressures under criteria D1C1, D2C3, D3C1, D8C2, D8C4 and D10C4, as well as the assessments of pressures under criteria D9C1, D10C3, D11C1 and D11C2, shall be taken into account in the assessments of species under Descriptor 1*".

The environmental status of the European marine waters in the context of the MSFD was primarily assessed by the MS in 2012, as part of the reporting obligations linked to the MSFD initial assessment. In that context, the first in-depth assessment of the MS reports highlighted the need to further harmonise methodological standards for assessment and monitoring related to MSFD Art. 8, to harmonise the GES determination at regional level providing a quantitative determination, where possible, and set measurable and GES-compatible targets for MSFD Art. 10 (Palialexis et al., 2014). The overall evaluation of the MS reports in 2012 indicated that D1 had many gaps in terms of data for

several species, the HD, BD and Common Fisheries Policy (CFP) only partially cover the overlapped species and only for some criteria. The selection of species assessment was not harmonised, and the use of indicators was not consistently assigned to the proper criterion.

The biodiversity expert network was established by the Working Group for the Good Environmental Status (WG GES) to review the repealed GES Decision (European Commission, 2010) and its recommendations (Palialexis et al., 2015) were well reflected in the GES Decision (European Commission, 2017). Since then, the MSFD Biodiversity network contributed to provide recommendations to several technical and scientific issues that were highly prioritised in the gaps of the first evaluation of the MS reports (Palialexis et al., 2014), such as integration rules, methods for thresholds and indicators for the species criteria assessment. Overall, the progress made during the first cycle of the MSFD implementation for D1, especially on the harmonisation of methods and on developing a common understanding for key elements of the assessment was impressive and was reflected in the current reporting cycle. Obviously, there is still room for improvement and the recommendations from this analysis aim to highlight the gaps, identify the policy tools and point out the proper players to take this work forward.

In response to their 2018 reporting obligations, the MS have currently reported information on MSFD D1 for the last 6-year MSFD reporting cycle, following the Article 17 requirements of updating Articles 8, 9 and 10. Despite the reporting deadline of October 2018, significant delays were observed. By September 2020, 20 MS (Table 1) had reported on D1 in electronic format, covering the four MSFD regions, the Baltic Sea (BAL), Northeast Atlantic (NEA), Mediterranean (MED) and Black Sea (BLK). More specifically, 19 MS reported for Art. 8 (except of LT, UK, EL and BG), 18 for Art. 9 and Art. 10 respectively (apart from IT, PT, UK, EL and BG). Three MS did not provide electronic reports (UK, EL and BG) and were excluded from the analysis since the reported information form the paper report was not consistent and comparable to the structure of the electronic report.

Table 1. The table below presents the names and abbreviations of MSFD regions and subregions, as well as of Members States (MS) allocated to their respective subregion(s). MS highlighted in grey had not submitted an electronic report for Art. 8, 9 and 10 by the end of September 2020 and they were not included in the current assessment.

Region	Subregion	Member States [MS]							
Baltic Sea [BAL]	BAL	Denmark [DK]	Estonia [EE]	Finland [FI]	Germany [DE]	Latvia [LV]	Lithuania [LT]	Poland [PL]	Sweden [SE]
North East Atlantic [NEA]	Bay of Biscay and the Iberian Coast [ABI]	France [FR]	Portugal [PT]	Spain [ES]					
	Celtic Seas [ACS]	France [FR]	Ireland [IE]	United Kingdom [UK]					
	Macaronesia [AMA]	Portugal [PT]	Spain [ES]						
	Greater North Sea [ANS]	Belgium [BE]	Denmark [DK]	France [FR]	Germany [DE]	Sweden [SE]	The Netherlands [NL]	United Kingdom [UK]	
Mediterranean Sea [MED]	Adriatic Sea [MAD]	Croatia [HR]	Italy [IT]	Slovenia [SI]					
	Aegean-Levantine Sea [MAL]	Cyprus [CY]	Greece [EL]						

	Ionian Sea and Central Mediterranean Sea [MIC]	Greece [EL]	Italy [IT]	Malta [MT]	
	Western Mediterranean Sea [MWE]	France [FR]	Italy [IT]	Spain [ES]	United Kingdom [UK]
Black Sea [BLK]	BLK	Bulgaria [BG]	Romania [RO]		

The report is structured around the five species groups (marine mammals, marine reptiles, seabirds, cephalopods and fish), where the GES assessment (Art. 8) and the GES determination (Art. 9) are evaluated following a set of common reported aspects. The reported targets (Art. 10) are evaluated in the last part of this report, since it was not feasible to group them at a common level. Many targets were set at the Descriptors level, or at a level of more than one species groups.

The scope of the report is to provide an overview of the current situation of the MSFD implementation and to identify gaps to facilitate the future workplans of the policy implementation. This information is organised at the end of each section as gaps and recommendations aim to inform the European Commission and the MS competent authorities. Moreover, detailed technical/scientific analysis took place for each criterion, species group and regional seas related with thresholds, indicators, integration tools and other technical issues. This information aims to prioritise and facilitate the work of the Biodiversity expert network, any biodiversity expert from the MS and the scientific community that are involved in the assessment and monitoring of the marine environment. Other international organisations, such as the RSC, International Council for the Exploitation of the Sea (ICES), General Fisheries Commission for the Mediterranean (GFSM), Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) and Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS), participating in the policy implementation and the scientific developments could also benefit from this analysis. Finally, the evaluation of the MSFD reports will directly feed the ongoing review of the MSFD and the alignment of environmental Directives (MSFD, HD and BD) in the frame of the European Commission's better regulation.

1. Marine Mammals

1.1 Results of Art.8 analysis

1.1.1 Consistency, comparability and adequacy of reported criteria elements and features assessed at EU and regional level

1.1.1.1 Objective: Which species are reported, by which MS per region, and which MS did not report species that occur in their waters.

Data: We analyse the data reported in column G "Elements" (Appendix 2, Art.8 mammals) per MS, subdivisions and regions.

Expected Outcome: Overview of species reported (black in Table 2 to Table 5) and species that should have been reported because of their distribution (blue) per MS, subdivision and region. In red, MS that did not provide electronic reports. Grey cells correspond to regions or subdivisions where the species do not occur. Thus, it is easy to identify the species distribution from the white cells and the MS that either reported or they should have done so, but they did not. It should be clarified that the analysed level of information cannot always show missing species that were deselected by the MS through the species selection criteria of the GES Decision (2017/848/EU). In addition, the reported species might not be assessed or could be partially assessed, and this is presented in section 1.1.2.

Table 2. Marine seals reported by the evaluated Member States, and their geographical association with the MSFD regions and subregions. In black font the species reported, in blue the species that should be reported because of their distribution per MS, subdivision and region, and in red, MS that did not provide electronic reports. Grey cells correspond to regions or subdivisions where the species do not occur. Missing MS from a region denote that species does not occur in their national water.

Seals species	BAL	NEA				MED				BLK
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BLK
Halichoerus grypus Grey seal	DE, DK, EE, FI, LV, PL, SE, LT	DE, DK, FR, NL, SE, UK	FR, UK, IE							
Phoca hispida botnica Ringed seal	EE, FI, LV, SE, PL, LT, DE									
Phoca vitulina Harbour seal	DE, DK, SE, PL	DE, DK, FR, NL, SE, UK, BE	FR, UK, IE							
Monachus monachus Mediterranean monk seal					PT	IT	IT, EL	IT, HR	EL, CY	

Table 3. Small-toothed cetaceans reported by the evaluated Member States and their geographical association with the MSFD regions and subregions. In black font the species reported, in blue the species that should be reported because of their distribution per MS, subdivision and region, and in red, MS that did not provide electronic reports. Grey cells correspond to regions or subdivisions where the species do not occur. Missing MS from a region denote that species does not occur in their national water.

Small toothed cetacean species	BAL	NEA				MED				BLK
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BLK
Delphinus delphis Short-beaked common dolphin			FR, UK, IE	ES, FR, PT	ES, PT	ES, FR, IT	MT, IT, EL	IT	EL, CY	RO, BG
Lagenorhynchus albirostris White beaked dolphin		FR, UK	FR, UK, IE							
Globicephala macrorhynchus Short-finned pilot whale				FR, ES, PT	ES, PT					

Small toothed cetacean species	BAL	NEA				MED				BLK
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BLK
Grampus griseus Risso's dolphin		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT	ES, PT	ES, FR, IT	IT, EL, MT	IT, HR, SI	EL, CY	
Orcinus orca Killer whale		DE, DK, FR, NL, SE, UK	FR, UK, IE	ES, FR, PT	ES, PT	ES, FR, IT	IT, EL, MT	IT, HR, SI	EL, CY	
Phocoena phocoena Harbour porpoise	DE, DK, FI, PL, SE, LT, LV	BE, DE, DK, NL, FR	FR, UK, IE	ES, FR, PT				IT, HR, SI		RO, BG
Stenella coeruleoalba Striped dolphin		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT	ES, PT	ES, FR, IT	IT, EL MT,	HR IT, SI	EL, CY	
Stenella frontalis Atlantic spotted dolphin				FR, ES, PT	ES, PT	ES, FR, IT				
Tursiops truncates Bottle-nosed dolphin		DE, DK, FR, NL, SE, UK	FR, UK, IE	ES, FR, PT	ES, PT	ES, FR, IT	MT, IT, EL	HR, IT, SI	EL, CY	RO, BG
Steno bredanensis Rough-toothed dolphin		DE, DK, FR, NL, SE, UK		FR, ES, PT	ES, PT	ES, FR, IT	IT, EL, MT	IT, HR, SI	EL, CY	RO, BG
Lagenodelphis hosei Fraser's dolphin					ES, PT					
Lagenorhynchus acutus Atlantic white-sided dolphin		DE, DK, FR, NL, SE, UK	FR, UK, IE							

Table 4. Deep-diving toothed cetaceans reported by the evaluated Member States and their geographical association with the MSFD regions and subregions. In black font the species reported, in blue the species that should be reported because of their distribution per MS, subdivision and region, and in red, MS that did not provide electronic reports. Grey cells correspond to regions or subdivisions where the species do not occur. Missing MS from a region denote that species does not occur in their national water.

Deep diving toothed species	BAL	NEA				MED				BLK
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BLK
Globicephala melas Long-finned pilot whale				ES, FR, PT	PT, ES,	ES, FR, IT				
Physeter macrocephalus Sperm whale					ES, PT	ES, FR, IT				
Ziphius cavirostris Cuvier's beaked whale				ES, PT	ES, PT	ES, FR, IT				
Mesoplodon bidens Sowerby's beaked whale		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT	ES, PT					
Mesoplodon densirostris Blainville's beaked whale				FR, ES, PT	ES, PT					
Crassidens Pseudorca False killer whale		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT	ES, PT	ES, FR, IT	IT, EL, MT	IT, HR, SI	EL, CY	
Hyperoodon ampullatus Northern bottle-nose whale		DE, DK, FR, NL, SE, UK	FR, UK, IE		PT, ES					
Kogia breviceps Pygmy sperm whale		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT	ES, PT					
Kogia simus Dwarf sperm whale				FR, ES, PT	ES, PT					
Mesoplodon europaeus Gervais' beaked whale				FR, ES, PT	ES, PT					
Mesoplodon mirus True's beaked whale			FR, UK, IE	FR, ES, PT	ES, PT					
Peponocephala electra Melon-headed whale					ES, PT					

Table 5. Baleen whales reported by the evaluated Member States and their geographical association with the MSFD regions and subregions. In black font the species reported, in blue the species that should be reported because of their

distribution per MS, subdivision and region, and in red, MS that did not provide electronic reports. Grey cells correspond to regions or subdivisions where the species do not occur. Missing MS from a region denote that species does not occur in their national water.

Baleens whale species	BAL	NEA				MED				BLK
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BLK
Balaenoptera acutorostrata Minke whale		FR, DE, DK, NL, SE, UK		FR, ES, PT	ES, PT					
Balaenoptera edeni Bryde's whale					ES, PT					
Balaenoptera physalus Fin whale				ES, FR, PT	ES, PT	ES, FR, IT				
Balaenoptera musculus Blue whale		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT	ES, PT					
Eubalaena glacialis Northern right whale		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT						
Balaenoptera borealis Sei whale		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT	ES, PT					
Megaptera novaeangliae Humpback whale		DE, DK, FR, NL, SE, UK	FR, UK, IE	FR, ES, PT	ES, PT					

Findings:

Species perspective:

Seals (Table 2) are well studied and reported by almost all MS where they occur. The MS that did not report (e.g., Poland for ringed seal), they claim that the species occurs only in low numbers and are not relevant for assessment, in line with the species selection criteria of the GES Decision. Only CY reported monk seal in the east MED.

The small toothed cetacean species (Table 3) are sparsely reported apart from three species (common and stripped dolphin, and harbour porpoise). Only three species (Table 4) were reported from the deep-diving cetaceans (Long-finned pilot whale, Sperm whale and Cuvier's beaked whale) out of the 12 species in the JRC's species list (Palialexis *et al*. 2018). Those that were not reported have distribution beyond the coastal waters in NEA. Same for the baleen whales (Table 5), where only ES and FR reported three out of the seven species distributed in the offshore waters.

Regional perspective:

All the species reported in the intermediate assessment of OSPAR (OSPAR 2017) were also reported for the MSFD; however, not all MS that contributed to the OSPAR assessments have provided assessments for all species in their MSFD reporting (details for the species contributed to the OSPAR assessment and the contracting parties provided data in the metadata of OSPAR 2017). The Risso's dolphin (*Grampus griseus*) was reported for first time in NEA region by France, while previously it was only reported in the MED.

All the species reported in the MED were included in UNEP/MAP assessments (UNEP/MAP 2017). All three marine mammal species present in the BLK were reported by RO. In the BAL, all four species that were assessed by HELCOM were also reported by the MS for the MSFD.

Good practices: The common monitoring programmes coordinated by OSPAR (SCANS) in the NEA and HELCOM (BAL) for marine mammals increase the harmonisation in the species reported across the MS in each region.

Gap: The major gaps in terms of species reported appear in those whales that have distribution in the offshore waters of the NEA and in the east MED. However, before putting any criticism on the MS it is essential to explore if those species have known causal links with specific pressures and thus their assessment will add value to the species group overall assessment, as the species selection criteria foresee in the GES Decision.

Recommendation for reporting: The species lists that were developed for the e-reporting greatly improve the consistency in the reporting of species, compared with the 2012 reporting. Synonyms, typos, or misreported species were found only in MS that provided paper reports, while the e-reporting ensures consistency. Chronic reporting delays hamper the analysis of the information and subsequent steps in the implementation of the Directive. The EC should keep encouraging the MS to provide e-reports, and the experience between the two reporting cycles (2012 and 2018) showed how the e-reports with the drop-down menus and the harmonised structure improved the consistency and comparability of the reported information.

Recommendation for implementation: The MS are encouraged to select species that are sensitive to specific pressures, and for their selection the GES Decision provides a set of practical and scientific selection criteria. Both in 2012 and in 2018 reports, the MS reported for the MSFD the information that was available from other obligations (HD and RSC), rather than those that are relevant for the MSFD objectives. For this reason, the MS did not consistently select and assess representative species for each species group and identify key species-indicators sensitive to specific pressures. Thus, the groups of dolphins and whales are scarcely assessed, without reflecting the potential pressures acting on their population (e.g., noise, bycatch, PCBs). We would recommend building on the available lists of pressures-species and include those in the species selection process to inform the final selected species to be assessed for each species group. The MSFD biodiversity network and the RSC group of experts can provide a harmonised selection of species at regional level, in line with the GES Decision selection criteria and consistently assign species to each species group. This level of collaboration could also contribute to harmonised (joint) monitoring programmes at regional level, based on the currently ongoing ones (i.e., the SCANS for the NEA and the new Mediterranean monitoring programme with the contribution of ACCOBAMS).

Recommendation for methodological standards: The discrepancies in the species selected at regional level could be tackled with the use of the species selection developed by JRC (RIsk-Based Choices for the Assessment of Good Environmental Status-RIBCAGE, submitted for publication). Thus, both the MS and the EC will have a transparent and comparable selection/deselection justification for all relevant species. The RIBCAGE will be presented and shared within the MSFD biodiversity expert network for testing.

1.1.1.2 Objective: The MS reported the sources of the elements (species), i.e., whether the species are selected from EU (e.g., Directives), regional (e.g., regional sea conventions) or national lists. The analysis of the sources will reveal the level of harmonisation across the MS and the level of exploitation of available information. This information combined with the source of threshold can reveal whether

the MS claim to use, for instance, national sources instead of regional to HD. Something that was evident in the reported monitoring programmes of 2014.

Data: We analyse the data reported in column M "Element source" (Appendix 2, Art.8 mammals).

Table 6. Element source by region and MS for D1-Mammals

Element source	Reported in:				Tot. MS
	BAL	**NEA**	**MED**	**BLK**	
EU	DE, EE	DE, IE, PT			4
HELCOM	DK, FI, LV, SE	SE			4
OSPAR		DK, NL			2
BARCON			MT		1
BSC				RO	1
MS in (sub)region		ES (AMA)			1
National	LV, PL	BE, ES, FR	CY, ES, IT, FR, HR, SI		9

Findings: The MS reported one of the sources for their elements in the first column of Table 6:

- EU
- Regional - HELCOM
- Regional - OSPAR
- Regional – BARCON
- Regional - BSC
- Subregional - MS in (sub) region
- National

There is no consistency at regional level. For instance, among the BAL MS there is a mixture of EU, regional (RSC) and national sources assigned to element sources. However, the marine mammals are included in both HD and RSC lists, so this entry is not informative and is open to different interpretations.

Gap: All MS reported for all entries. No gaps.

Recommendation for reporting: This entry can be omitted for marine mammals as they all belong to at least two categories (RSC and EU/HD) and it can be merged with the source of threshold, assuming that regional lists and assessments should be reused by the MS for the MSFD. The source of the assessment or threshold should be used in its place.

Recommendation for implementation: The MS accurately reported elements that are included in other EU, or international agreements and policies. The next step would be to ensure that the regional lists are developed and applied in a consistent way, to allow for consistent regional assessments for the highly mobile species, rather than using national, non-comparable, ones. The combination of the reported source of species and source of thresholds indicates that some MS use national thresholds and species assessments that are developed for the HD, which are not fully fit to the regional assessments required by the MSFD. Hopefully, the effort to align the environmental EU Directives will facilitate the direct use of such assessments.

Recommendation for methodological standards: Not relevant.

1.1.2 Extension in use of MSFD Criteria (primary and secondary) reported at EU, regional and (sub)regional level

Objective:

Table 7 provides a variety of information and overviews related with the progress of the assessments.

- Overview of the use of primary and secondary criteria. The number in each cell indicates the number of member states that reported each criterion out of the total number of MS reported for each species.

- Overview of the species assessments and threshold values per criterion and region. The traffic light approach (green, orange, red) corresponds to the level of assessment of the parameters for each criterion and species, including the reporting of threshold values. Green: Indicates that both the threshold value and the achieved value are reported. Orange: Indicates that either a threshold value is available, or the value achieved (estimated parameter), so assessment is not complete. Red: Indicates that neither threshold values nor achieved values are reported.

- Overview of the assessed parameter for each species and criterion. The bold borders around the cells indicate those species and criteria for which the achieved parameter has reported (either negative or positive). This information, in principle, should reflect the decision of an achieved (or not) parameter based on the assessment value and the threshold value. However, in many cases MS reported parameters as achieved without reporting the two prerequired entries. We assume that in those cases the MS got assessments from other obligations (e.g., HD) and denote these cases with the bold frame.

Data: The reported information in column N (Appendix 2, Art.8 mammals) was used for the use of the criteria. The species assessment was based on the information in columns Q, R, S and V (Appendix 2, Art.8 mammals). The overview of the assessed parameters was based on the information in column AD. The assumption for the traffic light approach is that any reported category was aggregated to the higher level, so if only one MS provided threshold value and value achieved for a single species in a single Marine Reporting Unit (MRU), this is assigned to the species, region or subdivision. We assume that all MS in the same region or subdivision should have available methods to perform a similar assessment.

Table 7. Reported threshold values and/or estimated parameters are shown for each species and criterion as: i) green, for those criteria with both the threshold value and the value achieved reported, ii) orange, when either a threshold value is available, or the value achieved (estimated parameter), so assessment is not complete, and iii) red, when neither threshold values nor values achieved are reported. The numbers reflect the MS that reported each criterion to allow for an overview of the usage between primary against secondary criteria. The bold-framed cells show the criteria of the species that were reported to have a final assessment (positive or negative).

BAL		D1C1 primary	D1C2 primary	D1C3 secondary	D1C4 primary	D1C5 primary
Seals DE, DK, EE, FI, LV, PL, SE	*Halichoerus grypus*	2/6	7/7	5/5	7/7	3/4
	Phoca hispida botnica	1/2	4/4	1/1	4/4	1/2
	Phoca vitulina	1/2	3/3	1/1	3/3	2/2
Small-toothed cetaceans DE, DK, FI	*Phocoena phocoena*	2/3	3/3	1/1	3/3	2/2

NEA		D1C1 primary	D1C2 primary	D1C3 secondary	D1C4 primary	D1C5 primary
Seals DE, DK, FR, IE, NL, PT, SE	*Halichoerus grypus*	1/5	4/5	3/4	5/5	3/5
	Phoca vitulina	2/4	5/6	1/2	5/5	4/4
	Monachus monachus	1/1	1/1	1/1	1/1	1/1
Small-toothed cetaceans BE, DE, DK, ES, FR, IE, NL, PT	*Delphinus delphis*	1/3	1/3	1/3	2/3	1/3
	Globicephala macrorhynchus	0/1	0/1	0/1	0/1	0/1
	Globicephala melas	1/1	0/1	0/1	0/1	0/1
	Grampus griseus	0/1	0/1	0/1	1/1	1/1
	Lagerorhynchus albirostris	0/1	1/1	0/1	0/1	0/1
	Orcinus orca	1/1	1/1	1/1	1/1	1/1
	Phocoena phocoena	7/7	7/7	3/3	5/6	6/7
	Pseudorca crassidens	0/1	0/1	0/1	0/1	0/1
	Stenella coeruleoalba	1/2	2/2	0/1	2/2	1/2
	Stenella frontalis	1/2	1/1	0/1	0/1	0/1
	Steno bredanensis	0/1	0/1	0/1	0/1	0/1
	Tursiops truncatus	3/4	2/4	1/3	3/4	2/4
Deep-diving toothed cetaceans ES, FR, PT	*Globicephala macrorhynchus*	0/1	1/2	0/2	0/1	0/1
	Globicephala melas	0/2	2/2	1/2	1/2	0/2
	Grampus griseus	172	1/2	0/3	1/2	0/2
	Hyperoodon ampullatus	0/1	0/1	0/1	0/1	0/1
	Kogia breviceps	1/1	0/1	0/1	0/1	0/1
	Mesoplodon bidens	0/1	0/1	0/1	0/1	0/1
	Mesoplodon europaeus	0/1	0/1	0/1	0/1	0/1
	Mesoplodon mirus	0/1	0/1	0/1	0/1	0/1
	Physeter macrocephalus	2/2	1/2	0/2	0/1	0/1
	Ziphius cavirostris	2/2	1/1	1/1	0/1	1/1
Baleen whales ES, FR, PT	*Balaenoptera acutorostrata*	0/1	2/2	0/1	2/2	1/2
	Balaenoptera borealis	0/1	0/1	0/1	0/1	0/1
	Balaenoptera edeni	0/1	1/1	0/1	0/1	0/1
	Balaenoptera musculus	0/1	0/1	0/1	0/1	0/1
	Balaenoptera physalus	0/2	0/2	1/2	1/2	1/2
	Megaptera novaeangliae	0/1	0/1	0/1	0/1	0/1

MED		D1C1 primary	D1C2 primary	D1C3 secondary	D1C4 primary	D1C5 primary
Seals CY	*Monachus monachus*	1/1	1/1	1/1	0/1	0/1
Small-toothed cetaceans ES, FR, HR, IT, MT, SI	*Delphinus delphis*	1/2	1/2	0/1	0/2	0/2
	Stenella coeruleoalba	1/4	0/4	2/2	1/4	2/4
	Tursiops truncatus	2/4	2/4	2/2	1/3	2/3

Deep-diving toothed cetaceans ES	*Globicephala melas*	0/1	0/1	0/1	0/1	0/1
	Grampus griseus	0/1	0/1	1/1	1/1	0//1
	Physeter macrocephalus	0/1	0/1	0/1	1/1	0//1
	Ziphius cavirostris	0/1	0/1	1/1	0/1	1/1
Baleen whales ES, IT	*Balaenoptera physalus*	0/2	0/2	1/1	1/1	1/1

BLK		D1C1 primary	D1C2 primary	D1C3 secondary	D1C4 primary	D1C5 primary
Small-toothed cetaceans RO	*Delphinus delphis*	1/1	0/1	0/1	0/1	0/1
	Phocoena phocoena	1/1	0/1	0/1	0/1	0/1
	Tursiops truncatus	1/1	0/1	0/1	0/1	0/1

Findings:

Use of primary and secondary criteria: Although we would expect the MS to use more the primary than the secondary criteria, it seems that their selection of criteria was based on data and methods availability. Thus, in cases where available data cover secondary criteria, such as for D1C3 for marine seals in the Baltic, the assessments are reported. In contrast with primary criteria such as D1C1, where less information and data are available. The overlay of the three-fold information in Table 7 provides an easy-to-see pattern showing that the selection of criteria is data-driven, as it is verified by the bold frames and by the non-clear preference to primary against secondary. In other words, MS reported what was available. In the BAL, the HELCOM assessments for marine mammals cover all criteria, except bycatch. The OSPAR IA assessment provides similar to HELCOM assessments for seals and more complete assessments for a few small cetaceans (e.g., bottle-nose dolphin and harbour porpoise). For the rest of the marine mammals the IA provides assessments for abundance and less for distribution (D1C2 and D1C4, respectively). In the Mediterranean very few species have good data and thus assessed criteria. Finally, in the BLK available data exist only for bycatch and this was the only criterion reported. There is no justification reported by MS for not using secondary criteria.

Species assessments and threshold values per criterion and region: The species at regional level with full assessments of their parameters completely mirror the RSC complete assessments form the recent regional reports (HELCOM holistic assessment and OSPAR Intermediate Assessment). That is the case in the BAL and NEA, as for the MED and BLK the RSC do not have complete assessments for marine mammals. The status of developed methods for methods to set thresholds, threshold values and indicators are described in the overview of Palialexis *et al.* (2019), where all RSC indicators for marine mammals are listed.

Consistency of assessed parameter reported for each species and criterion: The assessed parameters were more than what was expected based on the complete assessments. The bold-bordered cells on yellow or red cells reveal that some MS assessed their parameters using other assessments (e.g., trends from HD), without providing estimates of the parameter or thresholds. Moreover, some reported parameters seem to be assessed without providing any threshold value or estimate at all, or even the source of the assessment. To this end, the assessed parameters should be checked one-by-one to verify the validity and certainty of the assessment. Once again, most of the reported parameters are based on the RSC assessments.

In cases where it was feasible to evaluate the MS justification for the assessed parameters, we observed different approaches. For instance, some MS reported positive assessments, even when the uncertainty was high (e.g., missing threshold value), while others were more reluctant to report any assessment that was not well justified by the data.

Good practices: The high level of coordination and consistency in the assessment of the seals in ANS and BAL is the result of the work of HELCOM and OSPAR on these species. Such established groups of experts could take over/forward the work on the missing criteria and parameters (e.g., develop threshold values for D1C1). Coordination through the MSFD biodiversity network could facilitate similar developments to other regions and methodological harmonisation.

Gap: There are many species for which the lack of data or lack of thresholds does not allow for complete assessments. In the MED and NEA, there are many gaps that could be covered with better coordination at and across regions and with the wide regional marine mammal monitoring programmes (such as SCANS for NEA and the new monitoring programme, started in 2018, in the MED with the contribution of ACCOBAMS). In the BLK, the monitoring programmes should generate data for species distribution and abundance. The few reported threshold values for the criteria are developed regionally, however, the methods to set threshold values could be also applied and tested to other regions.

Recommendation for reporting: The entries analysed in this section, which include thresholds values, values achieved, and assessed parameters, are essential for the Art. 8 report. The MS reported in a consistent way, denoting that they have a good understanding of the structure of the reporting and of the concepts behind it. Some inconsistencies in the way the parameters are assessed raised questions, whether the assessment is based on a direct comparison of the value achieved and the threshold value or by other sources. It should be clear in the coming reporting guidance (2024) that the assessments should be based on the reported information (value assessed and threshold), so to facilitate the evaluation of the assessment result.

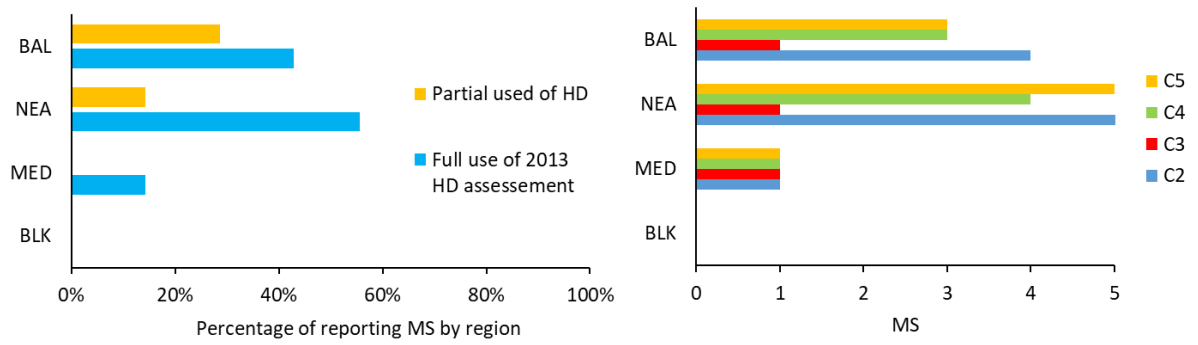
Recommendation for implementation: The analysis of the multidimensional information in Table 7 shows that there is progress in the assessments, in the understanding and in the harmonisation of the reported information compared with the 2012 reporting. The challenge now is to fill-in the data gaps and the methodological gaps for the species that were not assessed. The first through the updates of the monitoring programmes, due in 2020 (MSFD Art. 17 updates for Art. 11), with regional coordination and joint monitoring, and the second through the work that takes place within the marine mammals' expert networks of the RSC, ASCOBANS, ACCOBAMS, the Habitats Directive and the MSFD Biodiversity expert network. The MS should ensure the continuous support of their experts to the networks.

1.1.3 Legislation related to marine mammals at EU and regional levels

Objective: Analysis of relevant EU policies and international or regional agreements that the MS reported. This is a general analysis to complement the element sources in section (2.1.2) and the threshold value sources (2.4.1).

Data: All entries that refer to other assessment obligations (Appendix 2, Art.8 mammals).

Figure 1. Percentage of MS (out of 19) reported the use of Habitats Directive assessments (left) and number of MS reused HD parameters criteria D1C2-D1C5 (right) for marine mammals in 2018 MSFD cycle for Article 8.



Findings: All marine mammals reported are listed in Annex IV of the Habitats Directive. At regional level, the RSC lists include all the species reported for the MSFD. All MS referred to either the HD or to RSC assessments. In some cases, they referred to HD assessments which were reported as 'national' sources. In the BAL, for instance, FI and SE reported HELCOM assessments, while DE and DK used the HD 2013 assessments for all criteria. Figure 1 presents the MS that referred to HD and the number of criteria that were associated with HD parameters. A comparison of the species that were assessed based on HD assessments was not performed as it is expected to be done by the DG ENV funded project[1] on the alignment of MSFD and HD.

In the Baltic, the assessment results are often given at regional level, so many trends for national MRU reported unknown with trends and parameters taken from the regional HELCOM assessment, apart from few MS (PL, FI, SE).

In the intermediate assessment of OSPAR (OSPAR 2017), the following species were assessed: harbour porpoise *(Phocoena phocoena)*, offshore bottlenose dolphin *(Tursiops truncates),* white-beaked dolphin *(Lagenorhynchus albirostris),* short-beaked common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*), minke whale (*Balaenoptera acutorostrata*), fin whale (*Balaenoptera physalus*), long-finned pilot whale (*Globicephala melas*), sperm whale (*Physeter macrocephalus*) and beaked whales (the latter as a combined species group). All these species were reported also for the MSFD; however, not all MS that were included in the OSPAR analysis have provided assessments for all species in their MSFD reporting.

On the other hand, the following eleven species of cetaceans, regularly occurring in the MED, were included in UNEP/MAP assessments (UNEP/MAP 2017): short-beaked common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*), common bottlenose dolphin (*Tursiops truncatus*),

[1] In February 2020, the European Commission launched a service contract on "Coordinated assessments of marine species and habitats under the Birds and Habitats Directives and the Marine Strategy Framework Directive" under the framework contract no. ENV.C.2/FRA/2016/0017

harbour porpoise (*Phocoena phocoena*), long-finned pilot whale (*Globicephala melas*), rough-toothed dolphin (*Steno bredanensis*), Risso's dolphin (*Grampus griseus*), fin whale (*Balaenoptera physalus*), sperm whale (*Physeter macrocephalus*), Cuvier's beaked whale (*Ziphius cavirostris*) and killer whale (*Orcinus orca*). Two of these species have very limited ranges within MED: the harbour porpoise, possibly representing a small remnant population in the Aegean Sea, and the killer whale, present only as a small population of few individuals in the Strait of Gibraltar. Despite the wide spatial distribution of the remaining species, many of them were not reported as shown in Table 1, a gap that should be considered in the updates of the monitoring programmes.

The BLK has three marine mammal species which are assessed by the two MS with great consistency. The three species present in the BLK are reported from Romania (Bulgaria did not report electronically), however there are no existing assessments for those species at regional scale, neither from the RSC.

Good practices: It is positive that the MS increased the consistency in their reports and the efficiency of the assessments by reusing highly coordinated regional RSC assessments.

Gap: The RSC, and even more so the HD, are not completely harmonised with the MSFD. The MS, depending on their needs, exploit the existing assessments at different levels; for instance, some used HD parameters, but not the assessments of species. Others used the trends and based on them they assessed the species status, and others used only the threshold values.

An issue of caution is that the HD assessments are undertaken at national scale, while the RSC assessments were made at regional level and the reported assessments might not be comparable. Other factors beyond the scale might also affect the assessments. To exemplify potential differences, FI specified that the national assessment for grey seals differs from the regional one and consequently the status result also differs.

Recommendation for reporting: It will be more transparent if the MS refer in their reports to HD and national assessments more consistently. When the assessment comes from the HD it should be stated so, even if the reporting is at national level. Assessments reported as national, should be independent from other policy assessments and not modification of existing reported assessments, to avoid jeopardising the methodological harmonisation across reporting obligations.

Recommendation for implementation: MSFD Art 5(2) requires MS to work together in each (sub)region to produce consistent and coordinated assessments. The GES Decision requires (sub)regionally agreed lists of species and thresholds, and use of regional or subregional assessment scales. Use of HD assessments needs to be in this context (e.g., reuse of data, same parameters/indicators). The RSC assessments and the HD assessments are not directly comparable or well aligned. The EC has launched a process to harmonise MSFD and HD. Until the full alignment of the assessments and the achievement of one monitoring, one assessment for all reporting obligations, we would recommend to the MS follow the MSFD and the GES Decision requirements entailing (sub)regional definition of GES and coordinated assessments using harmonised methodological standards. HD should be used as described above.

1.1.4 Marine mammal parameters and threshold values

1.1.4.1 Parameters and sources for D1 criteria

Objective: We analysed the parameters reported, which largely come from a predefined list in the reporting guidance. It provides a good indication of the variety of information reported, the consistency and the areas where refinement is required.

Data: We analyse the data reported in column O and P for the parameters reported for each criterion per species (Appendix 2, Art.8 mammals).

Analysis of the reports and findings for D1C1 criterion:

- **D1C1**

The parameter MOR/F (mortality rate) is the default value in the reporting list. Overall, many MS did not assess the parameter, because of missing threshold values (e.g., seals in BAL, threshold values for mammals in OSPAR), indicators, and lack of monitoring/data. Some MS (for instance, EE, ES, FR and LV) reported species for this criterion, but did not provide an assessment. Table 8 summarises the parameters reported by each MS, the source of the parameters and the associated species. Figure 2 shows the distribution of parameters in each region and the level of consistency. For instance, five out of the seven Baltic MS reported the same parameter.

Table 8. Parameters reported and additional information for the use of parameters in the reports (also includes MS which reported parameters but did not assessed them for the criteria).

PAR	Reported parameters	Reporting MS	Threshold Value source	Species groups
A	MOR/F	BE, CY, DE, DK, ES, FI, FR, HR, IE, IT, MT, NL, PL, PT, SE	HELCOM, OSPAR, CMS, ASCOBAN, National	Seals, small-toothed cetaceans (*Phocoena phocoena)*, deep diving toothed cetaceans, baleen-whales
B	Mortality by catch rate	RO	National	Small cetaceans
C	Mortality rate from ship collision	ES (AMA)		Deep divers
D	Percentage of (sp. name) stranded with signals compatible with bycatch	ES (ABI, MWE)	OSPAR	Small cetaceans (included *Phocoena phocoena)*, deep divers, baleen whales
E	Incidental capture (No individuals); fishing longlining / Tuna fisheries	PT (AMA)		Seals (*Monachus monachus*)

In Table 8, A and B are practically the same parameter reported differently, indicating the lack of consistency in the reporting, despite the default drop-down menu with option. D and E are another expression of mortality (A).

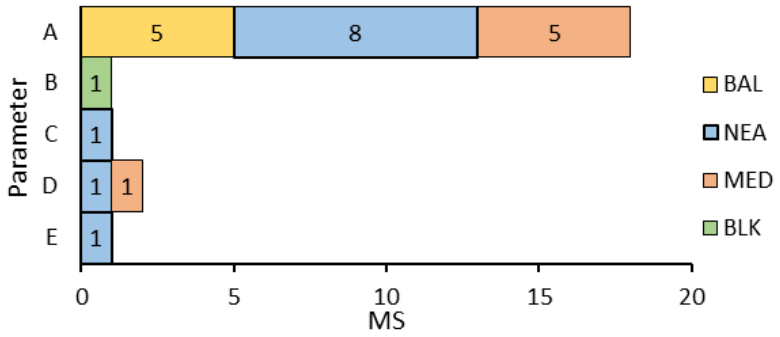


Figure 2. Number of MS per each region using the parameters listed in Table 7. Duplications allowed for same MS using more parameters in the same region (example: ES uses D in three regions).

- **D1C2**

While ABU (abundance) is the default parameter for this criterion, some MS (Table 9 and Figure 3) reported other parameters, obviously because these were already available and possibly assessed for some species. Moreover, the abundance is expressed as number of individuals, relative abundance within the community and trend, making it difficult to compare changes in the population across regions and MS. Growth rate was also reported for D1C2, which is typically a D1C3 indicator. ES and PT were reported assessments that were made during the MISTIC SEA project, which covered the area of Macaronesia. However, the estimated parameters were deviate from the recommendations of the GES Decision (F and H in Table 9). Depending on the species some MS made use of both regional and national assessments (e.g., FI), while others reported qualitative threshold values at national level (e.g., PL). For the MS having marine waters in two regions, FR set its own threshold values that are different across the (sub)regions, while other MS (DE, DK, SE) used the same threshold for both BAL and NEA. Cetaceans in MED could not be evaluated as the assessments are not comparable. MT reported trends, IT reported number of species but without threshold values and thus assessments of criteria, HR reported a value only for one species and one criterion, and CY assessed *Monachus monachus* and no other species, common with other MS (monk seal occurs in EL, but EL did not provide e-report and was not included in the analysis). FR reported only one criterion of one species in the MED (*Stenella coeruleoalba*) and only ES reported a more detailed assessment of several species and criteria for marine mammals in the MED. The comparison of the quality and quantity of the reported information across MED is indicative of the failure of the reporting to provide a single and harmonized assessment of the marine mammals' status in this region. No data for the BLK.

Table 9. Parameters reported and additional information for the use of parameters in the reports (also includes MS which reported parameters but did not assess them for the criteria).

PAR	Parameter name	MS reporting (regardless completing assessment)	Threshold Values (+source) assigned to parameter
A	Abundance (ABU)	CY, DE, DK, EE, ES, FI, HR, IE, IT, LV, MT, NL, PL, PT, SE	HELCOM, HD, MISTIC SEA II, National
B	Population growth rate	FI	HELCOM, National
C	Trend in abundance	SE	HELCOM
D	Relative abundance within community (short term)	FR	OSPAR, National
E	Relative abundance within community (long term)	FR (ACS, ANS)	OSPAR
F	Abundance DS (Distance Sampling)	ES (AMA)	MISTIC SEA II
G	Abundance spatial modelling	ES (AMA)	MISTIC SEA II
H	CMR (Capture Mark Recapture)	PT (AMA)	MISTIC SEA II

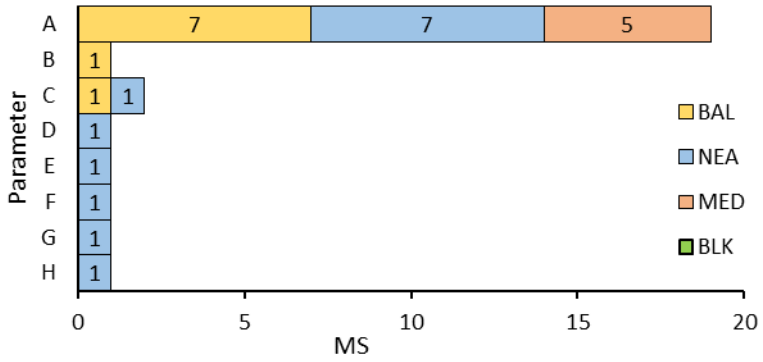


Figure 3. Number of MS per each region using the parameters listed in Table 9. Duplications allowed for same MS using more parameters in the same region (example: ES uses D in three regions).

- **D1C3**

HELCOM

In D1C3 several parameters could be assigned related to the population characteristics. The MS reported more than the four default options (Table 10 and Figure 4), including two well-developed indicators for HELCOM grey seals:

- 'Nutritional status' of seals evaluates the blubber thickness of a specimen of the population in relation to a minimum threshold value (HELCOM 2018a).
- 'Reproductive status' measures the proportion of adult female grey seals over 6 years old that are pregnant or give birth during July to February in relation to a minimum threshold value (HELCOM 2018a).

This is a secondary criterion for all mammals, where many species reported but not all of them assessed.

Most of the additional parameters were reported by a few MS (Figure 4), suggesting that these were available for the reporting and were not developed for the MSFD (e.g., the HELCOM indicators for the seals). This is not a criticism, since the developed indicators are very useful, sensitive to specific pressures and robust, but it is unlikely to be developed by other MS for other regions or species because of the data requirement and the new monitoring programmes that should be established.

Table 10. Parameters reported and additional information on use of parameters in the reports (also includes MS which reported parameters but did not assess them for the criteria).

PAR	Parameter name	MS reporting (regardless completing assessment)	Threshold values (+source) assigned to parameter
A	Age distribution (AGE-D)	DE, ES, HR	Habitats
B	Fecundity (breeding rate) (FEC)	CY, ES, FI, NL, PL, SE	HELCOM, OSPAR, National
C	Sex distribution (SEX-D)	ES	

D	Survival rate (SUR)	ES, FI, PT	OSPAR, National
E	Blubber thickness (caught seals)	SE	HELCOM
F	Blubber thickness (hunted seals)	SE	HELCOM
G	Reproductive status	LV	HELCOM
H	Breeding interval (BI), Growth rate	ES	(National)
I	LE- Life Expectancy, NMR- Natural Mortality Rate, AGR- Annual Gestation Rate, Size- length, Temporal emigration probability (TEP) estimated for the Ria de Arousa area	ES	(National)
J	Generation time	ES	(National)
K	Mortality rate	ES	(National)
R	Number of extreme strandings[2]	FR	National
S	Hunting	FI	National

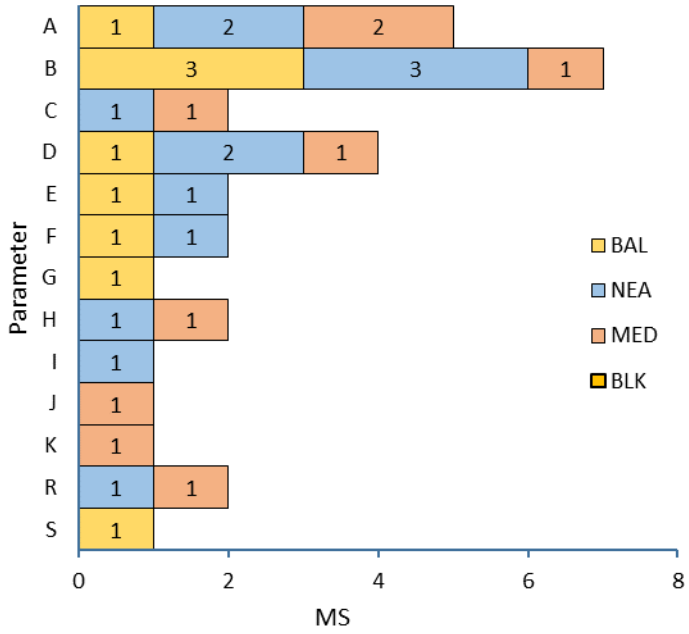


Figure 4. Number of MS per each region using the parameters listed in Table 10. Duplications allowed for same MS using more parameters in the same region (example: ES uses D in three regions).

- **D1C4**

All MS reported the three default categories (distribution pattern, range and spatial distribution, A, B and C respectively in Figure 5). Most of them reported at least two parameters depending on the source (Table 11) and the species groups. In many cases indicators developed by the RSC for abundance D1C2 are also applied for distribution (e.g., OSPAR indicators for abundance and distribution of cetaceans and distribution and abundance of harbour porpoise).

Given the lack of data on the overlap between spatial distribution of human activities/pressures and species distribution, it is not possible to identify whether there is a cause-effect relationship between

[2] A qualitative threshold values which is determined as: The number of groundings actually observed over 3 days does not exceed, over more than one month for two years of the current cycle, the upper limit of the confidence interval at 95% of the monthly threshold (predicted from the cycle previous).

human activities and cetacean population size and distribution (OSPAR, 2017; abundance and distribution of cetaceans' indicators). The power to detect trends could be improved by increasing the frequency of large-scale surveys. Spatial distribution models are very popular where data exist, but once again it is challenging to make a causal link with pressures and identify changes caused by anthropogenic activities and not by other natural phenomena.

Table 11. Parameters reported (first two columns) and additional information on use of parameters in the reports (also includes MS which reported parameters but did not assess them for the criteria).

PAR	Parameter name	MS reporting (regardless completing assessment)	Threshold Values (+ source) assigned to parameter
A	Distribution pattern (DIST-P)	EE, ES, HR	HELCOM
B	Distribution range (DIST-R)	DK, EE, ES, FI, IE, MT, PT, SE	HELCOM, National
C	Distribution spatial (DIST-S)	CY, DE, ES, FR, HR, LV, PL, PT, SE	Habitats, HELCOM, OSPAR, National

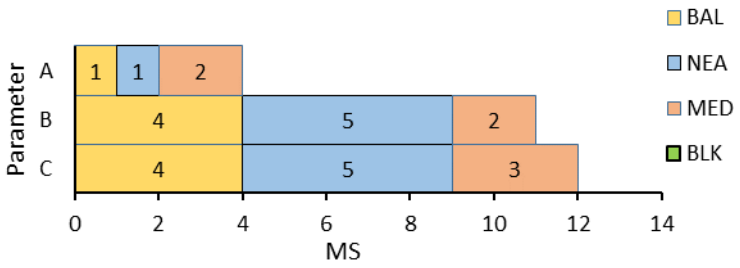


Figure 5. Number of MS per each region using the parameters listed in Table 11. Duplications allowed for same MS using more parameters in the same region (example: ES uses D in three regions).

- **D1C5**

Interestingly, ES reported several parameters for criterion D1C5, beyond the Habitat Condition (HAB-CON) parameter that was expected for this criterion. They reported the extent (EXT) of the habitat for the species, as MT also did, and several parameters that are also relevant to D8C1 and D9C1 (Concentration of contaminants in biota, in fat, liver and other tissues). HD is currently the only potential source for this criterion; for instance, BAL MS reported bad criteria status because of the bad habitat quality for the species according to HD. However, lack of threshold values and data did not allow for many assessments for this criterion. The 13 MS reported for this criterion made 22 assessments in total for D1C5 for five species, indicating the lack of data and methods and the low contribution of this criterion in the species assessments.

Table 12. Parameters reported (first two columns) and additional information on use of parameters in the reports (also includes MS which reported parameters but did not assess them for the criteria).

PAR	Parameter name	MS reporting (regardless completing assessment)	Threshold Values (+source) assigned to parameter
A	Habitat condition (HAB-CON)	CY, DE, DK, ES, FI, HR, MT, NL	Habitats
B	Extent (EXT)	ES, IE, MT, PT	
C	Indirect values of contaminants available	ES	
D	Concentration in biota - liver (CONC-B-LI)	ES	
E	Concentration in biota - other (CONC-B-OT)	ES	
F	Concentration in biota - fat (CONC-B-FA)	ES	
G	Duration	ES	

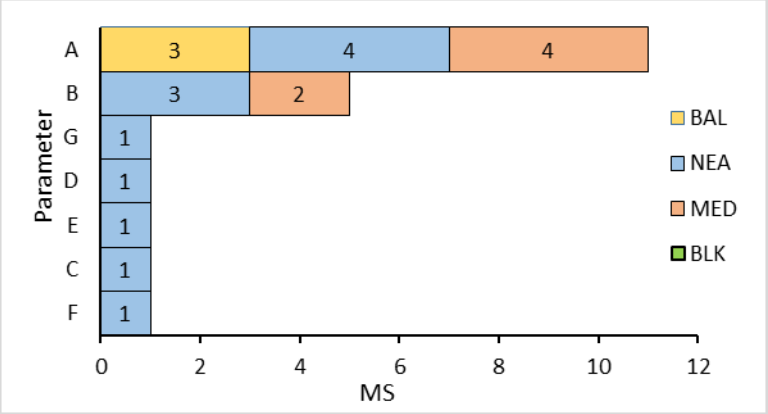


Figure 6. Number of MS per each region using the parameters listed in Table 12. Duplications allowed for same MS using more parameters in the same region (example: ES uses D in three regions).

Gap: Lack of common assessment methods to harmonise the parameters at regional level, and at the species level.

Recommendation for reporting: No recommendations, this entry is clear, and the reported information is consistent. However, there are several cases where the MS reported as "other" parameters that could fit to the default categories. The harmonisation of methodology at regional level or through the biodiversity expert network could further improve the consistency in the description of the parameters. The drop-down menus with prefilled parameters had greatly improved the consistency in the reporting compared with the 2012 reporting.

Recommendation for implementation: The development of common regional methodologies and the work developed within the MSFD biodiversity expert network will facilitate the harmonisation of the parameters reported at regional level and across the same species. The analysis shows that very few parameters assigned to species and assessments for some criteria (e.g., D1C5 and D1C1). Obviously, there are still gaps in data, which should be covered in the updates of the monitoring programmes. The methodological gaps can be tackled with regional and EU coordination through the expert network. Another striking point is that D1C5 was not adequately reported or omitted by many MS, despite the link with the HD assessment for the habitat of the species. Reviewing the HD reports for the same species it becomes clear that there is lack of the causal link between the habitat condition and extend of the marine mammals and the pressures acting on those habitats, which complicates the D1C5 assessment. Moreover, in several cases the MS did not manage to characterise the habitats of the species and restricted their analysis to the population characteristics. More work is required across descriptors to link pressures with affected habitats in a quantitative manner and to better characterise species' habitats with specific populations especially for those species that are related with pelagic habitats (development of methodological standards for D1C6 could also support this link).

1.1.4.2 Threshold values

Objective: To provide an overview of the reported threshold values (Table 13) and compare them with those that are developed by the RSC or other organisations (e.g., ASCOBANS) and for EU legislation for each D1 criterion.

Data: We analyse the data reported in columns Q, R and S for threshold values (Appendix 2, Art.8 mammals). This information is checked against the RSC roof reports and against the Palialexis *et al.* (2019) report on the harmonisation of methods to set threshold values.

Table 13. Overview of the threshold values reported and their sources per criterion and species group. Explanations of the parameter are given in the previous section. The criteria in grey font correspond to the secondary ones.

Criteria	OSPAR	HELCOM	UNEP/MAP	HD parameters	No source reported and qualitative Threshold Values
Seal					
D1C1	-	-		-	No Threshold Value set for MOR/F
D1C2	-25.0: Relative abundance within community (long term) 6.0: Relative abundance within community (short term)	10000.0 (ind.): ABU 0.6 (BQR-ratio); ABU 7.0, 9.0, -10.0: Trend in abundance Rate of decrease less than 10% over a 10-year period		10000 (ind.): ABU >7, <15: ABU Favorable conservation status of the population: ABU Trend as GES definition	Increasing population growth rate (FI) Trend as GES definition (NL) Abundance increases by 10% in comparison to previous year (PL)
D1C3	-1.0: FEC	90.0: FEC 0.6: Reproductive status 35.0: Blubber thickness (caught seals) 40.0: Blubber thickness (hunted seals)		>7, <15: FEC Favorable conservation status of the population: AGE-D	Number of feeding females, offspring or pregnant females reaching at least 5% of the population (PL): FEC Hunting (FI)
D1C4	No changes in the species distribution: DIST-S	0.6: DIST-S DIST-P DIST-R		Favorable conservation status of the distribution: DIST-S	No decrease in area of occupation occurs: DIST-R Appearance of grey seal at all haul-out areas during monitoring period and molting: DIST-S
D1C5	-	-	-	Favorable state of conservation of the habitat: HAB-CON	

				Sufficiency of area and quality of occupied habitat	
Whale – baleen, Small-toothed cetaceans, Deep-diving toothed cetaceans					
D1C1	MOR/F: 1.7% 0.7% or 1.4% varying by species	-	-	-	MOR/F: 1.7 % of the population mortality to be caused by bycatch comes from the ASCOBANS recommendation or national TV 1.0 % mortality rate from ship collision 1.0 % from CMS Number of individuals dead due to bycatch never exceed 0.7% of the best abundance estimate available (ES) National values (in BLK) Percentage of (mammal sp.) stranded with signals compatible with bycatch (ES). 0.0: Incidental capture (No individuals) ? Tuna fisheries/fishing longlining Stable or declining trend (MT)
D1C2	-5.0: Relative abundance within community (long term)	-	-	ABU: Favorable conservation status of the population Stable trend (MT) ABU: At or greater than the current Favourable Reference Population value (IE) Comparison census in the assessment period with values reported in Art. 17 of the Habitats Directive (PT)	-0.5: Relative abundance within community (short term) – National (FR) abundance spatial modelling abundance Distance Sampling – source: MISTIC SEAS II (ES)

D1C3	-	-	-	AGE-D: Favorable conservation status of the population	AGE-D FEC SEX-D SUR The number of groundings actually observed over 3 days does not exceed, over more than one month for two years of the current cycle, the upper limit of the confidence interval at 95% of the monthly threshold (predicted from the cycle previous) (FR) Breeding interval BI (ES) Size-length (ES) NMR- Natural Mortality Rate (ES) AGR- Annual Gestation Rate (ES) LE- Life Expectancy (ES) Temporal emigration probability (TEP) estimated for the Ria de Arousa area (ES) Generation time (ES)
D1C4	No changes in the species distribution: DIST-S	-	-	DIST-S: Favorable conservation status of the distribution Comparison census in the assessment period with values reported in Art. 17 of the Habitats Directive	The upper limit of the confidence interval at 80% of the average annual percentage difference in the proportion of area occupied by the species over the assessment cycle must be greater than 0% (FR) : DIST-S Distribution range extends to Finnish marine area and it is observed yearly from each sub-basin (except Bothnian Bay) Stable trend in distributional range (MT): DIST-R
D1C5	-	-	-	HAB-CON Favorable state of conservation of the habitat EXT: Equivalent to the current Favourable Reference Range (IE)	17.0: Indirect values of contaminants available (ES) EXT HAB-CON CONC-B-OT CONC-B-LI CONC-B-FA Duration

				Comparison census in the assessment period with values reported in Art. 17 of the Habitats Directive (PT)	

Findings: The variety of sources and methods to set threshold values and the differences in data availability across the regional seas is well reflected in the different types of thresholds reported. For D1C1 there is only a method developed for threshold and a value proposed by ASCOBANS, with some variation from the OSPAR and HELCOM. Thus, where it was reported it was consistent. Threshold values reported for D1C2 and D1C4 are influenced by the HD. For D1C3 and D1C5 numerous parameters were reported and consequently different, non-comparable threshold values were reported.

Gap: For several species' groups, species and regions, threshold values do not exist, and the lack of data prevents any attempt to establish such values. The threshold values that were reported are coming from other assessment obligations, regional (from ASCOBANS for D1C1) or HD (common in D1C2).

Recommendation for reporting: The reporting of the threshold values was efficient and had the detailed compilation of information for a comprehensive understanding of the estimation and use of the thresholds. Some inconsistencies and misunderstandings on the selected/developed threshold values for parameters that deviate from the GES Decision could be refined either with the monitoring guidance or with the Art. 8 guidance. Such inconsistencies derived from the MS' tendency to report available information, even if it's not fully fit to the required entries (e.g., relevant abundance for D1C2) or from projects that developed thresholds at subregional level, which are not aligned with the GES Decision.

Recommendation for implementation: Generally, the MS reported threshold values that are already developed by RSC or other organisations (ASCOBANS). Given the lack of data and the regional harmonisation, the reported threshold values can be the basis for regional coordination and extrapolation of methods to other regions. For D1C1 and D1C3 some already developed indicators could provide some level of harmonisation of the methods to set threshold values. For D1C2 and D1C4 (possible also D1C5, but this was not evident in this reporting cycle) the HD provides some consistency in the threshold values in terms of units. However, the highly mobile species should require a more coordinate assessment at regional level, some more harmonisation is required for a meaningful assessment of the species status. Given the different monitoring programmes being reported for the marine mammals (2014 monitoring reports) and the poorly developed guidance and methods for threshold values, the ongoing work focused on the regional coordination of setting threshold values in line with the MSFD requirements will contribute to the improve the coming assessments. Despite the lack of agreed methods to set thresholds and the very few thresholds that are available from other sources, the expert networks for the species groups have a dynamic to develop harmonised methods for testing and endorsement for the MSFD. The MS should support their experts working regionally and for the MSFD D1 expert networks, as this group can provide recommendations to fulfil MSFD, HD and RSC assessments and reporting.

1.1.5 Consistency of spatial coverage and assessment period

Objective: The MS reported the assessment period for each parameter per species and criterion. We analysed this information to explore potential discrepancies in the assessment at regional and criterion level that could potentially affect the comparability and consistency in the final assessment of each parameter (Table 14).

Data: This information is reported in column AT "assessment period" (Appendix 2, Art. 8 mammals).

Table 14: Assessment period per criterion and region based on which the MS performed the assessment of their parameters. The numbers indicate how many reported parameters have the same assessment period per criterion.

	2000-2017	2006-2016	2006-2017	2009-2018	2011-2016	2011-2017	2012-2016	2012-2017	2012-2018	2013-2017	2013-2018	2014-2018
BAL	**10**	**4**	**8**		**206**				**15**			
D1C1	2	1	2		33				3			
D1C2	2	1	2		58				3			
D1C3					44				3			
D1C4	4	1	2		46				3			
D1C5	2	1	2		25				3			
NEA		**4**	**8**	**16**	**129**	**94**	**8**	**40**	**173**			**15**
D1C1		1	2	4	25	15	1	10	38			2
D1C2		1	2	4	30	11	3	10	36			8
D1C3					22	33	1		33			3
D1C4		1	2	4	28	18		10	33			1
D1C5		1	2	4	24	17	3	10	33			1
MED					**5**	**64**		**16**	**25**		**9**	
D1C1					1	12		7	5		1	
D1C2					1	12		7	5		1	
D1C3					1	15			2		1	
D1C4					1	12		1	5		4	
D1C5					1	13		1	8		2	
BLK										**3**		
D1C1										3		

Findings: There is no harmonisation in the assessment period for most of the parameters assessed for each criterion, indicating that the assessments might not be fully comparable and might have different levels of uncertainty. Moreover, the 6-year assessment cycle is not reflected from the assessed parameters.

The pattern of the assessment periods at regional level (Table 14) corresponds to the assessments that the MS/contracting parties did for the RSC. This explains why most of the BAL and NEA assessments have data until 2016, or 2017 in some cases where the assessment was updated for the 2018 reporting. The influence from the HD is evident in the assessment period as well, where the MS used both a long time-series for trends (starting in 2000 or a bit later) and shorter time-series corresponding to the 6-year policy cycle.

Gaps: Once again, the MS used what was available in terms of data, indicators and assessments and did not report assessments adjusted to the MSFD requirements – the six-year assessment cycle in this case. Of course, longer data sets can provide more accurate estimates for threshold values or state assessment, however, in the requested duration should be six years and in line with the policy requirements. The different assessment periods might not provide comparable assessments and might not reflect the same volume of pressures to the species.

Recommendations for reporting: This information is crucial and well reported in terms of the provided information. However, the six-year period should be harmonised across the criteria used to ensure comparability, and consistency across the state assessment which should consider pressure and impact criteria assessments.

Recommendations for implementation: We should introduce in the discussion of the policy harmonisation that includes the harmonisation of the timing, a process to harmonise the regional assessments, as well. Otherwise, the assessment period will be an additional factor to the different parameters, methods, and thresholds that produce incomparable and inconsistent assessments.

1.1.6 Date when GES is expected to be achieved

Objective: The MS reported for each species group if it is in GES, or by when they expect to achieve GES. We analyse the reported information to identify the proportion of species that are in GES at regional level and when each species group could be in GES according to the MS.

Data: The information on the GES achievement or the expected date is in column AR (Appendix 2, Art. 8 mammals). For many species, the MS reported that the GES achievement date is unknown or not assessed (approx. 20% of the entries). The rest were included in the analysis. Achieving GES is the overall goal of the MSFD. In the structure of the reporting this entry corresponds to the assessment of parameters, which are integrated at the level of criterion and then the criteria are integrated at the level of species. The species are aggregated at the level of species groups and the field assessed here (GESachieved) is based on the feature (species group) for which the MS needs to specify what proportion of species in the group need to be in good status (GES extent threshold). Given the different methods of integration at both levels and the number of parameters or criteria that contributed to each assessment the final GES assessment/achievement might not be consistent yet.

Expected Outcome: The outcome will provide a quick overview of the proportion of species that are in GES and the provision for the GES achievement for the species group.

Table 15. GES status for marine mammals or provisional date of GES achievement as it was reported by each MS.

Species groups and species in BAL		GES achieved	GES expected to be achieved			Not assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Seals	*Halichoerus grypus*		LV, SE	EE	DE	LV	DK, FI, PL
	Phoca hispida botnica		FI, LV, SE	EE			FI
	Phoca vitulina		SE		DE		DK
Small	*Phocoena phocoena*				DE, FI	SE	DK, PL

cetaceans							

Species groups and species in NEA		GES achieved	GES expected to be achieved			Not assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Seals	*Halichoerus grypus*	DE, FR, IE	SE		NL		DK
	Phoca vitulina	DE, FR, IE, SE	SE		NL		DK
	Monachus monachus					PT	
Small cetaceans	*Delphinus delphis*				ES, FR	PT	PT (AMA)
	Globicephala macrorhynchus						PT (AMA)
	Globicephala melas					PT	
	Grampus griseus					PT	
	Lagerorhynchus albirostris				FR		
	Orcinus orca				ES		PT (AMA)
	Phocoena phocoena	IE			DE, ES, FR, NL	DK, PT, SE	BE
	Pseudorca crassidens						PT (AMA)
	Stenella coeruleoalba				FR	PT	PT (AMA)
	Stenella frontalis					PT	AMA: ES PT
	Steno bredanensis						PT (AMA)
	Tursiops truncatus	IE			ES, FR	PT	AMA: ES PT
Deep divers	*Globicephala macrorhynchus*					PT	ES (AMA)
	Globicephala melas	FR			ES		PT (AMA)
	Grampus griseus	FR					PT (AMA)
	Hyperoodon ampullatus						PT (AMA)
	Kogia breviceps					PT	PT (AMA)
	Mesoplodon bidens						PT (AMA)
	Mesoplodon europaeus						PT (AMA)
	Mesoplodon mirus						PT (AMA)
	Physeter macrocephalus					PT	AMA: ES PT
	Ziphius cavirostris				ES	PT	AMA: ES PT
Baleen whales	*Balaenoptera acutorostrata*	FR				PT	PT (AMA)

	Balaenoptera borealis						PT (AMA)
	Balaenoptera edeni					PT	AMA: ES PT
	Balaenoptera musculus						PT (AMA)
	Balaenoptera physalus	FR			ES	PT	PT (AMA)
	Megaptera novaeangliae						PT (AMA)

Species groups and species in MED		GES achieved	GES expected to be achieved			Not assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Seals	*Monachus monachus*	CY					
Small cetaceans	*Delphinus delphis*				ES	MT	
	Stenella coeruleoalba				ES, IT	MT	FR, HR
	Tursiops truncatus				ES, IT	MT, SI	HR
Deep divers	*Globicephala melas*				ES		
	Grampus griseus				ES		
	Physeter macrocephalus				ES		
	Ziphius cavirostris				ES		
Baleen whales	*Balaenoptera physalus*				ES, IT		

Species groups and species in BLK		GES achieved	GES expected to be achieved			Not assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Small cetaceans	*Delphinus delphis*						RO
	Phocoena phocoena						RO
	Tursiops truncatus						RO

Findings:

The seals in BAL are not in GES and the Baltic MS are not aligned regarding the date of GES achievement. This outcome is contradicted with the outcome of HELCOM (2018) at least for some species and sub-divisions. On the other hand, the seals in NEA are in GES, except for the populations in the NL, and DK where the GES status is unknown, which agrees with their assessments in the BAL.

The differences in the GES assessment from the MS referring to the same populations denotes the inconsistency of the methods or in the GES determination across them. In some cases, the inconsistency comes from the differences between Art. 8 and Art. 9 of the same MS. For instance, FR determined GES in a qualitative way, while for Art. 8 they provide many details including complete assessments and threshold values.

The rest of the marine mammals (apart from four species in the French waters) are reported as not in GES and the MS foresee to achieve GES after 2020 in NEA. Similar is the case in the MED and BLK where no species are in GES, mostly because the MS did not fully assess them. Moreover, in the MED many country reports are awaited and those analysed are not representative of the marine mammals' distribution. For instance, not all the countries where the Mediterranean seal occurs are included in the analysis (i.e., EL).

Gap: Many data gaps, as this entry requires consideration of several assessments and integration across parameters, criteria and species within each species group. The outcome is not representative of the status of GES in the European waters for marine mammals, as it was expected by the number of species assessed by the HD and by RSC in their roof reports.

Recommendations for reporting: The MS need to combine assessments of criteria and parameters to conclude on species (element) status and then assess if GES is achieved at species group level. This entry, which is at the species/parameter/criterion level, despite following the GES Decision structure corresponds to aggregated information of several lines at the reporting. As such, it might be easier for the MS to clarify the link of this entry with the aggregated information of the species group, rather than with each line that corresponds to parameters. Many MS conceived it in a different manner and reported inconsistent information e.g., assessment of criterion instead of species or no assessment at all, when the relevant parameter/criterion was not assessed.

Recommendations for implementation: This entry includes information close to ultimate MSFD scope, which is the GES achievement. All the work related with the harmonisation of methodological standards (thresholds, integration) can ensure a consistent and comparable assessment of species in the coming cycles. Contradicted assessment between MSFD, RSCs and HD should be avoided, like the seals in the Baltic. Most MS need to define GES extent threshold values, and to conclude on element status throughout and to report whether the species group in in GES. The underlying assessments need to be done to consistent standards so that the final assessment is meaningful.

1.1.7 Analysis of the integration methods across parameters and criteria

Objective: The integration rules are an essential part of the GES assessment. We analyse the reported information to identify potential patterns in the use of different rules, get an overview of the methods applied and reported and use this information for the ongoing debate on agreeing integration rules for D1 species.

Data: The MS reported the integration rules between parameters to inform the criterion level, and between criteria to inform the species level (Integration rule type parameter in column AK and Integration rule type criteria in column AM, respectively in Appendix 2, Art. 8 mammals).

Table 16. Integration rule type parameter for all criteria.

Species groups	Regions	Integration rule type by parameter			Species
		NHIE_NWEI	OOAO	Not relevant	

Seals	BAL	EE	FI, LV, PL, SE	DE, DK, LV	*Halichoerus grypus*
		EE	FI, LV		*Phoca hispida botnica*
				DE, DK, SE	*Phoca vitulina*
	NEA		FR, SE	DE, DK, NL	*Halichoerus grypus*
			FR, SE	DE, DK, NL	*Phoca vitulina*
Small cetaceans	BAL			DE, DK, PL, SE	
	NEA		FR	BE, DE, DK, ES, FR, NL	
	MED			ES, FR, HR, MT	
	BLK			RO	
Deep-diving cetaceans	NEA		FR	ES, FR	
	MED			ES	
Baleen whales	NEA		FR	ES, FR	
	MED			ES	

Table 17. Integration rule type criteria for all criteria

Species groups	Regions	Species	Integration rule type by parameter	
			OOAO	Not relevant
Seals	BAL	*Halichoerus grypus*	DK, EE, FI, LV, PL, SE, DE	LV
	MED	*Delphinus delphis*	ES	
		Stenella coeruleoalba	ES	FR
		Tursiops truncatus	ES	
	BLK			RO
Deep-diving cetaceans	NEA	*Globicephala macrorhynchus*		ES
		Globicephala melas	ES, FR	
		Grampus griseus	FR	
		Physeter macrocephalus		ES
		Ziphius cavirostris	ES	ES
	MED	*Globicephala melas*	ES	
		Grampus griseus	ES	
		Physeter catodon	ES	
		Ziphius cavirostris	ES	
Baleen whales	NEA	*Balaenoptera acurostrata*	FR	
		Balaenoptera edeni		ES
		Balaenoptera physalus	ES	FR
	MED	*Balaenoptera physalus*	ES	

Findings: For the parameters, EE was the only one reporting "Non-hierarchical, non-weighted averaging" (NHIE_NWEI) while the rest reported "One-Out-All-Out" (OOAO) (Table 16). Many MS reported "not relevant" when for each criterion only one parameter is assessed.

For the integration rules across criteria to the species (element) level all MS reported "One-Out-All-Out" (Table 17). The "not relevant" in this case correspond to species that have only one criterion assessed (e.g., the three cetaceans in the BLK). Exception for ES where the OOAO method has been applied directly in the case of primary criteria. In the case of secondary criteria, expert judgement has also been considered for integration.

Good practices: No variety in the reporting, so no option to be tested.

Gaps: A common agreed method for each level of integration to secure the consistency in the GES assessment and the level of environmental protection since the integration rules could affect the conclusion of the status assessment per species.

Recommendations for reporting: The integration rules are reported only once which helps the MS to avoid repeating the same information, and simplifies the reporting.

Recommendations for implementation: The debate on agreeing integration rules is still ongoing for several descriptors. For species, the MSFD biodiversity expert network is working to this direction and will continue testing and recommending the most promising methods for each species group (e.g., JRC124613 report: Integration methods for MSFD biodiversity assessments). The results should be reflected to the updates of the Art. 8 guidance.

1.2 Results of Art.9 analysis

1.2.1 GES determination levels

Objective: To get an overview of how the MS determined GES and explore possibilities to harmonise the GES determination.

Data: We analysed the GES description from the MS reports at the levels that were reported (column I in Appendix 2, D1-Art9).

Table 18. Analysis of the levels of detail provided by the MS in the GES determination by criteria and region.

GES component	Region	Descriptor	Criteria	Species group	Species	Threshold value
D1	BAL	DE	LV, PL			
	NEA	DE, FR	ES	PT		
	MED	CY, FR, SI	ES, IT			
	BLK		RO			
D1C1	BAL	DK	SE			FI, LT
	NEA	DK	DK, IE, SE			NL, PT
	MED	IT	HR, MT			
D1C2	BAL	DK	PL, SE		FI (small cet.)	EE, FI (seals), LT
	NEA	DK	BE, IE, SE		NL	PT
	MED	IT, MT	HR			
D1C3	BAL					FI (seals), LT
	NEA		PL, SE			PT
	MED		HR, MT(?)			
D1C4	BAL	DK	PL			EE, FI, LT
	NEA	DK	BE, IE, PT, SE			
	MED	MT	HR			
D1C5	BAL	DK			FI (seals)	
	NEA		BE, IE		NL	
	MED		HR			

Findings: MS have determined GES at the level of descriptor, criterion, species, and indicator (Table 18). There is no consistency in the GES determination at any level, even when it refers to the same species and criteria. The different levels of GES determination hinder the comparison of GES

achievement across the MS, as was also verified from the GES achievement reporting information for Art. 8 (section 2.6). Several reasons caused the inconsistency in the GES determination in Art. 9, including:

- The use of the GES determination of the 2012 reporting, not considering the details provided in Commission Decision (EU) 2017/848.

- The use of assessments from other sources (HD, RSC) which are species specific and MS determined GES at the level of the available assessments.

- Use of both GES Decisions, especially where the repealed one (Commission Decision 2010/477/EU) did not provide clarifications on the level of GES determination and on the grouping of the species groups no harmonised GES determination could be achieved across the MS.

- Qualitative determination was reported, since lack of data, of methods and of adequate/common understanding of GES could not support a quantified GES determination.

- Lack of regional coordination and common GES determination at regional or subregional level to deliver MSFD Art. 3(5). The established RSC' indicators are species oriented and provide useful means that could lead to the overall GES determination through the criteria. In the first MSFD cycle the MS put substantial effort to commonly developed these indicators, which was reflected to the increased harmonisation of several criteria at regional level. However, they did not manage to achieve the same level of harmonisation in the GES determination at regional level and per species groups. This step is essential and it should be prioritised to provide a common basis for a more holistic approach (i.e. pizza-satellite concept (SWD(2020) 62) to materialise the ecosystem approach to management and the DPSIR approach) as required by the MSFD. More indicators and coordination at regional level will facilitate the MSFD requirements if these are well interpreted through a common GES determination.

- Rarely is the GES determination informative enough for specific species groups.

Gaps: Lack of harmonisation caused by lack of common understanding of the level of where GES should be determined and lack of a common approach to provide a qualitative GES at regional level. This caused by the misinterpretation of the MSFD requirements in relation to the GES determination per Descriptor and using the two GES Decision (2010 and 2017) or reiteration of the 2010 GES determination ignoring the progress in the first MSFD cycle, which was well reflected in the 2017 GES Decision clarifying Art.9.

Recommendations for reporting: No recommendation, this information is crucial and well reported. Given that most MS provide long description of GES determination (from a sentence to paragraph) it could be helpful some of the characteristics that are evaluated to be reported separately. For instance, if the GES determination is qualitative or quantitative, and units for the quantitative determination (percentage, ratio), always as a drop-down selection to facilitate reporting. Eventually, when agreed GES determinations at regional level will be available, this fields could be automatically generated per region.

Recommendations for implementation: The assessment flow and the Art. 8 guidance should be the basis for building a common GES determination in a consistent way and agreeing how the GES will be reflected at the level of species group, indicators, criteria, and species. Since the MS invested considerable effort to harmonise methods for assessments, that improved the common understanding of the MSFD requirements, the follow up is to transfer this common understanding to the work for harmonising GES determination. Common integration rules and common agreed methods will bring consistency in all levels. The reporting tool should be developed accordingly, linking

GES determination to the proper level reducing and automatizing the reporting effort. Starting from the technical groups, and in this case from the biodiversity expert network, the experts could propose the basis for a quantitative GES determination for each species group, which later could be refined through the WG GES.

1.2.2 Comparability with legislation related to marine mammals at different scales

Most MS provided general descriptions at descriptor level, which in some cases are based on other policies or agreements (e.g., HD), however, more information on the policies come from Art. 8 reporting. MS made references to MSFD (FR, MT, PL) and HD (DE and DK). Particularly, DE provided a comprehensive overview of all the relevant legislation (e.g., WFD, ASCOBANS, HELCOM, OSPAR and national plans) used in its determination. NL was the only MS to specify threshold value source (ASCOBANS) next to the threshold value.

1.2.3 Analysis of adequacy of GES

The GES determinations for the MS reporting for two regions (NEA and MED) are quite vague and general, while at the descriptor and criteria levels they were more consistent.

Not all MS provided a GES determination by species group, partially justified using the 'Feature' field in the reporting template (Column G, in Appendix 2, D1-Art9). Only for seals and small cetaceans separate GES descriptions were reported. The general group 'All mammals' was reported only by DK and ES, despite they did not assess all species groups, while the other MS preferred reporting the species groups in different combinations according to what was reported under Art.8 across the regions and criteria.

Only FI provided different GES determinations between seals and small cetaceans for some criteria and at the most detailed level (including species and threshold values).

1.2.4 Consistency and adequacy of reported GES spatial coverage (when relevant; regional, national, MRU)

Most GES determinations were done at larger MRU/national waters scale. MRUs all grouped together (Column D, Appendix 2, D1-Art9), and GES determination covers more than one species groups (birds, mammals, reptiles, fish, and cephalopods). The combination of the reported MRUs and species at species groups and the varied levels of GES determination jeopardised the spatial harmonisation of GES determination, even for the same species group.

1.2.5 Justifications for delays in setting EU/regional thresholds and non-use of criteria

Delays:

MS declared two reasons for delayed reporting:

- Missing list of species and information on habitats (BE, FR, PT, SE).
- No agreed threshold values and indicators at regional level, stating in some cases to have measured values in the field, but do not have reference threshold values to assess the species status (DE, DK, FR).

Both issues are already prioritized, and on-going work is taking place at regional level and within the MSFD biodiversity expert network.

2. Marine reptiles

2.1 Marine reptiles result of Art.8 analysis

2.1.1 Consistency, comparability and adequacy of reported criteria elements and features assessed at EU and regional level

Objective: Which species are reported, by which MS per region, and which MS did not report species with distribution in their waters.

Data: We analyse the data reported in column G "Elements" per MS, subdivisions and regions in Appendix 2, Art. 8 turtles).

Expected Outcome: Overview of species reported (black), species that could be reported (blue) per MS, subdivisions and regions according to the spatial distribution. In red, MS that did not provide yet electronic reports. Grey cells correspond to regions or subdivisions where the species do not occur. Thus, it is easy to identify the species distribution from the white cells and the MS that either reported them or should have done so, but they did not.

Table 19. Marine turtles reported by the Member States and their geographical association with the MSFD regions and subdivisions.

Turtle species	NEA				MED			
	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL
Caretta caretta Loggerhead turtle			ES, PT, FR	ES, PT	ES, IT, FR	EL, IT, MT	EL, HR, IT, SI	CY, EL
Chelonia mydas Green turtle			ES, PT	ES, PT	ES, IT, FR	EL, IT, MT	IT	CY, EL
Dermochelys coriacea Leatherback turtle	UK	UK, IE, FR	ES, PT, FR	ES, PT	ES, FR	EL, IT, MT		CY, EL
Eretmochelys imbricate Hawksbill turtle				ES, PT				
Lepidochelys kempii Kemp's Ridley turtle				ES, PT				

Findings:

Species perspective:

Marine turtles (Table 19) occur in NEA and MED. Five MS from the NEA and eight from the MED have the obligation to assess marine turtles as they are all included in the HD Annexes. Three marine turtle species are in the coastal MS and five in AMA. Eventually three species were assessed from the MS that were analysed (the three on the top of Table 19) by seven MS (ES, MT, HR, CY, HR, SI, IT) out of the 10 that we were expecting to report. The outcome of the MSFD report is not representative to the distribution of the marine turtles and to their status. For the analysis of the marine turtles' distribution and population characteristics, it should be considered that these migratory species occurred in the

European seas, but occurrence might not always correspond to resident populations with well identified nesting sites and foraging grounds.

Gap: In this analysis we miss data from at least 30% of the MS that we expected to assess marine turtle species (UK, FR, EL) and many more at criterion level.

Recommendation for reporting: We would recommend the MS to report using the electronic format.

Recommendation for implementation: There is good knowledge of the distribution of species and of the predominant pressures in the literature and within the sea turtle expert group. However, the monitoring programmes are not well connected and consistent in generating information and there is lack of methods to assess the GES criteria and methods to set threshold values. The marine turtle GES group working under the MSFD biodiversity expert network started to analyse and combine available data and promising methods to cover the GES criteria. The recommendation from this expert group should be reflected in the update of the Art. 8 guidance.

Recommendation for methodological standards: The marine turtle GES group produced three workshop reports, to summarise the outcomes of the workshops that took place in 2019 and 2020, with the aim to develop and test methods to support the MSFD D1 criteria assessments. This group was officially established as an OSPAR expert group, however, includes many of the MSFD officially nominated experts and experts working for relevant organisations in the MED (ACCOBAMS, UNEP/MAP, SPA/RAC). Most of these experts are also contributing to the HD assessments. As such, the best way forward to achieve harmonisation across RSC and EU policies is to establish a single group of experts (in this case covering all the expertise needed and all the regional seas foreseen to be assessed) to provide scientific and technical recommendations and one assessment of marine turtles for all reporting obligations.

2.1.2 Extension in use of MSFD Criteria (primary and secondary) reported at EU, regional and (sub)regional level

Objective:

Table 20 provides a variety of information and overviews related with the progress of the assessments.

- Overview of the use of primary and secondary criteria. The number in each cell indicates the number of member states reported each criterion out of the total number of MS reported for each species.

- Overview of the species assessments and threshold values per criterion and region. The traffic light approach (green, orange, red) corresponds to the level of assessment of the parameters for each criterion and species, including the report of threshold values. Green: Indicates that for those criteria a complete assessment has been done by comparing the threshold value with the achieved value. Orange: Indicates that either a threshold value is available or the

achieved value (estimated parameter), so assessment is not complete. Red: Indicates that no threshold value or achieved value are reported.

- Overview of the assessed parameter for each species and criterion. The bold borders around the cells indicate those species and criteria for which the achieved parameter has been reported (either negative or positive).

Data: The reported information in column N (in Appendix 2, Art. 8 turtles) was used for the use of the criteria. The species assessment was based on the information in columns Q, R, S and V. The overview of the assessed parameters was based on the information in column AD. The assumption for the traffic light approach is that the any reported category was aggregated to the higher level, so if only one MS provided threshold value and value achieved for a single species and in a single MRU, this is assigned to the species and region or subdivision. We assume that all MS in the same region or subdivision should have available methods to perform a similar assessment.

Table 20. Reported threshold values and/or estimated parameters are shown for each species and criterion as: i) green, for those criteria with both the threshold value and the value achieved reported, ii) orange, when either a threshold value is available, or the value achieved (estimated parameter), so assessment is not complete, and iii) red, when neither threshold values nor values achieved are reported. The numbers reflect the MS that reported each criterion to allow for an overview of the usage between primary against secondary criteria. The bold-framed cells show the criteria of the species that were reported to have a final assessment (positive or negative).

NEA Turtles		D1C1 primary	D1C2 primary Use BD	D1C3 secondary	D1C4 secondary Use BD	D1C5 secondary
ES, PT, IE	*Caretta caretta*	1/2	1/2	2/2	1/2	1/2
	Chelonia mydas	1/2	1/2	1/2	0/2	0/2
	Dermochelys coriacea	0/3	1/3	0/3	1/3	1/3

MED Turtles		D1C1 primary	D1C2 primary Use BD	D1C3 secondary	D1C4 secondary Use BD	D1C5 secondary
ES, HR, MT, CY, IT, SI	*Caretta caretta*	1/6	5/6	1/6	4/6	5/6
CY	*Chelonia mydas*	0/1	1/1	0/1	0/1	0/1

Findings:

Use of primary and secondary criteria: Secondary criterion (D1C3) was reported and is informative for the marine turtles' populations. One out of six MS in the MED and two out of three in NEA reported this criterion, however, the MS did not discriminate between primary and secondary, but they reported what was available.

Species assessments and threshold values per criterion and region: Very limited information is reported based on projects (MISTIC SEAS) or publications that set threshold at local populations (e.g., ES). There is no coordination for the threshold values setting.

Assessed parameter for each species and criterion: The expected parameters were reported for the three species and in the MED a MS reported that all parameters were assessed for both species and criteria, however without providing details on thresholds and achieved parameters.

Good practices: The marine turtle GES group working under the MSFD biodiversity expert network started to analyse and combine available data and promising methods to cover the GES criteria. For this process, the reported information was also considered, however the reported parameters and thresholds do not seem to be aligned with the recommendations of the group.

Gap: There are gaps in data and spatial coverage of the marine turtles in both the NEA and MED. Experts got together for the first time to combine data and explore the possibility to provide assessment at regional or subdivisional level. The marine turtles require assessments at regional (or subdivisional) as highly mobile species with migratory corridors. As such, the assessments and monitoring should be coordinated across neighbouring MS.

Recommendations for reporting: The structure of the reported information is clear and informative. No recommendations.

Recommendations for implementation: Some methodological gaps could be covered by the ongoing work of the GES turtle expert network. These gaps related with agreed methods for the assessment of relevant parameters (distribution, abundance, population characteristics and bycatch). Bycatch monitoring should be enhanced and better coordinated with the CFP monitoring and reporting. In addition, marine turtles are well linked with specific habitats, either for nesting or for foraging, so the habitats for the species (D1C5) is essential for their assessment as shown in the reports, despite being a secondary criterion. Monitoring of these habitats could contribute to the overall species assessment and increase the causal link between populations' state and pressures. Data gaps should be considered in the updates of the monitoring programmes, however, to test potential methods and extract threshold values, only available data are used. As such, the process is still very data driven, despite their limited sources. Combination of different data sets for marine turtles' abundance and distribution proved very useful for the population assessments, especially for such highly mobile species. Support from RSC and MS is required to keep the group of experts active.

2.1.3 Marine reptile parameters and thresholds

Objective: Provide an overview of the reported threshold values (Table 21) and compare them with those that are developed by the RSC or other organisations (e.g., ASCOBANS) and legislations.

Data: We analyse the data reported in columns Q, R and S for threshold values (in Appendix 2, Art. 8 turtles).

Table 21. Overview of the reported threshold values per criterion and the assessments and trends that come from other policies and RSCs. Red denotes no threshold values agreed or reported at regional level, green denotes existing threshold values (not the case for marine turtles) and light green refers to thresholds reported for the Habitats Directive. D1C3 is a secondary criterion for marine reptiles

Species group	**Criteria**	OSPAR	HELCOM	UNEPMAP / BARCON	HD	**No source reported**
Reptiles - turtles	D1C1	-	N/A		N/A	0.2: MOR/F (ES) Stable or declining trend (MT, CY)
	D1C2	-	N/A			Number of individuals (ES, CY) 2.6 individuals/Km^2 (ES)

						National TV – MISTIC SEA II: ABU (ES)
	D1C3	-	N/A		N/A	1.76 – MISTIC SEA II: Body Condition Index (ES)
	D1C4	-	N/A			100.0: Distribution Range (ES)
	D1C5	-	N/A			100%: Extent and Habitat Condition (ES)

Findings: The four turtles are included in the HD Annexes and are assessed under the UNEP/MAP. There are HD assessments available, which were reused for the MSFD by some MS (MT and CY). No regional agreements or agreed values exist at the RSCs for marine turtles. All the reported threshold values are coming from the scientific literature based on local and species-specific studies.

Gap: There is no regional coordination for thresholds and agreed methods for threshold values. Only UNEP/MAP has indicators for turtles, but not agreed quantitative thresholds.

Recommendations for reporting: The structure of reporting of the threshold values was efficient and achieved detailed collection of all necessary information for a comprehensive understanding of the estimation and use of the thresholds. The lack of information though could not provide good practices and cover all species and criteria.

Recommendations for implementation: Once again, the methodological gaps could be covered by the ongoing work of the GES turtle expert network. The MS should support the experts working on this.

2.1.4 Consistency of spatial coverage and assessment period

Objective: The MS reported the assessment period for each parameter per species and criterion. We analysed this information to explore potential discrepancies in the assessment at regional and criterion level that could potentially affect the comparability and the consistency in the final assessment of each parameter.

Data: This information is reported in column AT “assessment period” (in Appendix 2, Art. 8 turtles).

Findings: The eight MS reported for marine turtles, assigned assessment periods each criterion and species, however, given the lack of data, there is not any logical assumption that could be made for the selection of the assessment period, with very few exemptions where values were reported. In any case, the assessment period is not consistent, which is expected to be in order to achieve comparable assessment, at least regionally.

Recommendations for reporting: No recommendation, this information is crucial for the evaluation of the assessments.

Recommendations for implementation: No recommendation since there are not enough data to analyse. MS should try to harmonise the assessment periods, otherwise the assessments might not be comparable.

2.1.5 Date when GES is expected to be achieved

Objective: The MS reported for each species if it is in GES, or when they expect to achieve GES. We analyse the reported information to identify the proportion of species that are reported to be in GES at regional level and when most of the species in each species groups could be in GES according to the MS.

Data: The information of the GES achievement or the expected date is in column AR (Appendix 2, Art. 8 turtles). For many species, the MS reported that the GES achievement date is unknown or not assessed (approx. 60% of the entries). The rest were included in the analysis.

Expected Outcome: Achieving GES is the overall goal of the MSFD. In the structure of the reporting this entry corresponds to the assessment of parameters, which are integrated at the level of criterion and then the criteria are integrated at the level of species. The species are aggregated at the level of species groups and the field assessed here (GES achieved) is based on the feature (species group) for which the MS needs to specify what proportion of species in the group need to be in good status (GES extent threshold). Given the different methods of integration at both levels and the number of parameters or criteria that contributed to each assessment, the final GES assessment/achievement might not be consistent yet. The outcome will provide a quick overview of the proportion of species that are in GES and the provision for the GES achievement for the species group.

Table 22. GES status for marine reptiles or provisional date of GES achievement as it was reported by each MS.

GES assessment D1 NEA	GES achieved	GES expected to be achieved by 22	GES expected to be achieved later than 22, Article 14 exception reported	GES expected to be achieved later than 22, no Article 14 exception reported	Not assessed	Unknown
Caretta caretta					1 (PT)	2 (PT, ES)
Chelonia mydas						2 (PT, ES)
Dermochelys coriacea					1 (PT)	3 (PT, ES, IE)

GES assessment D1 MED	GES achieved	GES expected to be achieved by 22	GES expected to be achieved later than 22, Article 14 exception reported	GES expected to be achieved later than 22, no Article 14 exception reported	Not assessed	Unknown
Caretta caretta	2 (MT, CY)		1 (IT)		1 (SI)	2 (ES, HR)
Chelonia mydas	1 (CY)					

Findings: The GES achievement is either unknown or not assessed for all species in NEA (Table 22). However, in the MED two MS reported that GES is achieved for Loggerhead turtle (*Caretta caretta*) and one MS for the green turtle (*Chelonia mydas*). Considering the reported assessments for marine turtles in the two regions, it is obvious that the GES achievement is not similarly interpreted and supported by the MS.

Gap: Gaps exist in data, understanding of GES, and methods to assess GES.

Recommendations for reporting: See the recommendation for mammals (section 2.6). The marine turtles' reports do not provide enough information to formulate specific recommendations.

Recommendations for implementation: Once again, the methodological gaps and the GES understanding could be covered by the ongoing work of the GES turtle expert network. The MS should support the experts working on this. Monitoring gaps should be considered in the updates of the monitoring programmes pursuant to MSFD Art.11 and their updates (Art. 17).

2.1.6 Analysis of the integration methods across parameters and criteria

Objective: The integration rules are an essential part of the GES assessment. We analyse the reported information to identify potential patterns in the use of different rules, get an overview of the methods applied and reported and use this information for the ongoing debate for agreed integration rules for D1 species.

Data: The MS reported the integration rules between parameters to inform the criterion level, and between criteria to inform the species level (Integration rule type parameter in column AK and Integration rule type criteria in column AM, respectively in Appendix 2, Art. 8 turtles).

Findings: MS are reported for the integration between criteria. No information for parameters integration was reported.

MT used the HD approach: "The Habitats Directive (Council Directive 92/43/EEC) integration method was applied. Since three of the four criteria were assessed and all three were determined to be good/stable, turtles as represented by *C. caretta* in Maltese waters as part of the marine sub-region can be considered to be in good status. Integration at species level was not required since *C. caretta* is the only species representing marine reptiles in Maltese waters."

ES for the AMA did not integrate: "*The results of the evaluation of marine mammals in the MISTIC SEAS 2 project have not been integrated because it was considered inadequate or, at least, premature, with the current level of information and knowledge*."

ES for ABI and MWE they use Hierarchical non weighting average: "*HIE_NWEI: If a primary criterion cannot be assessed for a species due to a lack of data then the resultant assessment of that criterion for the species cannot be assigned a status (i.e. it is 'not assessed'). Where the species is only assessed with the primary abundance criterion, if data are missing for this criterion, the species cannot be assigned a status. It also means that the Member State should take action on monitoring and assessment tools to ensure that at the next update under Article 8 MSFD an assessment can be undertaken.*"

PT promote a One-Out-All-Out approach. "…a *reliable and robust integration method if the state of each element, criterion, indicator could be evaluated with a very high degree of confidence, which rarely happens. The large knowledge gaps associated with the evaluation of each element and metric lead to a high probability of degrading the evaluation of the true general environmental state, and an overly conservative global assessment*."

Gaps: No coordination even within the same country.

Recommendations for reporting: Not enough information to provide recommendation.

Recommendations for implementation: The debate for agreed integration rules is in progress for several descriptors. For species, the MSFD biodiversity expert network is working to this direction and will continue testing the most promising methods. However, the fact that the three MS that reported integration rules for criteria promoted different methods is indicative for the need of coordinated work to agree on common integration rules across criteria. The lack of data will, however, delay the progress of a harmonised/agreed approach, since testing is not possible.

2.2 Results of Art.9 analysis for D1 marine reptiles

2.2.1 GES determination levels

Objective: To get an overview of how the MS determined GES and explore possibilities to harmonise GES determination.

Data: We analysed the GES description from the MS reports at the levels that were reported (column I, Appendix 2, D1-Art9).

Table 23. Level of GES determination and examples of GES description. The count of entries corresponds to the total number of ecosystem component per MS and subregion for which GES was determined for D1 or its criteria. This is indicative to the variety of GES descriptions.

Levels of GES determination	MS	Examples of GES description
Descriptor	1 IT	The marine species listed in the Habitats Directive, the Birds Directive and in the SPA / BD protocol of the Barcelona Convention maintain or achieve a satisfactory conservation status.
Criteria	3 MT, HR, SI	The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long- term viability is ensured.
Species group	1 MT	Area of the habitat of marine reptiles in Maltese waters is stable or increasing and habitat quality is suitable for the long-term survival of the species.
Species	1 ES	The corresponding sea demarcation does not act as a sink for any of the source populations.
Indicators	-	-
No determination	5	Blank: no GES description
Total entries	**9**	

Findings: MS have determined GES at the levels of descriptor, species group and species (Table 23). There is no consistency in the GES determinations at any level, even when they refer to the same species. The different levels of GES determination jeopardise the comparison of GES achievement across the MS. From the eight MS reported for marine turtles only three reported GES determination for this species group. The lack of data, thresholds values and operational indicators were reported to justify no determination. Several reasons caused the inconsistency in the GES determination, which are listed in section 3.1. The lack of information in the Art. 9 did not allow to assess possible qualitative and quantitative ways to harmonise GES determination and threshold values related with GES determination.

Gaps: Lack of harmonisation caused by lack of common understanding and misinterpretation of the MSFD requirements in relation to the GES determination per Descriptor. This should be also clarified across the Descriptors and following the ecosystem approach to the assessment linking State with Impact and Pressures (DPSIR). The lack of data, thresholds values and operational indicators were reported to justify no GES determination by five out of the eight MS.

Recommendations for reporting: This information is crucial and well reported. Maybe if we break down the detailed description of GES to more detailed entries more information could be extracted,

as those MS that reported GES description usually provide long text. However, this needs further discussion and is relevant with the harmonisation of GES at descriptor level.

Recommendations for implementation: The assessment flow and the Art. 8 guidance should be the basis for clarifying the GES determination in a consistent way. It should be clarified how the GES will be reflected at the level of species groups indicators, criteria, and species. Common integration rules and common agreed methods will bring consistency in all levels. The reporting tool should be developed accordingly, linking GES determination to the proper level reducing and automatizing the reporting effort. The experts developing the methodological standards should contribute to the GES determination for marine turtles and provide quantitative description, consistent across regions and across populations of the same species.

3. Seabirds

3.1 Seabirds results of Art.8 analysis

3.1.1 Consistency, comparability and adequacy of reported criteria elements and features assessed at EU and regional level

Objective: Which species are reported, by which MS per region, and which species were not reported, despite that they are included in RSCs lists or EU policies.

Data: We analyse the data reported in column G "Elements" per MS, subdivisions and regions (Appendix 2, Art.8 birds).

Expected Outcome: This analysis provides an overview of the reported species (black font), species that were reported in 2012 but not in 2018 (blue) per MS, subdivisions and regions. In red are the species reported in 2012 from MS that did not provide electronic reports in 2018 and thus were not included in the analysis. Grey cells correspond to regions or subdivisions where there is no information from the reporting. For birds, Table 24 does not correspond to the species spatial distribution, but only to the reported information, either in 2012 or in 2018, in contrast with the marine mammals' Table 2. This change was made because of the number of seabird species compared with the marine mammals and the difficulty to associate their spatial distribution on the table. Some species were reported in more than one species groups, depending on where the national experts allocated them.

Table 24. Seabirds reported by the evaluated Member States and their geographical association with the MSFD regions and subdivisions. In blue species that were reported in 2012, but not in 2018 and in red species that were reported in 2012 by MS that did not provide e-reports in 2018 and thus were not included in the evaluation.

Benthic bird species	BAL	NEA				MED				BS
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
Aythya ferina Common pochard	DE, DK, EE, PL, SE	DK, NL, SE								
Aythya fuligula Tufted duck	DE, DK, EE, PL, SE	DK, NL, SE								
Aythya marila Greater scaup	DE, DK, EE, PL, SE	DK, NL								
Bucephala clangula Common goldeneye	DE, DK, EE, LT, PL, SE	DK, NL, SE								
Clangula hyemalis Long-tailed duck	DE, DK, LT, SE	DK, NL, SE								
Gavia arctica* Black-throated diver						IT	IT	IT		
Gavia stellate* Red-throated loon or diver						IT	IT	IT		
Melanitta fusca Velvet scoter	DE, DK, EE, LT, PL, SE	DK, NL, SE				IT		IT		
Melanitta nigra Common scoter	DE, DK, LT, SE	BE, DE, DK, NL, SE		PT		IT	IT	IT		
Melanitta spp.		BE								
Mergus serrator* Red-breasted merganser						IT	IT	IT		
Phalacrocorax aristotelis* European shag						IT		IT		
Podiceps nigricollis *black-necked grebe*						IT	IT	IT		
Polysticta stelleri Steller's eider	EE, LT									

Somateria mollissima Common eider	DE, DK, EE, LT, PL, SE	BE, DE, DK, NL, SE				IT		IT		
Benthic-feeding birds (grouped)	FI, LV									
Somateria spectabilis *King eider*	Reported in OSPAR									

Grazing bird species	**BAL**	**NEA**				**MED**				**BS**
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
Anas acuta Pintail	DE, DK, PL	DE, DK								
Anas clypeata* Shoveler	DK	DE, DK								
Anas crecca* Teal	SE	SE								
Anas Penelope Widgeon	DE, DK, PL, SE	DE, DK, NL, SE								
Anas platyrhynchos Mallard	DE, DK, EE, PL, SE	BE, DE, DK, NL, SE								
Anser albifrons Greenland white-fronted goose	DK	DK, NL								
Anser anser Greylag goose	DE, DK, EE, PL, SE	DK, SE								
Branta bernicla Brent goose		DE, NL								
Branta canadensis Canada goose	DK, SE	DK, SE								
Branta leucopsis Barnacle goose	DK, EE, PL, SE	DK, NL, SE								
Cygnus bewickii Bewick's swan	DE	NL								
Cygnus columbianus Tundra swan	DK, PL	DK								
Cygnus cygnus Whooper swan	DE, DK, EE, PL, SE	DK, NL, SE								
Cygnus olor Mute swan	DE, DK, EE, PL, SE	BE, DK, NL, SE								
Fulica atra Coot	DE, DK, EE, PL, SE	DK, NL, SE								
Grazing birds (grouped)	FI, LV									
Anser erythropus Lesser white-fronted goose	Reported in HELCOM									
Branta ruficollis Red-breasted Goose	Reported in OSPAR and in BS protocol									

Pelagic bird species	**BAL**	**NEA**				**MED**				**BS**
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
Alca torda Razorbill	DE, DK, PL, SE	BE, DE, DK, NL, SE	FR	FR						
Bulweria bulwerii Bulwer's petrel					ES					
Calonectrs borealis Scopoli's shearwater				ES	ES	ES				
Cepphus grille Black guillemot	DE, DK, PL, SE	BE, DK, SE								

Fratercula arctica Puffin		BE, DE, NL	FR							
Fulmarus glacialis* Northern fulmar			IE							
Gavia arctica* Black-throated diver	DE, DK	DE, DK,								
Gavia stellate* Red-throated loon or diver	DE, DK, SE	DE, DK, SE								
Gavia sp.		BE								
Hydrobates (Oceanodroma) castro* Band-rumped storm-petrel					ES					
Mergellus albellus Smew	DE, DK, EE, PL, SE	DK, NL, SE								
Mergus merganser Common merganser/goosander	DE, DK, EE, PL, SE	DK, NL, SE								
Mergus serrator* Red-breasted merganser	DE, DK, EE, PL, SE	BE, DE, DK, NL, SE								
Morus bassanus Northern gannet		BE, DE, FR, NL	FR, IE	ES, FR		FR				
Pelagodroma marina* White-faced storm petrel					ES					
Phalacrocorax aristotelis* European shag		BE, FR, NL	FR	ES, FR		ES, FR		HR, IT		
Phalacrocorax carbo Great cormorant	DE, DK, EE, PL, SE	BE, DE, DK, FR, NL, SE	FR	FR		FR				
Phalacrocorax pygmeus Pygmy cormorant								HR		
Podiceps auritus Slavonian grebe	DE, SE	NL, SE								
Podiceps cristatus Great crested grebe	DE, DK, EE, PL, SE	BE, DK, NL, SE								
Podiceps grisegena Red-necked grebe	DE, DK	DK								
Puffinus lherminieri Audubon's shearwater					ES					
Puffinus mauretanicus * Balearic shearwater		UK	UK	ES		ES				
Puffinus yelkouan * Mediterranean or Yelkouan shearwater							MT			
Rissa tridactyla* Black-legged kittiwake			IE							
Sterna hirundo * Common tern					ES					
Uria aalge Common guillemot	DE, DK, PL, SE	BE, DE, DK, NL, SE	FR	ES, FR						
Pelagic-feeding birds (grouped)	FI, LV									
Ceryle rudis Pied kingfisher	Reported in UNEPMAP									
Gavia immer *Great northern loon*	Reported in OSPAR									
Halcyon smyrnensis White-throated kingfisher	Reported in UNEPMAP									
Pelecanus crispus Dalmatian Pelican washing	Reported in UNEPMAP and in BS (BLK)									
Sterna bengalensis Lesser crested tern	Reported in UNEPMAP									
Uria aalge ibericus Iberian guillemot	Reported in OSPAR									

Uria lomvia Brünnich's guillemot	Reported in OSPAR

Surface feeding bird species	BAL	NEA				MED				BS
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
***Anas clypeata** * Shoveler		NL								
Calonectris diomedea borealis Cory's shearwater				ES		ES				
Calonectris diomedea diomedea Scopoli's shearwater				ES	ES	ES, FR	MT	HR		
Chlidonias niger Black tern	DK	DK								
Fulmarus glacialis* Northern fulmar		BE, DE, FR, NL	FR	FR						
Gelochelidon (Sterna) nilotica Gull-billed tern				PT		FR				
Haliaeetus albicilla White-tailed sea-eagle	PL									
Hydrobates (Oceanodroma) castro* Band-rumped storm-petrel				PT	PT					
Hydrobates monteiroi *Monteiro's storm petrel*					PT					
Hydrobates pelagicus European storm petrel			FR	ES, FR, PT		ES, FR, IT	IT, MT	IT		
Hydrocoloeus minutus Little gull	DK	BE, DE, DK								
Hydroprogne caspia Caspian tern	DE, EE, PL, SE	SE								
***Larus argentatus** * Herring gull	DE, DK, EE, PL, SE	BE, DE, DK, FR, NL, SE	FR	FR						
Larus audouinii (Ichthyaetus audouinii) Audouin's gull				PT		ES, FR, IT	IT, EL	EL, HR, IT	EL	
***Larus canus** * Common gull	DE, DK, EE, PL, SE	DE, DK, FR, NL, SE								
Larus fuscus * (Subsp. Graellsii and intermedius) Lesser black-backed gull	DE, DK, EE, PL, SE	BE, DE, DK, FR, NL, SE	FR	FR, PT						
Larus genei Slender-billed gull						FR				
Larus marinus Great black-backed gull	DE, DK, EE, PL, SE	BE, DE, DK, FR, NL, SE	FR	FR						
Larus melanocephalus Mediterranean gull	DK	BE, DE, DK, FR, NL		FR, PT		ES, FR				
Larus michahellis* Yellow-legged gull				FR, PT		FR				
Larus ridibundus* Black-headed gull	EE, PL, SE	BE, DE, FR, NL, SE		FR		FR				
Oceanodroma leucorhoa Leach's storm petrel				PT						
Pelagodroma marina* White-faced storm petrel					PT					
***Puffinus mauretanicus** * Balearic shearwater		UK	UK	FR						
Puffinus puffinus Manx shearwater			FR	FR						

Surface feeding bird species	BAL	NEA				MED				BS
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
***Puffinus yelkouan** **</br>Mediterranean or Yelkouan shearwater						FR		HR		
Rissa tridactyla* </br>Black-legged kittiwake	DK	BE, DE, DK, FR, NL, UK	FR, UK	ES, FR, PT						
Stercorarius parasiticus </br>Arctic skua	SE	BE, DE, NL, SE		FR						
Stercorarius pomarinus </br>Pomarine skua		DE								
Stercorarius skua </br>Great skua		BE, DE, NL		FR, PT						
Sterna dougallii </br>Roseate tern		BE, FR, NL, UK	FR, UK	FR	PT					
Sterna hirundo * </br>Common tern	DE, DK, EE, PL, SE	BE, DE, DK, FR, NL, SE	FR	ES, FR, PT	PT	ES, FR		SI		
Sterna paradisaea </br>Arctic tern	DE, DK, EE, PL, SE	BE, DE, DK, NL, SE								
Sterna sandvicensis </br>Sandwich tern	DE, DK, EE, PL	BE, DE, DK, FR, NL	FR	FR, PT		ES, FR		IT		
Sternula albifrons </br>Little tern	DE, DK, EE, PL	BE, DE, DK, NL		ES, PT		ES		SI		
Surface-feeding birds (grouped)	FI, LV									
Larus armenicus </br>Armenian gull	Reported in UNEPMAP									
Larus minutus </br>Little gull	Reported in OSPAR									
Pagophila eburnean </br>Ivory gull	Reported in OSPAR									
Pandion haliaetus </br>Osprey	Reported in UNEPMAP and in BS									
Panurus biarmicus </br>Bearded Reedling	Reported in BS									
Phalaropus fulicarius </br>Grey phalorope	Reported in OSPAR									
Phalaropus lobatus </br>Red-necked phalarope	Reported in OSPAR									
Stercorarius longicaudus </br>Long-tailed skua	Reported in OSPAR and in UNEPMAP									
Stercorarius pomarinus </br>Pomarine skua	Reported in OSPAR and in UNEPMAP									
Sterna caspia </br>Caspian tern	Reported in WB, in OSPAR and in HD Annex II									

Wading bird species	BAL	NEA				MED				BS
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
Actitis hypoleucos </br>Common sandpiper	SE	SE								
Anas crecca * </br>Teal	DE, DK, PL	DK								
Arenaria interpres </br>Ruddy turnstone	DK, EE, PL, SE	DE, DK, NL, SE								
Calidris alba </br>Sanderling	DK	DE, DK, NL								
Calidris alpina </br>Dunlin/Greenland dunlin	DE, DK, EE, PL	DE, DK, NL								
Calidris canutus </br>Red knot	DK	DE, DK, NL								

Wading bird species	BAL	NEA				MED				BS
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
Calidris ferruginea Curlew sandpiper		NL								
Calidris maritima Purple sandpiper	DK	DE, DK, NL								
Charadrius alexandrines Kentish Plover	DK	BE, DE, DK, NL								
Charadrius hiaticula Ringed plover	DE, DK, EE, PL, SE	BE, DE, DK, NL, SE								
Egretta garzetta Little egret		NL								
Haematopus ostralegus Oystercatcher	DE, DK, EE, PL, SE	BE, DE, DK, NL, SE								
Larus argentatus* Herring gull		BE								
Larus canus* Common gull		BE								
Larus fuscus* Lesser black-backed gull		BE								
Larus michahellis* Yellow-legged gull								SI		
Larus ridibundus* Black-headed gull								SI		
Limosa lapponica Bar-tailed godwit	DK	DE, DK, NL								
Limosa limosa Black-tailed godwit		DE, NL								
Numenius arquata Curlew	DK	DE, DK, NL								
Numenius phaeopus Whimbrel		DE, NL								
Philomachus pugnax Ruff	DE, DK	DK, NL								
Platalea leucorodia Eurasian spoonbill	DK	BE, DE, DK, NL								
Pluvialis apricaria Golden plover	DK	DE, DK, NL								
Pluvialis squatarola Grey plover	DK	DE, DK, NL								
Recurvirostra avosetta Pied avocet	DE, DK, EE, PL	BE, DE, DK, NL								
Tadorna tadorna Shelduck	DE, DK, EE, PL, SE	BE, DE, DK, NL, SE								
Tringa erythropus Spotted redshank		DE, NL								
Tringa glareola Wood sandpiper	DK	DK								
Tringa nebularia Greenshank		DE, NL								
Tringa totanus Redshank	DK, SE	DE, DK, NL, SE								
Vanellus vanellus Lapwing	DK	DE, DK, NL								
Wading birds (grouped)	FI, LV									
Charadrius leschenaultii columbinus Greater sand plover	Reported in UNEPMAP									
Ciconia nigra Black stork	Reported in BS biodiversity									
Himantopus himantopus	Reported in OSPAR and in BS biodiversity									

Wading bird species	BAL	NEA				MED				BS
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
Black-winged stilt										
Numenius tenuirostris *Slender-billed* curlew	Reported in UNEPMAP and in BS									
Phoenicopterus ruber American flamingo	Reported in UNEPMAP, BS									
Plegadis falcinellus Glossy ibis	Reported in BS									

Additional species previously reported in the reference list, belonging to a different species group from those included in MSFD assessment:

Bird of prey	BAL	NEA				MED			
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL
Falco eleonorae Common sandpiper								HR	

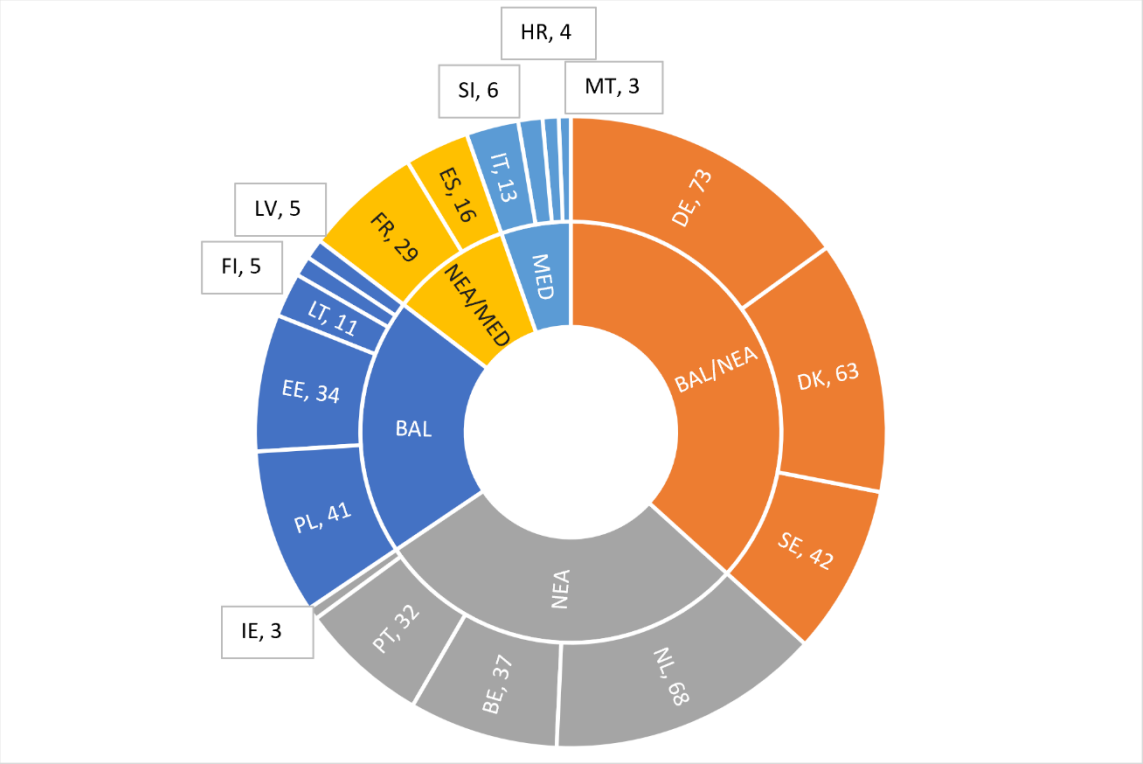


Figure 7. Number of seabird species reported by MS in the outer cycle, grouped by their regions (inner cycle and same colour).

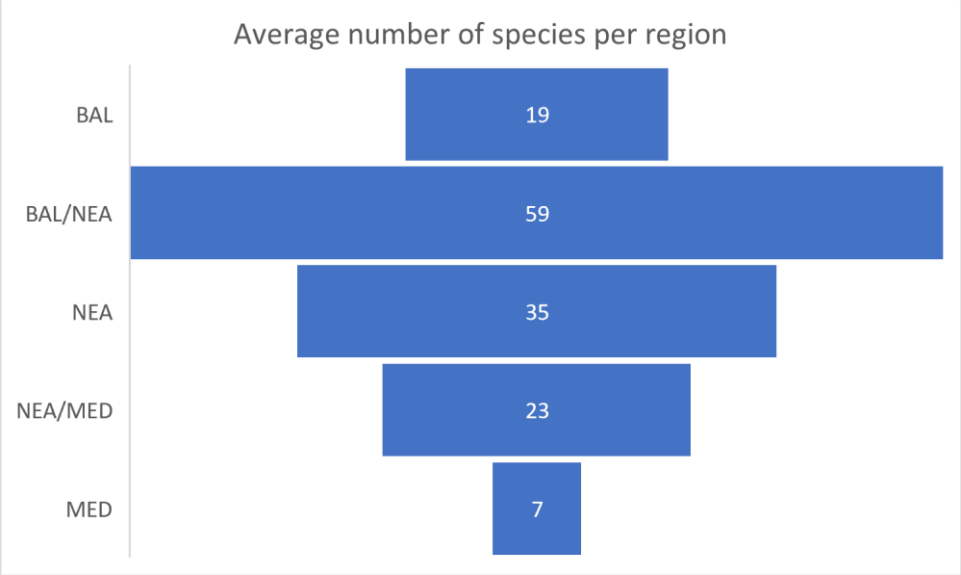


Figure 8. Average number of seabird species reported per region. BAL/NEA and NEA/MED include those MS with jurisdiction in both areas, namely DK, DE and SE for the first group and FR and ES for the second, respectively.

Findings:

It is obvious from Table 24 that there is significant harmonisation in the species reported from the Baltic and the NEA (ANS) MS. The rest of the regions and subdivisions seems to have considerably less seabird species, according to the reporting. This is caused because of the lack of MS in the eastern (EL) part of the MED and in the BLK (BG) to report electronically. Moreover, it is well known that very few seabirds are monitored in the BLK and MED (especially when these numbers are compared with the Northern part of Europe), which well reflected in Figure 8. For instance, MT reported three species and HR four species, compared with 45 species reported by DE only for BAL. Table 24 also includes some seabirds that were not reported by the MS but are included in assessments or lists of RSCs. This was done to facilitate the MS to explore the inclusion of such species in the future monitoring programmes and assessments.

Some inconsistencies were observed in the reporting of species. In the BAL, FI and LV reported only species groups, without specified element (e.g., grouped Benthic-feeding birds). Some MS have grouped the species in the same family and only reported the family e.g., Gavia sp.

Good practices: The Joint Birds Working Group (WGBIRD) has achieved a high level of harmonisation in the OSPAR and HELCOM areas and lead the way for harmonising thresholds and methods for assessments. The results are well reflected in the MS reports in those regions.

Gap: Even from the analysis of the monitoring reports of the 2014 was evident that there is a huge gap in data and regular monitoring programmes for seabirds in the MED and in the BLK (

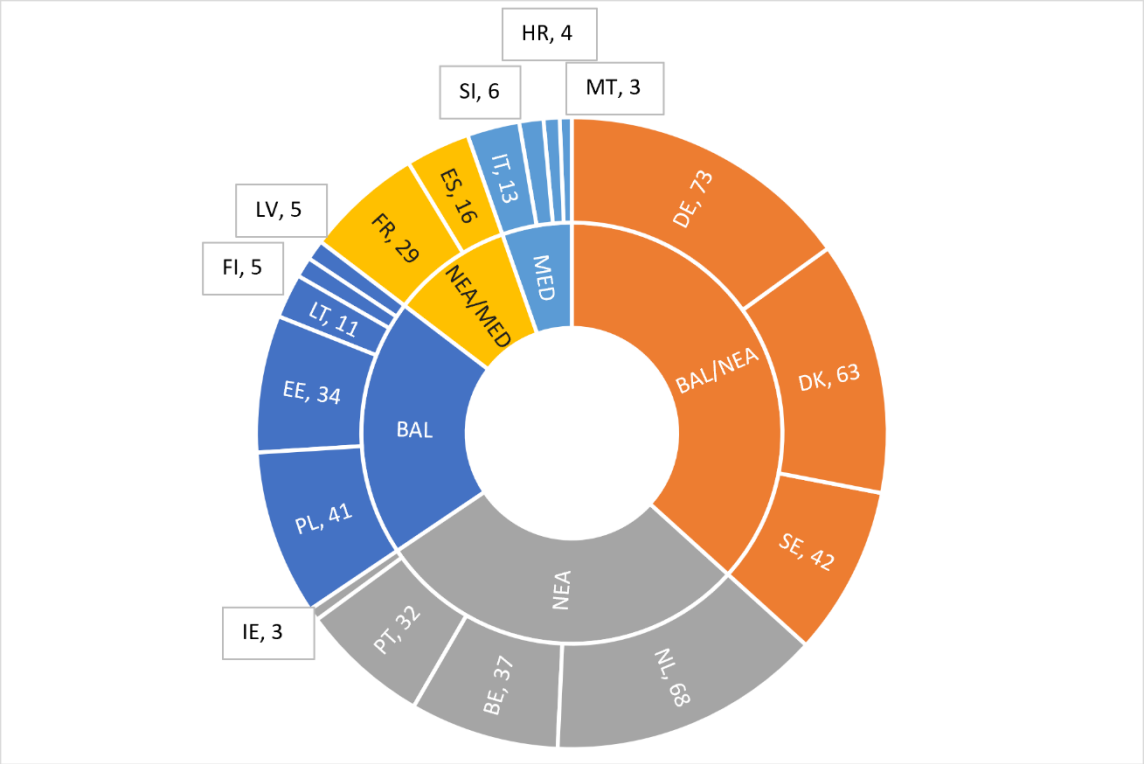


Figure 7 and Figure 8). Even though those MS introduced monitoring programmes for seabirds in the 2014 Art. 11 obligation, the elapsed time, the lack of coordination and the lack of assessment methods resulted in underreporting seabirds (Table 24).

Recommendations for reporting: The species lists that were developed for the reporting improved the consistency of the reported species, compared to 2012. Typos and misreported species were avoided. The use of a drop-down menu can prevent to report the same species with different scientific names (e.g., *Hydrobates castro and Oceanodroma castro*) or with both Latin and common English name, and facilitates the evaluation and analysis of the reports.

Recommendations for implementation and methodological standards: We would encourage the MS in the MED and BLK to follow the Joint Birds working group and get methodological standards to test to their regions. The data gaps should be identified and prioritised in the monitoring updates for Art.17.

3.1.2 Extension in use of MSFD Criteria (primary and secondary) reported at EU, regional and (sub)regional level

Objective:

Table 25 provides a variety of information and overviews related with the progress of the assessments:

- Overview of the use of primary and secondary criteria. The number in each cell indicates the number of member states reported each criterion out of the total number of MS reported each species.

- Overview of the species assessments and threshold values per criterion and region. The traffic light approach (green, orange, red) corresponds to the level of assessment of the parameters for each criterion and species, including the report of threshold values. Green: Indicates that for those criteria a complete assessment has been done by comparing the threshold value with the value achieved. Orange: Indicates that either a threshold value is available, or the value achieved (estimated parameter), so assessment is not complete. Red: Indicates that no threshold value or value achieved are reported.

- Overview of the assessed parameter for each species and criterion. The bold borders around the cells indicate those species and criteria for which the achieved parameter has reported (either negative or positive).

Data: The reported information in column N was used for the use of the criteria (Appendix 2, Art.8 birds). The species assessment was based on the information in columns Q, R, S and V. The overview of the assessed parameters was based on the information in column AD. The assumption for the traffic light approach is that the any reported category was aggregated to the higher level, so if only one MS provided threshold value and value achieved for a single species and in a single MRU, this is assigned to the species and region or subdivision. We assume that all MS in the same region or subdivision should have or get available methods to perform a similar assessment.

Table 25. Reported threshold values and/or estimated parameters. Green: Indicates that for those criteria a complete assessment has been done by comparing the threshold value with the value achieved. Orange: Indicates that either a threshold value is available, or the value achieved (estimated parameter), so assessment is not complete. Red: Indicates that no threshold value or value achieved are reported. The numbers reflect the MS that reported each criterion to allow for an overview of the primary vs. secondary criteria usage. The bold-framed cells show the criteria of the species that were reported to be assessed (positive or negative). The species in light-green cells are from the BD annex.

BAL		D1C1 primary	D1C2 primary Use BD	D1C3 secondary	D1C4 secondary Use BD	D1C5 secondary
Benthic feeding birds DE, DK, EE, FI, LV, LT, PL, SE	*Aythya ferina*	1/1	5/5		1/2	0/1
	Aythya fuligula	1/1	5/5	0/1	1/2	0/1
	Aythya marila	1/1	5/5		0/1	0/1
	Bucephala clangula	1/1	6/6		1/2	0/1
	Clangula hyemalis	1/1	4/4		0/1	0/1
	Melanitta fusca	1/1	6/6		0/1	0/1
	Melanitta nigra	1/1	4/4		0/1	0/1
	Polysticta stelleri		2/2			
	Somateria mollissima	1/1	6/6	0/1	1/2	0/1
	Benthic-feeding birds (grouped)	1/1	2/2	1/1		

Grazing birds DE, DK, FI-LV (grouped), PL, SE	*Anas acuta*		3/3		1/2	0/1
	Anas clypeata		1/1		1/1	
	Anas crecca		1/1			
	Anas penelope		4/4		1/2	0/1
	Anas platyrhynchos		5/5	0/1	1/2	0/1
	Anser albifrons		1/1			
	Anser anser		5/5	0/1	1/2	0/1
	Branta canadensis		2/2		1/1	
	Branta leucopsis		4/4		1/1	
	Cygnus bewickii		1/1		0/1	0/1
	Cygnus columbianus		2/2			
	Cygnus cygnus		5/5		0/1	0/1
	Cygnus olor		5/5	0/1	1/2	0/1
	Fulica atra		5/5	0/1	1/2	0/1
	Grazing birds (grouped)	1/1	2/2	1/1		
Pelagic feeding birds DE, DK, EE, PL, SE, FI, LT, LV grouped	*Alca torda*	1/1	4/4		1/2	0/1
	Cepphus grylle	1/1	4/4		1/2	0/1
	Gavia arctica	1/1	2/2		0/1	0/1
	Gavia stellata	1/1	3/3		0/1	0/1
	Gavia sp.		1/1			
	Mergellus albellus	1/1	6/6		0/1	0/1
	Mergus merganser	1/1	6/6	0/1	1/2	0/1
	Mergus serrator	1/1	6/6	0/1	1/2	0/1
	Phalacrocorax carbo	1/1	5/5	0/1	1/2	0/1
	Podiceps auritus	1/1	2/2		1	0/1
	Podiceps cristatus	1/1	6/6	0/1	1/2	0/1
	Podiceps grisegena	1/1	2/2		1/2	0/1
	Uria aalge	1/1	4/4		1/2	0/1
	Pelagic-feeding birds (grouped)	1/1	2/2	1/1		
Surface feeding birds DE, DK, EE, PL, SE, FI-LV grouped	*Chlidonias niger*		1/1		1/1	
	Haliaeetus albicilla			1/1		
	Hydrocoloeus minutus		1/1		1/1	
	Hydroprogne caspia	1/1	4/4	0/1	0/1	0/1
	Larus argentatus	1/1	5/5	0/1	1/2	0/1
	Larus canus	1/1	5/5	0/1	1/2	0/1
	Larus fuscus	1/1	3/3	0/1	0/1	0/1
	Larus fuscus graellsii		1/1			
	Larus fuscus intermedius		1/1		1/1	
	Larus marinus	1/1	5/5	0/1	1/2	0/1
	Larus melanocephalus		1/1		1/1	

	Larus ridibundus		3/3			
	Rissa tridactyla		1/1		1/1	
	Stercorarius parasiticus		1/1			
	Sterna hirundo	1/1	5/5	0/1	1/2	0/1
	Sterna paradisaea	1/1	5/5	0/1	1/2	0/1
	Sterna sandvicensis	1/1	4/4	0/1	1/2	0/1
	Sternula albifrons	1/1	4/4	0/1	1/2	0/1
	Surface-feeding birds (grouped)	1/1	2/2	1/1		
Wading birds DE, DK, EE, FI, LV, PL, SE	*Actitis hypoleucos*		1/1			
	Anas crecca		3/3		1/2	0/1
	Arenaria interpres		4/4		1/1	
	Calidris alba		1/1			
	Calidris alpina		4/4	0/1	1/2	0/1
	Calidris canutus		1/1			
	Calidris maritima		1/1			
	Charadrius alexandrinus		1/1		1/1	
	Charadrius hiaticula		5/5	0/1	1/2	0/1
	Haematopus ostralegus		5/5	0/1	1/2	0/1
	Limosa lapponica		1/1			
	Numenius arquata		1/1		1/1	
	Philomachus pugnax		1/2	0/1	1/2	0/1
	Platalea leucorodia		1/1		1/1	
	Pluvialis apricaria		1/1		1/1	
	Pluvialis squatarola		1/1			
	Recurvirostra avosetta		4/4	0/1	1/2	0/1
	Tadorna tadorna		5/5	0/1	1/2	0/1
	Tringa glareola		1/1		1/1	
	Tringa totanus		2/2		1/1	
	Vanellus vanellus		1/1		1/1	
	Wading birds (grouped)		2/2			

NEA		D1C1 primary	D1C2 primary Use BD	D1C3 secondary	D1C4 secondary Use BD	D1C5 secondary
Benthic feeding birds BE, DE, DK, NL, SE, PT	*Aythya ferina*		3/3		1/1	
	Aythya fuligula		3/3		1/1	
	Aythya marila		2/2			
	Bucephala clangula		3/3		1/1	
	Clangula hyemalis		3/3			
	Melanitta fusca		3/3			

	Melanitta nigra	1/1	4/4		0/1	0/1
	Melanitta spp.		1/1			
	Phalacrocorax aristotelis	1/1	1/1	1/1	1/1	0/1
	Somateria mollissima	1/1	4/4	1/2	1/2	0/1
Grazing birds BE, DE, DK, NL, SE	*Anas acuta*		2/2	0/1	1/2	0/1
	Anas clypeata		2/2	0/1	1/2	0/1
	Anas crecca		1/1			
	Anas penelope		4/4	0/1	1/2	0/1
	Anas platyrhynchos		4/4	1/2	1/2	0/1
	Anser albifrons		2/2			
	Anser anser		2/2		1/1	
	Branta bernicla		2/2		0/1	0/1
	Branta canadensis		2/2		1/1	
	Branta leucopsis		3/3		1/1	
	Cygnus bewickii		1/1			
	Cygnus columbianus		1/1			
	Cygnus cygnus		3/3			
	Cygnus olor		3/3	1/1	1/1	
	Fulica atra		3/3		1/1	
Pelagic feeding birds BE, DE, DK, ES, FR, NL, SE, IE, PT	*Alca torda*	1/3	7/7	3/4	2/4	0/2
	Bulweria bulwerii - AMA	1/2	2/2	2/2	1/2	0/1
	Calonectrs borealis - AMA	1/2	2/2	2/2	0/2	0/1
	Cepphus grylle		2/2	1/1	1/1	
	Fratercula arctica	1/2	1/2	2/3	0/2	0/2
	Fulmarus glacialis	0/1	0/1		0/1	0/1
	Gavia arctica	1/1	2/2		0/1	0/1
	Gavia stellata	1/1	3/3		0/1	0/1
	Gavia sp.		1/1			
	Hydrobates (Oceanodroma) castro - AMA	0/1	1/1	0/1	1/1	0/1
	Mergellus albellus		3/3			
	Mergus merganser		3/3		1/1	
	Mergus serrator	1/1	4/4	1/2	1/2	0/1
	Morus bassanus	2/4	5/6	3/4	2/4	0/3
	Pelagodroma marina - AMA	0/1	1/1	0/1	1/1	0/1
	Pterodroma deserta		0/1	1/1	0/1	
	Pterodroma madeira		0/1	1/1	0/1	
	Phalacrocorax aristotelis	1/2	2/2	4/4	1/2	0/2
	Phalacrocorax carbo	1/2	5/5	2/4	2/3	0/2
	Podiceps auritus		2/2			
	Podiceps cristatus		4/4		1/1	

	Podiceps grisegena		1/1		1/1	
	Puffinus lherminieri - AMA	1/2	2/2	1/1	0/2	0/1
	Puffinus mauretanicus	2/2	1/2	0/1	1/3	0/1
	Puffinus gravis	0/1	0/1	0/1	0/1	0/1
	Puffinus griseus	0/1	0/1	0/1	0/1	0/1
	Rissa tridactylu	0/1	0/1		0/1	0/1
	Sterna hirundo - AMA	0/1	1/1	0/1	1/1	0/1
	Uria aalge	3/4	6/8	4/5	3/4	0/3
	Pelagic-feeding birds (grouped)	0/1		1/1	1/1	0/1
Surface feeding birds BE, DE, DK, ES, FR, NL, PT, SE	*Anas clypeata*		1/1			
	Calonectris diomedea borealis	1/1	1/1	1/1	1/1	0/1
	Calonectris diomedea diomedea	1/1	0/1	0/1	0/1	0/1
	Chlidonias niger		1/1		1/1	
	Fulmarus glacialis	1/2	3/3	4/4	1/2	0/2
	Hydrobates pelagicus	0/2	2/2	2/2	1/2	0/2
	Hydrocoloeus minutus		2/3		1/2	0/1
	Hydroprogne caspia		1/1			
	Larus argentatus	1/2	4/4	3/4	2/3	0/2
	Larus canus	1/2	4/4	1/3	1/3	0/2
	Larus fuscus	0/1	2/2	2/3	1/1	0/1
	Larus fuscus graellsii	1/1	0/1	0/1	0/1	0/1
	Larus fuscus intermedius		1/1		1/1	
	Larus marinus	1/2	6/6	3/4	2/3	0/2
	Larus melanocephalus	0/1	4/4	1/3	1/3	0/2
	Larus michahellis	0/1	1/1	0/1	0/1	0/1
	Larus ridibundus	0/1	2/3	3/4	0/2	0/2
	Puffinus mauretanicus	0/1	1/1	0/1	1/1	0/1
	Puffinus puffinus	0/1	1/1	0/1	1/1	0/1
	Rissa tridactyla	2/3	6/6	4/5	3/4	0/3
	Stercorarius parasiticus	0/1	2/3	2/3	1/2	0/2
	Stercorarius pomarinus		0/1		0/1	0/1
	Stercorarius skua	1/1	2/2	1/3	0/2	0/2
	Sterna albifrons	0/1	1/1	1/1	0/1	0/1
	Sterna dougallii	0/1	1/1	3/3	0/1	0/1
	Sterna hirundo	1/3	7/7	5/5	2/4	0/3
	Sterna paradisaea	1/1	4/4	3/3	1/2	0/1
	Sterna sandvicensis	1/2	4/4	4/4	2/3	0/2
	Sternula albifrons	1/2	3/4	3/4	1/3	0/2
Wading birds BE, DE, DK, NL, SE	*Actitis hypoleucos*		1/1			
	Anas crecca		1/1		1/1	
	Arenaria interpres		4/4	0/1	1/2	0/1

	Calidris alba		3/3		0/1	0/1
	Calidris alpina		3/3	0/1	1/2	0/1
	Calidris canutus		3/3		0/1	0/1
	Calidris ferruginea		1/1			
	Calidris maritima		3/3		0/1	0/1
	Charadrius alexandrinus		3/3	1/2	1/2	0/1
	Charadrius hiaticula		4/4	1/2	1/2	0/1
	Egretta garzetta		1/1			
	Haematopus ostralegus		4/4	2/2	1/2	0/1
	Larus argentatus		1/1			
	Larus canus		1/1	1/1		
	Larus fuscus		1/1			
	Limosa lapponica		3/3		0/1	0/1
	Limosa limosa		2/2	0/1	0/1	0/1
	Numenius arquata		3/3	0/1	1/2	0/1
	Numenius phaeopus		2/2		0/1	0/1
	Philomachus pugnax		2/2		1/1	
	Platalea leucorodia		3/3	2/2	1/2	0/1
	Pluvialis apricaria		3/3		1/2	0/1
	Pluvialis squatarola		3/3		0/1	0/1
	Recurvirostra avosetta		3/3	2/2	1/2	0/1
	Tadorna tadorna		4/4	1/2	1/2	0/1
	Tringa erythropus		2/2		0/1	0/1
	Tringa glareola		1/1		1/1	
	Tringa nebularia		2/2		0/1	0/1
	Tringa totanus		4/4	0/1	1/2	0/1
	Vanellus vanellus		3/3	0/1	1/2	0/1

MED		D1C1 primary	D1C2 primary Use BD	D1C3 secondary	D1C4 secondary Use BD	D1C5 secondary
Benthic feeding birds IT	*Gavia arctica*	0/1	1/1		0/1	
	Gavia stellata	0/1	1/1			
	Melanitta fusca	0/1	1/1			
	Melanitta nigra	0/1	1/1			
	Mergus serrator	0/1	1/1			
	Phalacrocorax aristotelis	0/1	1/1		1/1	
	Podiceps nigricollis	0/1	1/1			
	Somateria mollissima	0/1	1/1			
Pelagic feeding birds	*Calonectris diomedea*	1/2	2/2	1/1	2/2	

ES, FR, HR, IT, MT, SI	*Hydrobates pelagicus*	1/1	1/1		1/1	
	Morus bassanus	0/1	0/1	0/1	0/1	0/1
	Phalacrocorax aristotelis	1/4	3/4	1/3	2/3	0/3
	Phalacrocorax carbo	0/2	1/2	0/1	0/1	0/1
	Puffinus mauretanicus	1/1	1/1	1/1	1/1	0/1
	Puffinus yelkouan	2/2	2/2	1/1	2/2	
Surface feeding birds ES, FR, HR, SI	*Calonectris diomedea*	0/1	0/1	0/1	0/1	0/1
	Calonectris diomedea borealis	1/1	1/1	1/1	0/1	0/1
	Calonectris diomedea diomedea	1/2	2/2	2/2	1/2	0/2
	Gelochelidon nilotica	0/1	1/1	0/1	0/1	0/1
	Hydrobates pelagicus	2/3	2/2	1/2	1/3	0/2
	Larus audouinii	2/4	4/4	2/3	2/4	0/3
	Larus genei	0/1	1/1	0/1	0/1	0/1
	Larus melanocephalus	0/1	1/1	0/1	0/1	0/1
	Larus michahellis	0/1	1/1	0/1	0/1	0/1
	Larus ridibundus	0/1	0/1	0/1	0/1	0/1
	Puffinus yelkouan	0/2	2/2	1/2	1/2	1/2
	Sterna hirundo	0/3	3/4	1/2	0/2	0/2
	Sterna sandvicensis	1/3	3/3	1/2	1/3	0/2
	Sternula (Sterna) albifrons	0/3	3/4	0/2	0/2	0/2
Wading birds SI	*Larus michahellis*	0/1	0/1			
	Larus ridibundus	0/1	0/1			

Findings:

Use of primary and secondary criteria: Although we would expect the MS to use more the primary than the secondary criteria, it seems that their selection of criteria was based on the availability of data and methods. In BAL, all MS completed the D1C2 assessments, but there were no assessments for other criteria. In the NEA, however, there are many species with assessments for D1C2 and D1C3, indicating the importance of the secondary criterion D1C3 for birds and the availability of data and methods for this criterion. The same is observed in the MED, despite the lower number of species, most of them are completely assessed for D1C2 mainly, but also for D1C1, D1C3 and D1C4. To conclude, there is significant use of the secondary criterion D1C3.

Species assessments and threshold values per criterion and region: The BD does not require assessments and does not set threshold values. The great coordination and development of indicators and thresholds in the OSPAR and HELCOM region is well reflected in the MSFD reporting. All species are assessed for their abundance and many for population characteristics (mostly breeding success) derived from the relevant OSPAR's indicator. The MED MS reported completed assessments for D1C1 and D1C4.

Assessed parameter for each species and criterion: There is a good correlation between the parameters assessed and the complete assessment (where both threshold values and parameter

estimates are reported). Very rarely the reported species miss one out of the parameter or threshold, which are needed for a complete assessment.

Good practices: The level of coordination in the OSPAR and HELCOM areas provides a good practice that contributes to the significant number of species reported and assessed in a harmonised manner. The BD might not require assessments like the MSFD, however it sets the basis and the monitoring framework that generates the required information for complete assessments.

Gap: There is no information and methods to perform assessments for criteria like D1D5, D1C1 and D1C4 in some regions.

Recommendations for reporting: The entries analysed in this paragraph and include thresholds values, values achieved, and parameters assessed are very informative. The MS reported in a consistent way, denoting that they have a good understanding of the structure of the reporting and of the concepts behind it.

Recommendations for implementation: The high level of regional coordination facilitates the complete assessment of several criteria and species. The MS should build on this coordination and agree on methods to cover more criteria. The MED and the BLK MS have short time-series for birds, but they could make use of available methods from the North. The methods developed by the WGBIRD should be tested in other regions. Experts from all regions should work together to continue the development of agreed methods and common monitoring programmes.

3.1.3 Seabirds threshold values and parameters reported

Objective: To provide an overview of the reported threshold values (Table 26) and compare them with those that are developed ad applied by the RSCs or other organisations and legislation.

Data: We analysed the data reported in columns Q, R and S for threshold values (Appendix 2, Art.8 birds). This information was checked against the RSCs roof reports and the Palialexis *et al.* (2019) report for the harmonisation of methods to set threshold values.

Table 26. Overview of the threshold values reported and their sources per criterion and species group. The secondary criteria are in grey font colour.

Criteria	OSPAR	HELCOM	UNEPMAP	BD	No source reported
D1C1					MOR/F (BE, DE, FI, FR, HR) MOR/F (MT: Stable trend; ES: By-catch should "approach zero". Source: Assessment by expert criteria) MOR/F (PT): 1.0, 0.0. (MISTIC SEA)
D1C2	0.7: ABU National values as breeding pairs (ES)	0.7: ABU 75.0: ABU		ABU (IT): Breeding Pairs	ABU: No significant downward trend: National

	0.7: Abundance (number of individuals) – breeding (DE) Abundance (number of individuals) – wintering (DE) ABU: <1.3, >0.7 (PT) 0.8: Abundance (number of individuals) – breeding (DE) 75.0: Abundance of breeding (NL) Abundance non-breeding (NL) FR: The parameter is considered to have been reached when the rate of change in the abundance of breeding pairs of the species is stable or increasing (> 0%). In addition, an expert opinion was considered for all species: Relative abundance within community (long term)	0.7: Abundance (number of individuals) – breeding (DE) Abundance (number of individuals) – wintering (DE) Abundance in breeding season (PL, SE) Abundance in wintering season (PL, SE) Abundance index [breeding season] (EE) Abundance index [wintering season] (EE) 0.8: Abundance in breeding season (SE) 75.0: Abundance of breeding waterbirds (FI) Abundance of breeding birds (FI)		ABU (PT): Female Breeds	complement to abundance assessment of resting birds offshore (DE) Regional (OSPAR, adapted under expert criteria) (ES) MISTIC SEAS 2 (ES) Abundance of scavengers, Abundance of non-scavengers: National, long term average abundance (BE) Abundance (number of individuals) – trend: National supplement to abundance assessment of breeding birds (TWSC data) and National complement to abundance assessment of resting birds offshore (DE) -0.5: Relative abundance within community (short term) - National (FR: The parameter is reached if the percentage annual average difference in the relative abundance of a species, over the assessment cycle, does not decline by more than 0.5% per year, is centred on 0% and the interval 80% confidence includes 0%). ABU: Breeding Pairs (IT); {individuals} (LT) ABU: No improvement in the status of the species compared to the target set in 2014 (PT)

					Number of nesting pairs (SI)
D1C3	3.0: FEC (FR: The annual percentage of colonies in massive reproductive failure does not exceed 5% of the colonies monitored, or the average percentage of colonies in failure during the previous 15 years, whichever is higher, for 3 years over the evaluated cycle.) 0.8, 0.85, 0.9: SUR Stable population: Breeding abundance (BE) 3.0: Annual colony failure rate (DE Number of years with gross loss for a maximum of 3 out of 6 years.) Breeding success (NL)	-		N/A	Brood size (climbed nests): National (PL) Productivity: National (PL) Ratio of reproduction to adult mortality: TWSC (DE) Breeding success: Regional (OSPAR, adapted under expert criteria) (ES) Brood success / brood failure (DE) 3.0: Annual colony failure rate (DE) 0.9: SUR - MISTIC SEA2 (ES) 0.9: SUR - Regional (OSPAR, adapted under expert criteria) (ES) SUR (FI, HR) FEC (PL, ES) 59.0: FEC – National (PL) Annual breeding success (fledged juvs/pair): Scientific literature (IT) FEC/SUR (PT): MISTIC SEA II
D1C4					31.0: DIST-R – Directional Trends (ES) DIST-P: MISTIC SEAS 2 (ES) DIST-S: (ES, HR) DIST-S: National (FR: The upper limit of the confidence interval at 80% of the average annual percentage difference in the proportion of area occupied by the species over the assessment cycle must be greater than 0%.) DIST-R (DK, ES) DIST-R (MT: Stable trends)

					Specific parameters related to distribution are still to be defined (DE) Distribution of breeding colonies (IT)
D1C5		-	-	-	EXT (HR) HAB-CON (HR) Specific parameters related to habitat characteristics are yet to be defined (DE)

Findings: In contrast with other ecosystem components, the regional coordination for seabirds provides an incredible harmonisation of the thresholds that mostly derive from the RSCs indicators. Equally harmonised are the reported parameters, as well. The criteria that have developed thresholds, like D1C2, have always one parameter reported for the species. The reported parameters for the criteria with no agreed thresholds also present a consistent use of the default ones (those included in the drop-down menus in the reporting sheets). This indicates a common understanding across the MS on how seabirds should be assessed, at least for the BAL and NEA MS.

Gap: D1C1, D1C4 and D1C5 do not have agreed thresholds. The reported values come from projects or local studies. D1C3 has agreed or coordinated threshold values, but it was not reported by several MS.

Recommendations for reporting: The reporting of the threshold values was efficient and achieved the detailed collection of all necessary information for a comprehensive understanding of the estimation and use of the thresholds.

Recommendations for implementation: The high level of regional coordination in OSPAR and HELCOM through the WGBIRD facilitates the complete assessment of several criteria and species. The MS should build on this coordination and agree on methods to cover more criteria. The MED and the BLK MS have short time-series for birds, but they could make use of available methods from the North. The developments of the WGBIRD should be included in the Art.8 guidance. Moreover, this is a good practice of a group of experts that can directly improve the harmonisation of the implementation for the MSFD, but also for the alignment of the MSFD and BD. The MS through the CIS working groups should support the work of their experts.

3.1.4 Consistency of spatial coverage and assessment period

Objective: The MS reported the assessment period for each parameter per species and criterion. We analysed this information to explore potential discrepancies in the assessment at regional and

criterion level that could potentially affect the comparability and the consistency in the final assessment of each parameter (Table 26).

Data: This information is reported in column AT "assessment period" (Appendix 2, Art.8 birds).

Table 27. Assessment period per criterion and region on which the MS performed the assessment of their parameters. The numbers indicate how many reported parameters were assessed for each period per criterion and region (in bold). BLK MS did not report seabird assessments.

	1999-2011	2009-2018	2010-2016	2011-2016	2012-2015	2012-2017	2012-2018	2013-2018	2014	2014-2018	2017-2018
BAL	**129**			**310**		**11**	**199**				
D1C1				74			29				
D1C2	81			213		11	57				
D1C3				23			25				
D1C4	48						44				
D1C5							44				
NEA	**129**	**12**	**384**	**121**	**87**	**46**	**338**		**32**	**25**	**64**
D1C1		3	73	54		12	38				12
D1C2	81	3	92	67	67	13	98			6	12
D1C3			73		20		62		32	12	16
D1C4	48	3	73			10	70			7	12
D1C5		3	73				70				12
MED			**75**			**92**	**77**	**24**			
D1C1			15			29	15	4			
D1C2			15			28	15	4			
D1C3			15			10	20	4			
D1C4			15			24	15	4			
D1C5			15				12	8			

Findings: There is no harmonisation in the assessment period for most of the assessed parameters per criterion, indicating that the assessments might not be comparable and might have different level of uncertainty. Moreover, the 6-year assessment cycle is always reflected in the assessed parameters.

The pattern of the assessment periods at regional level (Table 27) confirms the shorter time series in the MED and the BLK, which was pointed out after the evaluation of the monitoring programmes (Palialexis et al., 2018). Like the outcome of the mammals' analysis, the assessment periods in the BAL and NEA correspond to the regional assessment of HELCOM (2011-16) and OSPAR (2011-2017).

Good practices: -.

Gaps: Once again the MS reported what was available in terms of data, indicators and assessments. Of course, longer data set can provide more accurate estimates, however, in most of the periods the duration is shorter than 6 years. The different assessment periods might not provide comparable assessments and might not reflect the equivalent intensity of pressures to species.

Recommendations for reporting: No recommendation, this information is crucial and well reported.

Recommendations for implementation: The policy alignment between MSFD, BD and RSC assessment cycles that includes alignment of the assessment periods is crucial to reduce the burden of multiple incomparable and sometimes misleading assessments of the same elements. Otherwise, the assessment period will be an additional factor to the different parameters, methods, and thresholds

to produce incomparable and inconsistent environmental assessments. The initiatives to align the MSFD with other environmental policies could use the input from this analysis to justify the need for temporal alignment and methodological harmonisation across the policy obligations.

3.1.5 Date when GES is expected to be achieved

Objective: The MS reported the status (GES) of each species and when they expect them to achieve GES, in cases where GES in not yet achieved. We analysed the reported information to identify the proportion of species that are in GES at regional level and by when most of the species in each species groups could be in GES according to the MS.

Data: The information of the GES achievement or the expected date is in column AR (Appendix 2, Art.8 birds).

Expected Outcome: The GES achievement is the basis for the MSFD. In the structure of the reporting this entry corresponds to the assessment of parameters, which are integrated at the level of criterion and then the criteria are integrated at the level of species. Given the different methods of integration at both levels and the number of parameters or criteria that contributed to each assessment the final GES assessment/achievement might not be consistent yet. The outcome provides a quick overview of the proportion of species that are in GES and the provision for the GES achievement for the species group.

Table 28. GES status for seabirds or provisional date of GES achievement as it was reported by each MS.

Bird species groups and species in BAL		GES achieved	GES expected to be achieved			Not assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Benthic feeding birds	*Aythya ferina*		PL		DE, EE, SE		DK
	Aythya fuligula		PL		DE, EE, SE		DK
	Aythya marila		PL		DE, EE, SE		DK
	Bucephala clangula		PL		DE, EE, LT, SE		DK
	Clangula hyemalis				DE, LT, SE		DK
	Melanitta fusca		PL		DE, EE, LT, SE		DK
	Melanitta nigra				DE, LT, SE		DK
	Polysticta stelleri				EE, LT		
	Somateria mollissima		PL		DE, EE, LT, SE		DK
	Benthic-feeding birds (grouped)	FI	FI, LV				
Grazing birds	*Anas acuta*	DE, PL					DK
	Anas clypeata						DK
	Anas crecca	SE					
	Anas penelope	DE, PL, SE					DK
	Anas platyrhynchos	DE, EE, PL, SE	PL				DK

	Anser albifrons						DK
	Anser anser	DE, EE, PL, SE	PL				DK
	Branta canadensis	SE					DK
	Branta leucopsis	EE, SE	PL				DK
	Cygnus bewickii	DE					
	Cygnus columbianus	PL					DK
	Cygnus cygnus	DE, EE, PL, SE	PL				DK
	Cygnus olor	DE, EE, PL, SE	PL				DK
	Fulica atra	DE, EE, PL, SE	PL				DK
	Grazing birds (grouped)	FI	FI, LV				
Pelagic-feeding birds	*Alca torda*	DE, PL, SE	PL				DK
	Cepphus grylle	DE, PL, SE					DK
	Gavia arctica	DE					DK
	Gavia stellata	DE, SE					DK
	Gavia sp.				LT		
	Mergellus albellus	DE, EE, PL, SE	PL		LT		DK
	Mergus merganser	DE, EE, PL, SE	PL		LT		DK
	Mergus serrator	DE, EE, PL, SE	PL		LT		DK
	Phalacrocorax carbo	DE, EE, PL, SE	PL				DK
	Podiceps auritus	DE, SE					
	Podiceps cristatus	DE, EE, PL, SE	PL		LT		DK
	Podiceps grisegena	DE					DK
	Uria aalge	DE, PL, SE	PL				DK
	Pelagic-feeding birds (grouped)	FI, LV	FI				
Surface feeding birds	*Chlidonias niger*						DK
	Haliaeetus albicilla	PL					
	Hydrocoloeus minutus						DK
	Hydroprogne caspia	EE, SE	PL		DE		
	Larus argentatus	EE, SE	PL		DE		DK
	Larus canus	EE, SE	PL		DE		DK
	Larus fuscus	SE	PL		DE		
	Larus fuscus graellsii	EE					
	Larus fuscus intermedius						DK
	Larus marinus	EE, SE	PL		DE		DK
	Larus melanocephalus						DK
	Larus ridibundus	EE, SE	PL				
	Rissa tridactyla						DK
	Stercorarius parasiticus	SE					
	Sterna hirundo	EE, SE	PL		DE		DK

	Sterna paradisaea	EE, SE	PL		DE		DK
	Sterna sandvicensis	EE	PL		DE		DK
	Sternula albifrons	EE	PL		DE		DK
	Surface-feeding birds (grouped)	FI	FI, LV				
Wading birds	*Actitis hypoleucos*				SE		
	Anas crecca		PL		DE		DK
	Arenaria interpres	EE	PL		SE		DK
	Calidris alba						DK
	Calidris alpina	EE	PL		DE		DK
	Calidris canutus						DK
	Calidris maritima						DK
	Charadrius alexandrinus						DK
	Charadrius hiaticula	EE	PL		DE, SE		DK
	Haematopus ostralegus	EE	PL		DE, SE		DK
	Limosa lapponica						DK
	Numenius arquata						DK
	Philomachus pugnax				DE		DK
	Platalea leucorodia						DK
	Pluvialis apricaria						DK
	Pluvialis squatarola						DK
	Recurvirostra avosetta	EE	PL		DE		DK
	Tadorna tadorna	EE	PL		DE, SE		DK
	Tringa glareola						DK
	Tringa totanus				SE		DK
	Vanellus vanellus						DK
	Wading birds (grouped)	EE	FI, LV				

Bird species groups and species in NEA		GES achieved	GES expected to be achieved			Not assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Benthic-feeding birds	*Aythya fuligula*				NL, SE		DK
	Aythya marila				NL		DK
	Bucephala clangula				NL, SE		DK
	Clangula hyemalis				NL, SE		DK
	Melanitta fusca				NL, SE		DK
	Melanitta nigra				BE, DE, NL, SE		DK, PT
	Melanitta spp.						BE

	Phalacrocorax aristotelis					PT	
	Somateria mollissima	BE			DE, NL, SE		DK
Grazing feeding birds	*Anas acuta*	DE					DK
	Anas clypeata	DE					DK
	Anas crecca	SE					
	Anas penelope	DE, SE			NL		DK
	Anas platyrhynchos	DE, SE			BE, NL		DK
	Anser albifrons				NL		DK
	Anser anser	SE					DK
	Branta bernicla	DE			NL		
	Branta canadensis	SE					DK
	Branta leucopsis	SE			NL		DK
	Cygnus bewickii				NL		
	Cygnus columbianus						DK
	Cygnus cygnus	SE			NL		DK
	Cygnus olor	SE			BE, NL		DK
	Fulica atra	SE			NL		DK
Pelagic feeding birds	*Alca torda*	BE, DE, SE	NL		NL	PT	BE, DK, FR
	Bulweria bulwerii					ES, PT	PT
	Calonectris borealis					ES, PT	PT
	Cepphus grylle	BE, SE					DK
	Fratercula arctica	BE, DE	NL			PT	FR
	Fulmarus glacialis				IE		
	Gavia arctica	DE					DK
	Gavia sp.						BE
	Gavia stellata	DE, SE					DK
	Hydrobates castro						ES
	Mergellus albellus	SE			NL		DK
	Mergus merganser	SE			NL		DK
	Mergus serrator	BE, DE, SE			NL		DK
	Morus bassanus	BE, DE	NL		IE, NL	PT	BE, FR
	Pelagic-feeding birds (grouped)					ES	
	Pelagodroma marina					ES	
	Phalacrocorax aristotelis	BE	NL				ES, FR
	Phalacrocorax carbo	BE, DE, SE	NL		NL		DK, FR
	Podiceps auritus	SE			NL		

	Podiceps cristatus	SE			NL		BE, DK
	Podiceps grisegena						DK
	Puffinus gravis					PT	
	Puffinus griseus					PT	
	Pterodroma deserta					PT	
	Pterodroma madeira					PT	
	Puffinus lherminieri					ES, PT	PT
	Puffinus mauretanicus					PT	ES
	Rissa tridactylus				IE		
	Uria aalge	BE, DE, SE	NL		NL	PT	BE, DK, ES, FR
Surface feeding birds	*Anas clypeata*				NL		
	Calonectris diomedea borealis						ES
	Calonectris diomedea diomedea						ES
	Chlidonias niger						DK
	Fulmarus glacialis				BE, DE, NL		FR
	Gelochelidon nilotica					PT	
	Hydrobates castro					PT	PT
	Hydrobates monteiroi						PT
	Hydrobates pelagicus					PT	ES, FR
	Hydrocoloeus minutus				DE		BE, DK
	Hydroprogne caspia	SE					
	Larus argentatus	SE			BE, DE, NL		DK, FR
	Larus audouinii					PT	
	Larus canus	SE			DE, NL		DK, FR
	Larus fuscus	SE			BE, NL	PT	FR
	Larus fuscus graellsii				DE		
	Larus fuscus intermedius						DK
	Larus marinus	SE			BE, DE, NL		BE, DK, FR
	Larus melanocephalus				BE, DE, NL	PT	DK, FR
	Larus michahellis					PT	FR
	Larus ridibundus	SE			BE, DE, NL		FR
	Oceanodroma castro					PT	
	Oceanodroma leucorhoa					PT	
	Pelagodroma marina					PT	
	Puffinus mauretanicus						FR
	Puffinus puffinus						FR
	Rissa tridactyla				BE, DE, NL	PT	BE, DK, ES, FR

	Stercorarius parasiticus	SE			BE, DE, NL		FR
	Stercorarius pomarinus				DE		
	Stercorarius skua				BE, DE, NL	PT	FR
	Sterna albifrons						FR
	Sterna dougallii				BE, NL		FR. PT
	Sterna hirundo	SE			BE, DE, NL	PT	BE, DK, ES, FR, PT
	Sterna paradisaea	SE			BE, DE, NL		DK
	Sterna sandvicensis				BE, DE, NL	PT	DK, FR
	Sternula albifrons				BE, DE, NL	PT	DK, ES
Wading birds	*Actitis hypoleucos*				SE		
	Anas crecca						DK
	Arenaria interpres				DE, NL, SE		DK
	Calidris alba				DE, NL		DK
	Calidris alpina				DE, NL		DK
	Calidris canutus				DE, NL		DK
	Calidris ferruginea				NL		
	Calidris maritima				DE, NL		DK
	Charadrius alexandrinus				BE, DE, NL		DK
	Charadrius hiaticula				BE, DE, NL, SE		DK
	Egretta garzetta				NL		
	Haematopus ostralegus				BE, DE, NL, SE		DK
	Larus argentatus						BE
	Larus canus				BE		BE
	Larus fuscus						BE
	Limosa lapponica				DE, NL		DK
	Limosa limosa				DE, NL		
	Numenius arquata				DE, NL		DK
	Numenius phaeopus				DE, NL		
	Philomachus pugnax				NL		DK
	Platalea leucorodia				BE, DE, NL		DK
	Pluvialis apricaria				DE, NL		DK
	Pluvialis squatarola				DE, NL		DK
	Recurvirostra avosetta				BE, DE, NL		DK
	Tadorna tadorna				BE, DE, NL, SE		DK
	Tringa erythropus				DE, NL		
	Tringa glareola						DK
	Tringa nebularia				DE, NL		
	Tringa totanus				DE, NL, SE		DK
	Vanellus vanellus				DE, NL		DK

Bird species groups and species in MED		GES achieved	GES expected to be achieved			Not assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Benthic-feeding birds	*Gavia arctica*				IT		IT
	Gavia stellata				IT		IT
	Melanitta fusca				IT		
	Melanitta nigra				IT		IT
	Mergus serrator				IT		IT
	Phalacrocorax aristotelis				IT		
	Somateria mollissima				IT		
	Podiceps nigricollis				IT		IT
Pelagic feeding birds	*Calonectris diomedea*	MT			IT		IT
	Hydrobates pelagicus	MT					
	Morus bassanus						FR
	Phalacrocorax aristotelis		HR			SI	ES, FR
	Phalacrocorax carbo					SI	FR
	Puffinus mauretanicus						ES
	Puffinus yelkouan	MT			IT		IT
Surface feeding birds	*Calonectris diomedea*						FR
	Calonectris diomedea borealis						ES
	Calonectris diomedea diomedea				HR		ES
	Gelochelidon nilotica						FR
	Hydrobates pelagicus				IT		ES, FR, IT
	Larus audouinii				HR, IT		ES, FR, IT
	Larus genei						FR
	Larus melanocephalus						FR
	Larus michahellis						FR
	Larus ridibundus						FR
	Puffinus yelkouan				HR		FR
	Sternula albifrons					SI	FR
	Sterna hirundo					SI	ES, FR
	Sterna sandvicensis				IT		ES, FR
	Sternula albifrons						ES
Wading birds	*Larus michahellis*					SI	
	Larus ridibundus					SI	

Findings: The most stunning outcome from the overview of the achieved or provisional achievement of GES for seabirds is that the same species in the same region have different evaluation of GES

achievement. Given that the seabirds distribution usually covers the whole region, inconsistencies regarding the GES achievement jeopardise any informed decision for the species GES. Moreover, such inconsistencies indicate the need for better regional collaboration and harmonisation of the assessments, especially for the highly mobile species. Some MS systematically assigned "unknown" status for all reported species (DK, FR), because of lack of agreed thresholds or common integration rules, while others concluded to a GES assessment using only a single criterion. Given these inconsistencies we avoided quantifying the results as will be misleading for the status of the species.

Gap: Many data gaps, as this entry requires consideration of several assessments and integrations, which obviously led to inconsistent decision for the GES achievement at species level. The outcome is not representative of the status of GES in the European waters for seabirds. The MS had different understanding on how to assess the GES achievement and followed different approaches, which cannot always be deducted from the reported information.

Recommendations for reporting: The MS need to combine assessments from other criteria and parameters to assess the GES achievement. Thus, this entry which is at the species/parameter/criterion level should be moved to a higher level in the reporting. If possible, the GES should be estimated automatically from the MS assessment of criteria, according to agreed integration methods and agreed methods to set threshold values. Many MS conceived GES determination and achievement differently and reported inconsistent information e.g., some MS reported GES achievement based on a single criterion, while other MS, even with more criteria assessed, reported no assessment for the same species.

Recommendations for implementation: This entry includes information relevant to the high level MSFD scope, which is the GES achievement. All the work that is related with the harmonisation of methodological standards (thresholds, integration rules) can ensure a consistent and comparable assessment of species in the coming cycles and achieve consistency in the MS reports. The experts from the MS and the WGBIRD develop this work and their role is essential for a consistent regional assessment and can feed guidance documents such like Art. 8 and integration rules.

3.1.6 Analysis of the integration methods across parameters and criteria

Objective: The integration rules are an integral part of the GES assessment flow (as it is described in the Art. 8 guidance). We analysed the reported information to identify potential patterns in the use of different rules, and provide an overview of the reported methods. This analysis can support the ongoing debate for agreed integration rules for D1 species. It should be considered that when the MS reported there were no agreed integration rules for birds for parameters and criteria.

Data: The MS reported integration rules applied across parameters to inform the criterion level, and across criteria to inform the species level (integration rule type parameter in column AK and Integration rule type criteria in column AM, respectively in Appendix 2, file Art.8 birds).

Table 29. Integration rules reported across parameter for all criteria

Species group	Region	Integration rules				Not relevant
		Multimetric	OOAO	THRES	Other	
Benthic feeding birds	BAL	FI	DE, PL	EE, LV		DK SE
	NEA		BE, DE		NL	BE DK SE
	MED					IT

Grazing birds	BAL	FI	DE, PL	EE, LV		DK SE
	NEA		DE		NL	BE DK SE
Pelagic feeding birds	BAL	FI	DE, PL	EE, LV		DK SE
	NEA		DE		FR, NL	BE DK ES FR SE
	MED					FR IT
Surface feeding birds	BAL	FI	DE, PL	EE, LV		DK SE
	NEA		DE		FR, NL	BE DK FR SE
	MED					FR IT
Wading birds	BAL	FI	DE, PL	EE, LV		DK SE
	NEA		DE		NL	BE DK SE

Table 30. Integration rules reported across criteria

Species group	Region	Integration rules		Not relevant
		OOAO	Other	
Benthic feeding birds	BAL	DE, FI. LV		DK EE SE
	NEA	BE, DE	NL	BE DK SE
Grazing birds	BAL	DE, FI. LV		DK EE SE
	NEA	DE	NL	BE DK SE
Pelagic feeding birds	BAL	DE, FI. LV		DK EE SE
	NEA	DE	FR IE NL	BE DK ES SE
	MED		FR	
Surface feeding birds	BAL	DE, FI. LV		DK EE PL SE
	NEA	DE	FR NL	BE DK SE
	MED			
Wading birds	BAL	DE, FI. LV		DK EE SE
	NEA	DE	NL	BE DK SE
	MED		FR	

Findings:

- Integration of parameters to criteria (Table 29):

Generally, for the integration of parameters to criterion, the MS reported three methods from the default list, while FR reported "other". Being aware that the MS reports were based on the same HELCOM's indicator, we believe that the BAL MS named the integration rule differently (multimetric, OOAO, threshold) although in practice the refer to the same method. FR stated that no integration of parameters informing criterion D1C2 was carried out. The other criteria were not assessed, so there is no integration of parameters. PL integrated three parameters (breeding success, productivity and number of chicks) for D1C3 for *Haliaeetus albicilla* using OOAO and the result of the lowest rating determines the total assessment of the criterion.

- Integration of criteria to species (Table 30):

Three MS reported OOAO and FR reported that the integration rule is being developed within the framework of the Joint OSPAR/HELCOM/ICES Working Group on Seabirds, which in practice should be same with other MS in the BAL and NEA that reused the same assessments. Likewise, ES reported that the integration of the different criteria to a joint evaluation of GES by species was based on ICES

recommendations (ICES 2018a), with the recent modifications incorporated by the JWGBIRD (ICES 2018b).

Good practices: The MSFD biodiversity expert network develops recommendations for common integration rules across parameters and criteria. This work will be presented to WG GES aiming to achieve common agreed rules.

Gaps: At the time of the reporting there were no agreed integration rules, however, significant work was developed since them to cover this gap, which can affect the level of the GES determination.

Recommendations for reporting: The same recommendation as with the GES achievement (see also previous sectors like sector 2.6) is relevant to integration. The integration rules at the criterion level are not corresponding directly to the parameter/species/criterion structure, but to a higher level, so it has to be consistently and carefully repeated for all relevant parameters and criteria per individual species increasing the complexity of the reporting. An agreed method will eliminate the need for reporting integration rules.

Recommendations for implementation: The debate for agreed integration rules is on-going for several descriptors. For species, the MSFD biodiversity expert network is working to this direction and will continue testing the most promising methods. Eventually, common agreed rules will be introduced to Art. 8 guidance.

3.2 Results of Art.9 analysis for D1 seabirds

3.2.1 GES determination levels

Objective: This analysis aims to provide an overview of how the MS determined GES and explore possibilities to harmonise GES determination.

Data: We analysed the GES description from the MS reports at the levels that were reported (column I, Appendix 2, file D1-Art9).

Table 31. Level of GES determination and examples of GES description. The count of entries correspond to the total number of ecosystem component per MS and subregion for which GES was determined for D1 or its criteria. The examples are indicative to the variety of GES descriptions.

Levels	MS	Examples
Descriptor	3 CY DE IT	DE The good environmental status for D1 is defined, among other things, by the fact that: ... according to the WFD, the coastal waters are in a good ecological status and the entire coastal sea area is in a good chemical status. ... the habitat types of Annex I (LRT 11xx) of the Habitats Directive relevant for the marine area of the North Sea are in a favorable state of conservation. ... the species of Annex II of the Habitats Directive relevant for the marine area of the North Sea and the species of the Birds Directive relevant for the marine area of the North Sea are in a favorable state of conservation due to the quality of their food habitat.

		... the species, species groups and habitats in the Wadden Sea listed in the Wadden Sea Plan are in good condition. ... the goals of individual species or species group-specific conventions (e.g. ASCOBANS, seal agreements) have been achieved. ... the Ecological Quality Objectives (EcoQO) defined by OSPAR have been achieved. According to Commission (EU) 2017/848, the following criteria are used to assess the good environmental status of D1 birds: D1C1, D1C2, D1C3, D1C4, D1C5. An assessment was currently only possible for criteria D1C2 and D1C3. Explanation: Germany does not update the general description of the good environmental status of 2012 at descriptor level in this report round. During the reporting period, Germany worked with the countries bordering the North Sea as part of the EU's MSRL-CIS process and in OSPAR to develop methodological standards (indicators, evaluation methods). Specific details of criteria and indicators that contribute to a quantitative assessment of good environmental status are reported in the reporting scheme Art. 8_GES. For the evaluation of the criteria of the decision of the Commission (EU) 2017/848, where relevant, the evaluations according to other EU directives are included under Art. 8_GES, wherever possible the previously agreed regional evaluations are taken into account and supplemented by national evaluations in individual cases.
Criteria	10 ES FR IE LV PL BE DK HR MT SI	DK Mortality per species from by-catch is below levels that threaten the species in the long term. MT Levels of incidental by-catch of marine reptiles, marine mammals and seabirds do not result in declines in the population abundance of the representative species.
Species group		.
Species	1 EE	EE Species level: GES is achieved if the abundance of bird species is at least 70% from the baseline value. Species group level: GES is achieved if 75% of the bird species inside the species group have achieved GES.
Indicators	8 DK FI LT NL PL SE-(NEA) MT PT	DK-C1 Good environmental density for population density is considered to correspond to favorable conservation status (favorable reference population) under the Habitats Directive. DK-C2 In relation to the population density of bird species, the criterion is assessed in good environmental condition, corresponding to a positive assessment of population size under the Article 12 Report of the Bird Protection Directive from 2013. FI

		For more than 75% of nesting seabird species, population size does not fall> 30% from the 1991-2000 average. Seabirds are estimated as the average of two indicators. NL For each functional group, the population size of at least 75% of the species is above the 1992 threshold (OSPAR assessment value). PL-C2 The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured. Threshold values established on regional level (HELCOM). SE-C2 (NEA) Birds: When at least 75 % of the species within a species group achieve their species specific threshold values. MT-C2 The population trend in terms of the abundance of breeding seabirds, measured in breeding pairs over a 12-year time period, is stable and not decreasing, taking into consideration natural variation.
No determination	1 SE-(BAL)	SE-C2 (BAL) GES: Definition of GES at criteria level is not yet available.

Levels	MS	Examples
Descriptor	1 DE	DE The good environmental status for D1 is defined, among other things, by the fact that: ... according to the WFD, the coastal waters are in a good ecological status and the entire coastal sea area is in a good chemical status. ... the habitat types of Annex I (LRT 11xx) of the Habitats Directive relevant for the marine area of the North Sea are in a favorable state of conservation. ... the species of Annex II of the Habitats Directive relevant for the marine area of the North Sea and the species of the Birds Directive relevant for the marine area of the North Sea are in a favorable state of conservation due to the quality of their food habitat. ... the species, species groups and habitats in the Wadden Sea listed in the Wadden Sea Plan are in good condition. ... the goals of individual species or species group-specific conventions (e.g. ASCOBANS, seal agreements) have been achieved. ... the Ecological Quality Objectives (EcoQO) defined by OSPAR have been achieved.

		According to Commission (EU) 2017/848, the following criteria are used to assess the good environmental status of D1 birds: D1C1, D1C2, D1C3, D1C4, D1C5. An assessment was currently only possible for criteria D1C2 and D1C3. Explanation: Germany does not update the general description of the good environmental status of 2012 at descriptor level in this report round. During the reporting period, Germany worked with the countries bordering the North Sea as part of the EU's MSRL-CIS process and in OSPAR to develop methodological standards (indicators, evaluation methods). Specific details of criteria and indicators that contribute to a quantitative assessment of good environmental status are reported in the reporting scheme Art. 8_GES. For the evaluation of the criteria of the decision of the Commission (EU) 2017/848, where relevant, the evaluations according to other EU directives are included under Art. 8_GES, wherever possible the previously agreed regional evaluations are taken into account and supplemented by national evaluations in individual cases.
Criteria	8 ES FR LV PL BE DK HR MT	DK Mortality per species from by-catch is below levels that threaten the species in the long term. MT Levels of incidental by-catch of marine reptiles, marine mammals and seabirds do not result in declines in the population abundance of the representative species.
Species group		.
Species	1 EE	EE Species level: GES is achieved if the abundance of bird species is at least 70% from the baseline value. Species group level: GES is achieved if 75% of the bird species inside the species group have achieved GES.
Indicators	6 DK FI NL PL SE-(NEA) MT	DK-C1 Good environmental density for population density is considered to correspond to favorable conservation status (favorable reference population) under the Habitats Directive. DK-C2 In relation to the population density of bird species, the criterion is assessed in good environmental condition, corresponding to a positive assessment of population size under the Article 12 Report of the Bird Protection Directive from 2013. FI For more than 75% of nesting seabird species, population size does not fall> 30% from the 1991-2000 average. Seabirds are estimated as the average of two indicators. NL

		For each functional group, the population size of at least 75% of the species is above the 1992 threshold (OSPAR assessment value). PL-C2 The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured. Threshold values established on regional level (HELCOM). SE-C2 (NEA) Birds: When at least 75 % of the species within a species group achieve their species specific threshold values. MT-C2 The population trend in terms of the abundance of breeding seabirds, measured in breeding pairs over a 12-year time period, is stable and not decreasing, taking into consideration natural variation.
No determination	1 SE-(BAL)	SE-C2 (BAL) GES: Definition of GES at criteria level is not yet available.

Findings: MS have determined GES at the levels of descriptor, criterion, species, and indicator (Table 31). There is no consistency in the GES determination at any level, even when it refers to the same species and criteria. The different levels of GES determination jeopardised the comparison of GES achievement across the MS, as was also verified from the GES achievement reporting information for Art. 8 (see sections like section 2.6). Several reasons caused the inconsistency in the GES determination in Art. 9, which are listed for marine mammals (section 1.2) and are the same for all species groups.

Only some MS specified in the GES description that the assessment values were established by regional conventions (either OSPAR or HELCOM) or HBD, however the definition was always at criterion level. For instance, PL provides a specific GES determination for D1C3 for surface feeding birds: *"the population demographic characteristics (e.g., body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a healthy population which is not adversely affected due to anthropogenic pressures. Threshold values established on regional level (HELCOM)*".

Gaps: Lack of harmonisation caused by lack of common understanding and misinterpretation of the MSFD requirements in relation to the GES determination per Descriptor. This should be clarified across Descriptors and following the ecosystem approach to the assessment linking state with impact and pressures (DPSIR).

Recommendations for reporting: No recommendation, this information is crucial and well reported. Maybe a way to break down the detailed description of GES that some MS provided would help to extract more information from the GES determination, however, this needs further discussion.

Recommendations for implementation: The assessment flow and the Art. 8 guidance should be the basis for clarifying the GES determination in a consistent way. Guidelines are required on how a quantitative GES will be reflected at the level of species groups, criteria and species. Afterwards, agreed values should be developed based on scientific rationale on the percentage of the species in each area to be in GES. Common integration rules and common agreed methods will bring consistency in all levels. The biodiversity expert network in close collaboration with groups leading the ongoing

work at regional level (e.g., WGBIRD) can take the harmonisation of the GES determination forward. The reporting tool should be developed accordingly, linking GES determination to the proper level reducing and automatizing the reporting effort.

4. Cephalopods

4.1 Cephalopods results of Art.8 analysis

4.1.1 Consistency, comparability and adequacy of reported criteria elements and features assessed at EU and regional level

Objective: Which species are reported, by which MS per region.

Data: We analysed the data reported in column G "Elements" per MS, subdivisions and regions (Appendix 2, file Art.8 cephalopods).

Expected Outcome: This analysis can provide an overview of the species reported per MS, subdivisions and regions.

Table 32. Coastal shelf cephalopods reported by the evaluated Member States and their geographical association with the MSFD regions and subdivisions.

Coastal shelf cephalopods	NEA				MED			
	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL
Alloteuthis spp			PT				SI	
Eledone cirrhosa Curled octopus			ES			MT		
Eledone moschata Musky octopus			ES		MT	MT	SI	
Loligo vulgaris European squid			ES, PT			MT	SI, MT	
Octopus vulgaris Common octopus			ES, PT			MT	MT	
Sepia officinalis Common cuttlefish			ES, PT			MT	SI	
Coastal shelf cephalopods	DE							

Table 33. Deep-sea cephalopods reported by the evaluated Member States and their geographical association with the MSFD regions and subdivisions.

Deep-sea cephalopods	NEA				MED			
	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL
Eledone cirrhosa Curled octopus			ES, PT					
Illex coindetii Southern shortfin squid			ES, PT			MT	MT	
Scaeurgus unicirrhus Atlantic warty octopus						MT		
Sepia orbignyana Pink cuttlefish						MT		
Todaropsis eblanae Lesser flying squid			ES, PT					
Todaropsis sagittatus Flying squid						MT		

Cephalopods are not present in the Baltic Sea and in the Black Sea.

Findings:

Species perspective:

Four MS reported cephalopod species (PT, SI, ES, MT) and DE reported coastal shelf cephalopods as a group (Table 32 and Table 34). The MS that did not provide electronic reports (e.g., EL, UK) and those that did not report cephalopods (e.g., FR, IT) should report cephalopod species, because of their importance in the ecosystems and fisheries.

Gap: Assuming that the CFP generates data for all cephalopod species, the gaps in the reporting might be a result of not prioritising this ecosystem element compared with other or a result of methodological gaps and luck of coordination across cephalopod experts. Only MT referred to the CFP.

Recommendations for reporting: The species lists that were developed for the reporting greatly improve the consistency in the reporting of species, compared with the 2012 reporting. Especially, for the cephalopods it seems that the list guided the species to be assessed, at least for ES and MT, SI and PT.

Recommendations for implementation: The MS and their experts should discuss why this group is poorly reported and define the added value of assessing those species, especially against specific anthropogenic pressures.

Recommendations for methodological standards: The experts on cephalopods, as part of the MSFD biodiversity fish group need to work together and further develop methods for the assessment of those species and link them with specific pressures.

8.1.2 Objective: The MS reported the source of the element (i.e., species) reported. The analysis of the sources will reveal the level of harmonisation across the MS and the level of exploitation of available information.

Data: We analyse the data reported in column M "Element source" (Appendix 2, file Art.8 cephalopods).

Table 34. Element source by region and MS

Element source	Reported in:		Tot. MS
	NEA	**MED**	
National	ES, PT	SI	3
CFP		MT	1

DE did not provide the element source.

Findings: The MS reported as a source for their elements either "national" or "CFP" in the first column of Table 34:

Gap: Data gaps in the reporting, as not all MS reported cephalopods reported this entry.

Recommendations for implementation: The CFP data should be better exploited.

Recommendations for methodological standards: The experts on cephalopods, as part of the MSFD biodiversity fish group need to work together and further develop methods for the assessment of those species and link them with specific pressures.

4.1.2 Extension in use of MSFD Criteria (primary and secondary) reported at EU, regional and (sub)regional level

Objective:

Table 35 presents a variety of information and overviews related with the progress of the cephalopods' assessments.

- Gives an overview of the use of primary and secondary criteria. The number in each cell indicates the number of member states reported each criterion out of the total number of MS reported for each species.

- Provides an overview of the species assessments and threshold values per criterion and region. The traffic light approach (green, orange, red) corresponds to the level of assessment of the parameters for each criterion and species, including the report of threshold values. Green: Indicates those criteria with a complete assessment by comparing the threshold value with the value achieved. Orange: Indicates that either a threshold value is available, or the value achieved (estimated parameter), so assessment is not complete. Red: Indicates that no threshold value or value achieved are reported.

- Gives an overview of the assessed parameter for each species and criterion. The bold borders around the cells indicate those species and criteria for which the achieved parameter is assessed and reported (either negative or positive).

Data: The reported information in column N was used for the use of the criteria (Appendix 2, file Art.8 cephalopods). The species assessment was based on the information in columns Q, R, S and V. The overview of the assessed parameters was based on the information in column AD. The assumption for the traffic light approach is that the any reported category was aggregated to the higher level, so if only one MS provided threshold value and value achieved for a single species and in a single MRU, this is assigned to the species and region or subdivision. We assume that all MS in the same region or subdivision should have available methods to perform a similar assessment.

Table 35. Reported threshold values and/or estimated parameters. Green: Indicates that for those criteria a complete assessment has been done by comparing the threshold value with the value achieved. Orange: Indicates that either a threshold value is available, or the value achieved (estimated parameter), so assessment is not complete. Red: Indicates that no threshold value or value achieved are reported. The numbers reflect the MS that reported each criterion to allow for an overview of the primary vs. secondary criteria usage. The bold-framed cells show the criteria of the species that were reported to be assessed (positive or negative).

NEA		D1C1	D1C2	D1C3	D1C4	D1C5
Coastal/shelf cephalopods ES DE PT	*Eledone cirrhosa*	1/1	1/1	0/1	0/1	1/1
	Eledone moschata	1/1	1/1	0/1	0/1	1/1
	Loligo vulgaris	1/1	1/1	0/1	0/1	1/1
	Octopus vulgaris	1/1	1/1	0/1	0/1	1/1
	Sepia officinalis	1/1	1/1	0/1	0/1	1/1
	Alloteuthis spp.	1/1	1/1	1/1	0/1	0/1
	Coastal shelf cephalopods	1/1	1/1	1/1	1/1	1/1
Deep-sea cephalopods ES PT	*Eledone cirrhosa*	2/2	2/2	2/2	1/2	1/2
	Illex coindetii	2/2	2/2	2/2	1/2	1/2
	Todaropsis eblanae	2/2	2/2	2/2	1/2	1/2

MED		D1C1	D1C2	D1C3	D1C4	D1C5
Coastal/shelf cephalopods MT, SI	*Eledone cirrhosa*	1/1	1/1	1/1	1/1	1/1
	Eledone moschata	2/2	2/2	1/2	1/2	1/2
	Alloteuthis spp.	1/1	1/1	0/1	0/1	0/1
	Loligo vulgaris	1/2	2/2	1/2	0/2	0/2
	Sepia officinalis	1/2	2/2	1/2	0/2	0/2
	Illex coindetii	0/1	1/1	1/1	0/1	0/1
	Octopus vulgaris	0/1	1/1	1/1	0/1	0/1
Deep-sea cephalopods MT	*Scaeurgus unicirrhus*	1/1	1/1	0/1	0/1	0/1
	Sepia orbignyana	1/1	1/1	0/1	0/1	0/1
	Todarodes sagittatus	1/1	1/1	0/1	0/1	0/1

Findings:

Use of primary and secondary criteria: From the reported species D1C4 and D1C5 were reported much less that the other criteria. Estimated parameters were reported only for D1C2 and D1C3. So according to Table 35 there is no indications for using primary more than secondary, but D1C3 was reported more than other primary criteria, probably because there were available data for this criterion.

Species assessments and threshold values per criterion and region: No threshold values reported. Only MT reported values for D1C2 (five species), D1C3 (one species) and D1C4 (three species). PT reported trends for some species and a break point analysis method for thresholds that is based on a scientific paper (Probst and Stelzenmuller, 2015).

Assessed parameter for each species and criterion: MT and PT reported assessed parameters, but only for four species (in orange) and for the *Alloteuthis spp*. And only for two criteria (D1C2 and D1C3).

Gap: Assuming that the CFP generates data for all cephalopod species, the gaps in the reporting might be a result of not prioritising this ecosystem element compared with other or a result of methodological gaps and luck of coordination across cephalopod experts. Only MT and PT provided some kind of thresholds and assessments, but for very few species. MT is the only MS using information from the CFP, which could be a source for information for other MS as well.

Recommendations for methodological standards: The experts on cephalopods, as part of the MSFD biodiversity fish group, need to work together and further develop methods for the assessment and threshold values for those species and link them with specific pressures. With such a few reported assessments no other recommendation can be provided.

4.1.3 Cephalopods' thresholds values and parameters reported

Objective: This section provides an overview of the reported threshold values (Table 36) and compares them with those that are developed by the RSCs or other organisations (e.g., GFCM) and policies.

Data: We analysed the data reported in columns Q, R and S for threshold values (Appendix 2, file Art.8 cephalopods). This information is checked against the RSCs roof reports and the Palialexis *et al*. (2019) report the harmonisation of methods to set threshold values.

Table 36. Overview of the threshold values reported and their sources per criterion and species group.

Criteria	OSPAR	UNEPMAP	CFP	MSFD D3	No source reported
D1C1	-	-	-	-	Mortality rate from incidental by-catch Discards: Declining trend in discards of non-commercially exploited species (MT for five species)
D1C2	-	N/A		-	Biomass Index or LPUE: Above the long-term average for the species (MT) (5 species) Biomass: Combination of break point analysis and trend in the last five years (PT) (4 species)
D1C3	-	N/A	-	-	AGE-D 95% percentile of the length distribution: Above the long-term average for the species (MT) (5 species)
D1C4	-	N/A	-	-	DIST-R Biomass Distribution: Stable or increased in biomass distribution (MT) (5 species)
D1C5	-	N/A	-	-	No threshold reported

Findings:

Threshold values reported:

No threshold values were reported for any parameter and criterion. Quantitative thresholds were reported by PT for D1C2 and MT for D1C1, D1C2, D1C3 and D1C4 (Table 36).

Trends:

The qualitative thresholds are trend-based, which is always the case when no methods or luck of long data do not allow for the development of more sophisticated methods. Only ES and PT reported a trend, the first one for grouped coastal/shelf cephalopods, however the threshold value was not specified, neither the value achieves. The second one for three criteria (D1C2, D1C3 and D1C4) always combined with their qualitative trends.

Recommendations for methodological standards: The information reported is not representative to the species group to extract recommendations. The approaches of MT and PT are logical and could be considered as a good start for discussions with experts, especially for poor-data criteria.

4.1.4 Consistency of spatial coverage and assessment period

Objective: The MS reported the assessment period for each parameter per species and criterion. We analysed this information to explore potential discrepancies in the assessments at regional and criterion level that could potentially affect the comparability and the consistency of the final assessment of each parameter (Table 37).

Data: This information is reported in column AT "assessment period" (Appendix 2, file Art.8 cephalopods).

Table 37. Assessment period per criterion and region based on which the MS performed the assessment of their parameters. The numbers indicate how many reported parameters have the same assessment period per criterion.

	1993-2017	2011-2017	2012-2017	2012-2018
NEA				
D1C1			4	1
D1C2	1		4	1
D1C3	1		4	1
D1C4	1			1
D1C5				1
MED				
D1C1			4	5
D1C2			14	5
D1C3			10	5
D1C4				5
D1C5				5

Findings: There is no harmonisation in the assessment period even for the limited reporting of cephalopods. Moreover, the 6-year assessment cycle is not reflected in the assessed parameters.

Gaps: Data and methodology gaps.

Recommendations for reporting: No recommendation, this information is crucial, but the data gaps do not allow for a deeper analysis. It should be noted though that many MS included in the reporting information which does not correspond to specific parameter or data, but it was selected from the drop-down menus in the reporting. This is more evident in poor data cases like the cephalopods, where despite the very few completed assessments and threshold values the assessment period was reported for many more entries.

Recommendations for implementation: The policy alignment between MSFD, CFP (if there is an agreement to use the CFP monitoring as the main source of data) and RSC assessment cycles that includes alignment of the assessment periods is crucial to reduce the burden of multiple incomparable and sometimes misleading assessments of the same elements. Otherwise, the assessment period will be an additional factor to the different parameters, methods, and thresholds to produce incomparable and inconsistent environmental assessments. The initiatives to align the MSFD with other environmental policies could use this analysis to justify the need for temporal alignment and methodological harmonisation across the policy obligations.

4.1.5 GES achievement or date expected to be achieved

Objective: The MS reported for each species if it is in GES, or when they expect to achieve GES. We analysed the reported information to identify the proportion of species that are in GES at regional level and when most of the species in each species groups could be in GES according to the MS.

Data: The information of the GES achievement or the expected date is in column AR (Appendix 2, file Art.8 cephalopods).

Expected Outcome: The GES achievement is the basis for the MSFD. In the structure of the reporting this entry corresponds to the assessment of parameters, which are integrated at the level of criterion and then the criteria are integrated at the level of species. Given the different methods of integration at both levels and the number of parameters or criteria that contributed to each assessment the final GES assessment/achievement might not be consistent yet. The outcome will provide a quick overview of the proportion of species that are in GES and the provision for the GES achievement for the species group.

Table 38. GES status for cephalopods or provisional date of GES achievement as it was reported by each MS.

Species groups and species in NEA		GES achieved	GES expected to be achieved			Not Assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Coastal/shelf cephalopods	*Eledone cirrhosa*	PT					ES
	Eledone moschata						ES
	Alloteuthis spp.					PT	
	Loligo vulgaris					PT	ES
	Octopus vulgaris					PT	ES
	Sepia officinalis					PT	ES
	Coastal/shelf cephalopods						DE, ES
Deep-sea cephalopods	*Eledone cirrhosa*						ES
	Illex coindetii	PT					ES
	Todaropsis eblanae	PT					ES
	Deep sea cephalopods						DE, ES

Species groups and species in MED		GES achieved	GES expected to be achieved			Not Assessed	Unknown
			by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
Coastal/shelf cephalopods	*Eledone cirrhosa*			MT	MT		
	Alloteuthis spp.					SI	
	Eledone moschata			MT	MT	SI	
	Loligo vulgaris				MT	SI	

	Octopus vulgaris				MT		
	Sepia officinalis					SI	
Deep-sea cephalopods	*Scaeurgus unicirrhus*			MT			
	Illex coindetii				MT		
	Sepia orbignyana			MT			
	Todarodes sagittatus			MT			

Findings: As was shown for other ecosystem elements, the MS have different understanding of the GES achievement, which affects both the way they assessed each species per criterion and the way they reported "element assessed" and GES achievement. The MS that reported GES achievement for cephalopods followed different approach. ES reported that GES achievement is unknown, while MT reported that GES will be achieved after 2020. PT was the only one reported that GES was achieved for three species, while for the rest GES is not assessed.

Gap: For cephalopods there many data gaps, as this entry requires consideration of several assessments and integrations. The outcome is not representative of the status of GES in the European waters for cephalopods. Moreover, gaps exist in the methodology on how to commonly assess species and set comparable thresholds, which made some MS to report unknown or not assessed for GES achievement.

Recommendations for reporting: The MS to assess the GES achievement need to combine assessments of other criteria and parameters. Thus, this entry which is at the species/parameter/criterion level should be move to a higher level. Many MS conceive it in a different manner and reported inconsistent information e.g., assessment of criterion instead of species or no assessment at all, when the relevant parameter/criterion was not assessed.

Recommendations for implementation: This entry includes information relevant to the high level MSFD scope, which is the GES achievement. All the work that is related with the harmonisation of methodological standards (thresholds, integration rules) can ensure a consistent and comparable assessment of species in the coming cycles and achieve consistency in the MS reports. The experts from the MS could develop this work and their role is essential for a consistent regional assessment and can feed the Art. 8 guidance and test the recommendations for integration rules.

4.1.6 Analysis of the integration methods across parameters and criteria

Objective: The integration rules are an essential part of the GES assessment. We analyse the reported information to identify potential patterns in the use of different rules, get an overview of the methods applied and reported and use this information for the ongoing debate for agreed integration rules for D1 species.

Data: The MS reported the integration rules between parameters to inform the criterion level, and between criteria to inform the species level (Integration rule type parameter in column AK and Integration rule type criteria in column AM, respectively, in Appendix 2, file Art.8 cephalopods).

Findings: Despite the very few assessment of criteria MT reported a conditional rule for integration: "*The integration method used for the criteria was the following: If 2/3 criteria assessed were 'good', the overall status of the species was determined to be 'good'; if two criteria were assessed and one*

was determined to be 'good' and the other as 'not good', the overall status of the species was determined to be as 'not assessed'; if 2/3 criteria assessed were 'not good', the overall status of the species was determined to be 'not good'. In accordance with the 'Guidance for Assessments Under Article 8 of the Marine Strategy Framework Directive' integration at species level shall be agreed at Union level taking into account regional or subregional specificities; however, since the majority of the species were found to be in 'not good' status, on the basis of expert judgement, GES for both fish and cephalopods is expected to be achieved later than 2020". No other methods were reported.

Gaps: Data gaps and methodology gaps. As MT reported the integration rules should be agreed at EU level.

Recommendations for reporting: Except of the need to get more data to test the recommended integration methods, a similar recommendation with the GES achievement (see for instance sector 2.6) would fit here, as well ; the integration rules at the criterion level are not corresponding directly to the parameter/species/criterion structure, but to a higher level, so it has to be consistently and carefully repeated for all relevant parameters and criteria per individual species increasing the complexity of the reporting. An agreed method will eliminate the need for reporting.

Recommendations for implementation: The debate for agreed integration rules is on-going for several descriptors. For species, the MSFD biodiversity expert network is working to this direction and will continue testing the most promising methods.

4.2 Results of Art.9 analysis for D1 cephalopods

4.2.1 GES determination levels

Objective: This analysis aims to give an overview of how the MS determined GES and explore possibilities to harmonise it.

Data: We analysed the GES description from the MS reports at the levels that were reported (column I in file D1-Art9, Appendix 2).

Table 39. Level of GES determination and examples of GES description. The count of entries correspond to the total number of ecosystem component per MS and subregion for which GES was determined for D1 or its criteria. This is indicative to the variety of GES descriptions.

Levels	MS	Examples
Descriptor	2 DE, SI	DE The good environmental status for D1 is defined, among other things, by the fact that: ... according to the WFD, the coastal waters are in a good ecological status and the entire coastal sea area is in a good chemical status. ... the habitat types of Annex I (LRT 11xx) of the Habitats Directive relevant for the marine area of the North Sea are in a favorable state of conservation. ... the species of Annex II of the Habitats Directive relevant for the marine area of the North Sea and the species of the Birds Directive relevant for the marine area of the North Sea are in a favorable state of conservation due to the quality of their food habitat. ... the species, species groups and habitats in the Wadden Sea listed in the Wadden Sea Plan are in good condition.

		... the goals of individual species or species group-specific conventions (e.g. ASCOBANS, seal agreements) have been achieved. ... the Ecological Quality Objectives (EcoQO) defined by OSPAR have been achieved. The cephalopod species group could not be assessed. Explanation: Germany does not update the general description of the good environmental status of 2012 at descriptor level in this report round. During the reporting period, Germany worked with the countries bordering the North Sea as part of the EU's MSRL-CIS process and in OSPAR to develop methodological standards (indicators, evaluation methods). Specific details of criteria and indicators that contribute to a quantitative assessment of good environmental status are reported in the reporting scheme Art. 8_GES. For the evaluation of the criteria of the decision of the Commission (EU) 2017/848, where relevant, the evaluations according to other EU directives are included under Art. 8_GES, wherever possible the previously agreed regional evaluations are taken into account and supplemented by national evaluations in individual cases. SI Good environmental status in relation to the quality descriptor Biodiversity (D1) - groups of species of birds, reptiles, mammals, fish and cephalopods is achieved when: (1) the mortality rate for an individual species due to inadvertent by-catches is below endangering that their long-term viability is guaranteed, (2) anthropogenic pressures do not adversely affect the abundance of fish species populations, so that their long-term viability is guaranteed, (3) the demographic characteristics of commercial fish and cephalopod populations are typical for a healthy population, (4) the range of the species is in accordance with the prevailing physiographic, geographical and climatic conditions, (5) the habitat of the species has the necessary range and conditions to support the different stages of the life cycle of the species.
Criteria		
Species group		
Species		
Indicators	1 MT	The biomass indices and the size distribution of non-commercially exploited species, as assessed through MEDITS surveys, in comparison with historical averages, are indicative of healthy status.
No determination		

Findings: Only three MS provided a GES determination that could be relevant to cephalopods. DE and SI provided a very general GES description at the level of Descriptor (Table 39) DE provided the same GES description for all ecosystem elements. MT provided a very detailed GES description at the level of indicator. Of course, such a description does not facilitate an assessment at species level. No quantitative GES description was provided, neither any attempt to link GES with thresholds and GES extent.

Gaps: Lack of harmonisation caused by lack of common understanding and misinterpretation of the MSFD requirements in relation to the GES determination per Descriptor. This should be also clarified across the Descriptors and following the ecosystem approach to the assessment linking State with Impact and Pressures (DPSIR). When only three MS provided GES determination for cephalopods there is not much to analyse, however the experts should consider the same analysis and results for other species groups that are more informative.

Recommendations for reporting: No recommendation, this information is crucial for the reporting. As it was proposed for other species groups, a way forward could be to break down the detailed description of GES to more than one entry allowing the extraction of more information from the GES determination, however, this needs further discussion.

Recommendations for implementation: The assessment flow and the Art. 8 guidance should be the basis for clarifying the GES determination in a consistent way and how the GES will be reflected at the level of species groups indicators, criteria and species. Common integration rules and common agreed methods will bring consistency in all levels. The reporting tool should be developed accordingly, linking GES determination to the proper level reducing and automatizing the reporting effort.

4.2.2 Justifications for delays and no-using

DE reported a justification for delay, which we reproduce here as an indication of the very different justifications that can be reported for each species, indicators/criteria, mechanisms and scientific capacity or resources.

They reported: "*The relevance of the cephalopods for the description of the good environmental status of German North Sea waters is currently unclear: the pollution situation is unclear. There is no targeted fishing in Germany, but by-catches do occur. These are extremely low at 2t to 20t. There is currently no coordinated assessment procedure for assessing the state of the squid populations in the North Sea and the data basis is uncertain. The strong annual fluctuations in abundance make it difficult to define good environmental status for the respective populations. Scientific working groups under the patronage of the International Council for the Exploration of the Sea (ICES) work on the development of methods and the collection of data*".

5. Fish

5.1 Fish results of Art.8 analysis

5.1.1 Consistency, comparability and adequacy of reported criteria elements and features assessed at EU and regional level

10.1.1 Objective: This analysis presents the reported species by MS per region (black font), and the non-reported species (in blue font when they were reported by the MS in 2012), that are included in RSCs lists or EU policies[3] (lower part of Table 40 to Table 43).

Data: We analyse the data reported in column G "Elements" per MS, subdivisions and regions (Appendix 2, Art.8 fish).

Expected Outcome: The analysis gives an overview of the reported species (black) per region, MS and species group. At the bottom of each table, we list species not reported in 2018 per subregion, although they were previously reported in 2012. Species reported in more than one species group were included in additional tables to avoid duplication and are identified by green highlighting. Grey cells correspond to regions or subdivisions where there is no information in the reports.

Table 40. Coastal fish reported by the evaluated Member States and their geographical association with the MSFD regions and subdivisions. Green cells correspond to species reported under more than one fish groups.

Coastal fish species	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Abramis brama Common bream	DE				AMA					
Acipenser oxyrinchus Atlantic sturgeon	DE									
Acipenser sturio Atlantic sturgeon		DE, UK	UK							
Alepocephalus bairdii *Baird's smoothhead*			IE							
Alopias vulpinus *Common thresher shark*			IE							
Anguilla Anguilla Eel	DE	DE, UK	IE UK							
Antimora rostrata *Antimora*			IE							
Aphanopus carbo Black scabbardfish			IE							
Apristurus spp. *Deep sea catcharks*			IE							
Auxis rochei Bullet tuna						ES				
Beryx spp. *Alfonsino*			IE							
Callionymus lyra Common dragonet				PT						
Cataetyx laticeps			IE							
Chelon labrosus Longfin gurnard		DE		ABI						
Chimaera monstrosa			IE							

[3] Common Fisheries Policy and Data Collection (EC, 2013), HELCOM Red list (HELCOM, 2013), UNEP/MAP list (EC, 1999), OSPAR list (OSPAR, 2008), Black Sea protocol (BSC, 2002), and IUCN threatened species (IUCN, 2017).

Coastal fish species	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Rabbit fish										
Coregonus maraena Maraena whitefish	DE	DE				MWE				
Centrophorus squamosus *(Leafscale gulper shark*			IE							
Centroscyllium fabricii *Black dogfish*			IE							
Centroscymnus coelolepis *Portuguese dogfish*			IE							
Centroselachus crepidater *Longnose velvet dogfish*			IE							
Cetorhinus maximus *Basking shark*			IE							
Chimaera spp. *Rabbitfish*			IE							
Coris julis *Mediterranean rainbow wrasse*						IT	IT	IT		
Coryphaenoides rupestris *Roundnose grenadier*			IE							
Dalatias licha *Kitefin shark*			IE							
Deania calcea *Birdbeak dogfish*			IE							
Dentex dentex Four-spotted goby				FR		FR				
Dicentrarchus labrax Seabass		FR	FR	FR, ES						
Diplodus puntazzo						IT	IT	IT		
Diplodus sargus						IT	IT	IT		
Diplodus vulgaris *common two-banded sea bream*				PT		IT	IT	IT		
Dipturus batis *Common skate complex*			IE							
Dipturus nidarosiensis *Norwegian skate*			IE							
Epigonus telescopus *Bigeye*			IE							
Epinephelus marginatu Dusky grouper				FR		FR IT	IT	IT		
Esox Lucius Northern pike	DE									
Etmopterus princeps *Deepwater lanternshark*			IE							
Etmopterus spinax *Velvetbelly lanternshark*			IE							
Euthynnus alletteratus Little tunny						ES				
Gadus morhua Cod		SE, UK	IE, UK							
Galeorhinus galeus *Tope shark*			IE							

Coastal fish species	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Galeus melastomus *Blackmouth catshark*			IE							
Galeus murinus *Mouse catshark*			IE							
Helicolenus dactylopterus *Blackbelly rosefish*			IE							
Hexanchus griseus *Six-gill shark*			IE							
Hippocampus guttulatus Long-snouted seahorse		UK	UK			FR				
Hippocampus hippocampus Short-snouted seahorse		DE, UK	UK			FR				
Hippoglossus hippoglossus *Halibut*			IE							
Hoplostethus atlanticus *Orange roughy*			IE							
Hydrolagus mirabilis *(Large-eyed rabbitfish*			IE							
Isurus oxyrinchus *Shortfin mako shark*			IE							
Labrus viridis Green wrasse						FR				
Lamna nasus *Porbeagle shark*			IE	IE						
Lampetra fluviatilis *River lamprey*	DE, FI, SE	DE	IE	IE						
Leuciscus aspius Po brook lamprey	DE									
Leucoraja circularis *Sandy ra)*			IE							
Molva dypterygia *Blue ling*			IE							
Mora moro *Mora*			IE							
Mullus surmuletus *Striped red mullet*				PT						
Mustelus asterias *Starry moothhound*			IE							
Neogobius melanostomus Shorthorn sculpin										RO
Notocanthus chemnitzii Snub-nose spiny eel			IE							
Oblada melanura *Saddled seabream*						IT	IT	IT		
Oxynotus paradoxs Sailfin roughshark			IE							
Pagellus acarne				PT						
Pagellus erythrinus *Common pandora*				PT						
Perca fluvialis European perch	SE									
Petromyzon marinus Sea lamprey			IE							
Platichthys flesus European flounder	DK, LT	DE, DK								

Coastal fish species	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Raja clavate *Thornback ray*			IE							
Raja montagui Spotted ray			IE							
Raja undulata Undulate ray			IE							
Rajella fyllae Deepwater ray			IE							
Rhinochimaera atlantica Straightnose rabbitfish			IE							
Rostroraja alba White skate			IE							
Salmo salar Atlantic salmon	EE, FI	UK	IE, UK							
Sander lucioperca Pike-perch	DE									
Sarpa salpa *Salema porgy*						IT	IT	IT		
Sciaena umbra Brown meagre				FR		FR IT	IT	IT		
Scophthalmus maximus [Psetta maxima] Turbot			IE							
Scorpaena porcus *Black scorpionfish*						IT	IT	IT		
Scymnodon ringens Knitefooth shark			IE							
Serranus cabrilla Comber						IT	IT	IT		
Serranus hepatus Brown comber				PT						
Spondyliosoma cantharus Black seabream				PT						
Squalus acanthias Spurdog			IE							
Squatina squatina Angel shark			IE							
Symphodus cinereus *Grey wrasse*								SI		
Symphodus tinca *East Atlantic peacock wrasse*						IT	IT	IT		
Thunnus thynnus Bluefin tuna			IE							
Torpedo marmorata Marbled electric ray						ES				
Trachyscorpia cristulata Spiny scorpionfish			IE							
Vimba vimba Vimba bream	DE									
Zoarces viviparus Comber	DK	DK								
Coastal fish grouped	LT					ES				
Barbus barbus Barbel	HELCOM RED list									

Coastal fish species	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Cobitis taenia Spined loach	HELCOM RED list									
Cottus poecilopus Alpine bullhead	HELCOM RED list									
Gymnura altavela Spiny butterfly ray						UNEP list				
Gobio gobio Gudgeon	HELCOM RED list									
Labrus bergylta Ballan wrasse	HELCOM RED list									
Lebetus guilleti Guillet's goby	HELCOM RED list									
Nerophis ophidion Straightnose pipefish	HELCOM RED list									BS prot
Pristis pectinate Smalltooth sawfish						UNEP list				
Pristis pristis Common sawfish						UNEP list				
Rhinobatos rhinobatos Common guitarfish						UNEP list				
Sander marinus Estuarine perch										BS prot
Spinachia spinachia Sea stickleback	HELCOM RED list									
Symphodus melops Corkwing wrasse	HELCOM RED list									
Valencia letourneuxi Corfu toothcarp						UNEP list L322				

Table 41. Demersal shelf fish reported by the evaluated Member States and their geographical association with the MSFD regions and subdivisions.

Demersal shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Amblyraja radiate Starry ray	DK	DE, DK, SE								
Ammodytes spp Sand eel		SE								
Anarhichas lupus Atlantic wolffish		DK								
Anguilla Anguilla Eel	SE	SE								
Argentina Argentine			FR	FR		FR				
Argentina silus Black scabbardfish		SE								
Argentina sphyraena Argentine			FR	ES, PT, FR		FR				
Arnoglossus imperialis Imperial scaldfish				ES		ES				
Arnoglossus laterna				ES		ES				

Demersal shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Mediterranean scaldfish										
Arnoglossus rueppelli Rüppel's scaldback				ES		ES, FR				
Arnoglossus thori Thor's scaldfish				ES		ES				
Blennius ocellaris Butterfly blenny				ES		ES, FR				
Boops boops Bogue,				ES		ES, IT	IT	IT		
Brosme brosme Cusk		SE								
Buglossidium luteum Solonette				ES						
Callionymus lyra Common dragonet			IE	ES						
Callionymus maculatus Spotted dragonet			FR, IE	ES, FR		ES, FR				
Capros aper Boar fish			IE	ES						
Centrophorus granulosus Gulper shark						FR	MT			
Cepola macrophthalma Red Bandfish				ES		ES				
Chelidonichthys cuculus Red gurnard		FR	FR	ES, FR		ES, FR IT	IT	IT		
Chelidonichthys lastoviza Streaked gurnard						ES IT	IT	IT		
Chelidonichthys lucerna Streaked gurnard		FR		ES		IT	IT	IT		
Chelidonichthys obscurus Longfin gurnard				ES		FR				
Chimaera monstrosa *Rabbit fish*						FR, ES	MT			
Citharus linguatula Spotted flounder				ES		FR IT	IT	IT		
Coelorinchus caelorhincus Hollowsnout grenadier						ES, FR	MT			
Conger conger Conger eel			FR	ES, FR		ES, FR				
Coregonus lavaretus Lavaret	SE									
Coryphaenoides rupestris Roundnose grenadier		SE	IE							
Dalatias licha Kitefin shark						ES, FR				
Dasyatis pastinaca Common stingray		DE					MT			
Deltentosteus quadrimaculatus Four-spotted goby				ES, FR		ES, FR				
Dicentrarchus labrax Seabass		SE								
Diplodus annularis Annular seabream				ES		ES				
Dilpodus bellotii Wedge sole				ES		MWE				
Diplodus vulgaris Sargo				ES						

Demersal shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Dipturus batis Common skate		DE, DK, SE, UK	FR, UK	FR		IT	IT	IT		
Dipturus oxyrinchus Longnosed skate						FR				
Echiichtys vipera Painted eel		FR	FR	FR						
Enchelyopus cimbrius Fourbeard rockling	DE									
Etmopterus spinax Velvet belly lantern shark				ES		FR	MT			
Eutrigla gurnardus Grey gurnard		DE, FR, SE	FR, IE	ES, FR		FR				
Gadiculus argenteus Silvery pout				ES PT						
Gaidropsarus macrophthalmus Bigeye rockling				ES						
Gaidropsarus vulgaris Bigeye rockling		DE	ACS							
Gadus morhua Cod	DE, SE, FI, LV	DE, FR, SE, UK	FR, UK	FR						
Galeorhinus galeus Tope shark		FR								
Galeus melastomus Blackmouth catshark			FR	ES, FR		ES, FR	MT			
Glossanodon leioglossus Smalltoothed argentine						ES, FR				
Glyptocephalus cynoglossus Witch flounder		SE								
Gnathophis mystax Thinlip conger				ES						
Gobius niger Black goby				ES		ES				
Helicolenus dactylopterus Blackbelly rosefish			FR	ES, FR		ES, FR	MT			
Heptranchias perlo Sharpnose sevengill shark						IT	IT MT	IT		
Hexanchus griseus Bluntnose sixgill shark							MT			
Hippoglossus hippoglossus Atlantic halibut		DK								
Hymenocephalus italicus Glass-head grenadier							MT			
Lepidopus caudatus Silver scabbardfish				ES		ES, FR				
Lepidorhombus boscii Four-spot megrim			FR	ES, FR, PT		ES, FR				
Lepidorhombus whiffiagonis Megrim			IE	ES						
Lepidotrigla cavillone Large-scaled gurnard				ES		ES				
Lepidotrigla dieuzeidei Spiny gurnard				ES						
Lepidotrigla spp.				PT						
Lesueurigobius friesii Frie's goby				ES		ES				
Lesueurigobius sanzi Frie's goby				ES						
Leucoraja (Raja) circularis						IT	IT	IT		

Demersal shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Sandy rayfish										
Leucoraja fullonica Shagreen ray			FR	FR						
Leucoraja melitensis Maltese ray						IT	IT	IT		
Leucoraja naevus Cuckoo ray			FR, IE	ES, FR, PT		FR				
Limanda limanda Common dab	DE, SE	DE, SE								
Lophius budegassa Blackbellied angler			FR	ES, FR, PT		ES, FR				
Lophius piscatorius White Anglerfish		DK, SE	FR	ES, FR		FR IT	IT			
Lumpenus lampretaeformis Snakeblenny	DE									
Melanogrammus aeglefinus Haddock		DE, SE	IE							
Merlangius merlangus Whiting	DE	DE, SE	IE	ES						RO
Merluccius merluccius European Hake		SE	FR, IE	ES, FR, PT		ES, FR				
Microchirus azevia Bastard sole				ES		MWE				
Microchirus boscanion Lusitanian sole				ES						
Microchirus ocellatus Foureyed sole				ES						
Microchirus variegatus Thickback sole				ES, PT						
Micromesistius poutassou Blue whiting		SE	IE	ES, PT		ES				
Microstomus kitt Lemon sole		SE								
Molva dypterygia Blue ling		SE								
Molva macrophthalma Spanish ling						FR				
Molva molva Ling		DK, SE	FR	FR						
Mullus surmuletus Striped red mullet				ES		ES				
Mustelus Smooth-hounds		FR								
Mustelus asterias Starry smooth-hound		DE, DK				IT	IT	IT		
Mustelus mustelus Smooth-hound		DK, FR				IT	IT	IT		
Mustelus punctulatus blackspotted smooth-hound						IT	IT	IT		
Myliobatis aquila Common eagle ray							MT			
Nezumia aequalis Common Atlantic grenadier						ES				
Nezumia sclerorhynchus Common Atlantic grenadier							MT			
Pagellus acarne Axillary seabream				ES		ES				
Pagellus bellotii				ES						

Demersal shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Red pandora										
Pagellus bogaraveo Blackspot seabream						IT	IT	IT		
Pagellus erythrinus Common pandora				ES						
Peristedion cataphractum African armoured searobin						FR				
Petromyzon marinus Sea lamprey	DE, FI, SE	DE, UK	UK							
Phycis blennoides Greater forkbeard		DK, SE	FR, IE	ES, FR		ES, FR				
Platichthys flesus European flounder	LV, SE	SE								
Pleuronectes platessa Plaice	DE, SE	DE, SE	IE	ES						
Pollachius pollachius Pollack		FR, SE		ES						
Pollachius virens Saithe		DE, SE	IE							
Raja asterias Mediterranean starry ray						FR IT	IT	IT		
Raja clavata Thornback ray		BE, DE, DK, FR, SE, UK	FR, IE, UK	ES, FR		ES, FR, IT	IT	IT		
Raja miraletus Brown ray						FR				
Raja montagui Spotted ray		DE, DK, FR, UK	UK	ES						
Raja polystigma Cuckoo ray						FR				
Raja undulata Undulate ray		FR								
Rostroraja alba White skate		SE, UK	UK							
Scomber scombrus Atlantic mackerel				PT						
Scophthalmus maximus [Psetta maxima] Turbot	DE, SE	DE, SE	FR	FR		IT	IT	IT		
Scophthalmus rhombus Brill	DE, SE	DE, SE								
Scorpaena loppei Cadenat's rockfish				ES						
Scorpaena notata (Small) red scorpionfish				ES		FR				
Scorpaena scrofa Red scorpionfish						ES, FR				
Scyliorhinus canicula Small-spotted dogfish		DE, FR, SE	FR, IE	ES, FR, PT		ES, FR, IT	IT	IT		
Scyliorhinus stellaris Nursehound		FR		ES						
Serranus cabrilla Comber				ES		ES				
Serranus hepatus Brown comber				ES						
Solea solea Common sole	DE, SE (S. vulgaris)	DE	IE	ES		IT	IT	SI		
Spicara flexuosa				ES						

Demersal shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Blotched picarel										
Spondyliosoma cantharus Black seabream				ES	ES					
Squalus acanthias Spurdog		SE, UK	FR, UK	FR		FR, IT	IT	IT		RO
Squalus blainville Spiny dogfish, picked dogfish						FR				
Squatina squatina Angel shark/monkfish		UK	FR	FR		FR IT	IT	IT		
Symphurus nigrescens Tonguesole				ES		ES				
Thymallus thymallus Grayling	SE									
Torpedo marmorata *Marbled electric ray*						IT	IT	IT		
Trachinus draco Greater weaver	DE		FR	ES, FR		ES, FR				
Trachurus mediterraneus Mediterranean horse mackeral				ES		ES				
Trachurus picturatus *Blue jack mackerel*				PT		IT	IT	IT		
Trachurus trachurus Blue jack mackeral/ horse mackerel		SE	IE	ES, PT		ES				
Trachyrincus scabrous *Roughsnout grenadier*						ES, FR				
Trigla lyra Tub gurnard						FR				
Trisopterus luscus Pouting				ES						
Trisopterus minutus Poor cod			IE	ES		ES				
Zeus faber John Dory		FR	FR, IE	ES, FR, PT		ES, FR				
Zoarces viviparus Comber		DE								
Acipenser naccarii Adriatic sturgeon								IT		
Acipenser nudiventris Ship sturgeon										BS prot
Acipenser stellatus Stellate sturgeon										BS SoE
Aphanius fasciatus Mediterranean Killifish						UNEP list L322				
Aphanius iberus Spanish toothcarp						UNEP list L322				
Arnoglossus kessleri Scaldback										BS prot
Benthophiloides brauneri Goby										BS prot
Benthophilus stellatus Stellate tadpole-goby										BS prot
Cottus gobio Bullhead	HELCOM RED list									
Deania calcea Birdbeak dogfish		OSPAR LIST								

Demersal shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Diplodus sargus Sargo				ES						
Echelus myrus *Painted eel*				ES						
Entelurus aequoreus *Snake pipefish*	HELCOM RED list									
Epigonus denticulatus *Pencil cardinal*				ES						
Gobius niger jozo										
Hippocampus ramulosus *Long-snouted seahorse*						UNEP list				
Labrus mixtus Cuckoo wrasse	HELCOM RED list									
Lebetus scorpioides Diminutive goby	HELCOM RED list									
Lethenteron zanandreai Po brook lamprey						UNEP list L322				
Liparis montagui Montagus seasnail	HELCOM RED list									
Lithognathus mormyrus Striped seabream				ES						
Liza saliens Leaping mullet										BS prot
Lycodes gracilis Vahl's eelpout	HELCOM RED list									
Mullus barbatus Red mullet				ES		ES				
Myoxocephalus Scorpius Shorthorn sculpin	HELCOM RED list									
Nerophis lumbriciformis Worm pipefish	HELCOM RED list									
Nezumia aequalis Common Atlantic grenadier						ES				
Phoxinus phoxinus Eurasian minnow	HELCOM RED list									
Phrynorhombus norvegicus Norwegian topknot	HELCOM RED list									
Plectorhinchus mediterraneus Rubberlip grunt				ES						
Pomatoschistus canestrini Canestrini's goby						UNEP list L322				
Pomatoschistus norvegicus Norway goby	HELCOM RED list									
Pomatoschistus pictus Painted goby	HELCOM RED list									
Pomatoschistus tortonesei Tortonese's goby						UNEP list L322				
Raja alba White skate						UNEP list L322				
Rhinobatos cemiculus Blackchin guitarfish						UNEP list				
Salmo trutta labrax Black Sea salmon										BS prot
Sebastes viviparus Norway redfish	HELCOM RED list									
Sparus aurata Gilt-head bream						ES				
Squatina aculeata						UNEP list				

Demersal shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Sawback angelshark										
Squatina oculate Smoothback angelshark						UNEP list				
Syngnathus spp. (details in Ref list)	HELCOM RED									BS prot
Taurulus bubalis Longspined bullhead	HELCOM RED									
Umbrina cirrosa Shi drum						UNEP list				
Uranoscopus scaber Atlantic stargazer						ES				
Zeugopterus punctatus Topknot	HELCOM RED									

Table 42. Pelagic shelf fish reported by the evaluated Member States and their geographical association with the MSFD regions and subdivisions.

Pelagic shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Alosa alosa Allis shad		DE, UK	UK							
Alosa fallax Twaite shad	DE	DE								
Belone belone Deepwater sole	DE									
Boops boops *Bogue*				PT						
Capros aper Boar fish				PT						
Cetorhinus maximus Basking sharks		DE, FR, SE, UK	FR, UK	FR		FR				
Clupea harengus Atlantic herring	DE, LV, SE	DE, FR, SE	IE							
Clupea harengus membras Baltic herring	FI, LV									
Coregonus albula Vendace	SE									
Cyclopterus lumpus Lumpfish	DE	DE								
Dicentrarchus labrax *Seabass*		DE								
Engraulis encrasicolus European anchovy				ES PT	ES	ES, FR		SI		
Galeorhinus galeus Tope shark		DE, DK, SE				IT	IT	IT		
Lamna nasus Porbeagle		DE, FR, SE, UK	FR, UK	FR		FR				
Micromesistius poutassou Blue whiting		FR	FR	FR						
Mobula mobular Giant devil ray						IT	IT	IT		
Salmo salar Atlantic salmon	DE, LT, FI	DE								
Salmo trutta trutta Brown trout	DE, FI, LT									

Pelagic shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Sarda sarda Atlantic bonito						ES, IT	IT	IT		
Sardina pilchardus European pilchard				ES PT	ES	ES		SI		
Scomber colias Atlantic chub mackeral				ES PT	ES	ES				
Scomber scombrus Atlantic mackeral		FR, SE	FR, IE	ES, FR		ES, FR, IT	IT	IT		
Spicara maena Blotched picarel						ES IT	IT	IT		
Sprattus sprattus European sprat	DE, LV, SE	DE, SE	IE							
Squalus acanthias Spurdog		DE, UK	UK			IT	IT	IT		
Thunnus alalunga Albacore		FR	FR, IE	FR, ES	ES	ES				
Trachurus mediterraneus Mediterranean horse mackeral						IT	IT	IT		
Trachurus trachurus Blue jack mackeral/ horse mackerel		FR, SE	FR	FR						
Thunnus thynnus Atlantic bluefin tuna		FR	FR, IE	FR, ES		ES, FR				
Trisopterus esmarkii Norway pout		DE, SE	IE							
Xiphias gladius Norway pout		FR	FR	FR		FR				
Acanthocybium solandri Wahoo					ES					
Alopias vulpinus Thresher	HELCOM RED									
Alosa immaculata Pontic shad										BS prot
Alosa maeotica Black Sea shad										BS prot
Alosa pontica Pontic shad										BS SoE
Antonogadus megalokynodon Mediterranean bigeye rockling						ES				
Aphanopus carbo Black scabbardfish			IE							
Aspius aspius Asp	HELCOM RED									
Ballerus ballerus Zope	HELCOM RED									
Bathysolea profundicola Deepwater sole						ES				
Belone belone euxini Needlefish										BS prot
Carcharias Taurus Sand tiger shark						UNEP list				
Carcharodon Carcharias Great white shark						UNEP list L322				
Coregonus spp.	DE									RO

Pelagic shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Dentex gibbosus Pin dentex					ES					
Engraulis encrasicolus ponticus Anchovy						FR				
Gadiculus argenteus Silvery pout				ES		ES				
Hoplostethus atlanticus Orange roughy			IE							
Hoplostethus mediterraneus Mediterranean slimehead						ES				
Huso huso Beluga/European sturgeon						UNEP list L322				BS SoE
Isurus oxyrinchus Shortfin mako						UNEP list L322				
Katsuwonus pelamis Skipjack tuna					ES					
Liza aurata Golden grey mullet										BS prot
Liza haematocheilus So-iuy mullet										BS prot
Mugil cephalus Flathead grey mullet										BS prot
Odontaspis ferox Smalltooth sand tiger						UNEP list				
Pagellus bogaraveo Blacksot seabream				ES		ES				
Pagrus pagrus Red porgy/common seabream				ES	ES	ES				
Pelecus cultratus Sichel	HELCOM RED									
Pomatomus saltatrix Bluefish										BS SoE
Prionace glauca Blue shark								IT		
Sardinella aurita Round sardinella					ES	ES				
Sarpa salpa Salema/cow bream					ES					
Scomberesox saurus Atlantic saury						ES				
Sebastes marinus Golden redfish										
Sebastes norvegicus Golden redfish	HELCOM RED									
Somniosus microcephalus Greenland shark	HELCOM RED									
Sphyrna lewini Scalloped hammerhead						UNEP list				
Sphyrna mokarran Great hammerhead						UNEP list				
Sphyrna tudes Smalleye hammerhead										
Sphyrna zygaena Smooth hammerhead						UNEP list				
Thunnus albacares Yellowfin tuna					ES					

Pelagic shelf fish	BAL	NEA				MED				BS
	BAL	ANS	ACS	BS	AMA	MWE	MIC	MAD	MAL	BS
Trachurus picturatus Blue jack mackeral					ES	ES				

Table 43. Species reported in deep shelf fish by the evaluated Member States and their geographical association with the MSFD regions and subdivisions.

Deep shelf	BAL	NEA				MED				BS
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
Chimaera monstrosa Rabbit fish		DK		PT		ES, IT	IT	IT		
Oxynotus centrina Angular roughshark						UNEP list				

Table 44. Reef associated fish reported previously by the evaluated Member States and their geographical association with the MSFD regions and subdivisions.

Reef associated	BAL	NEA				MED				BS
	BAL	ANS	ACS	ABI	AMA	MWE	MIC	MAD	MAL	BS
Sparidae Sea breams and porgies				ES						
Sparisoma cretense Parrotfish					ES					

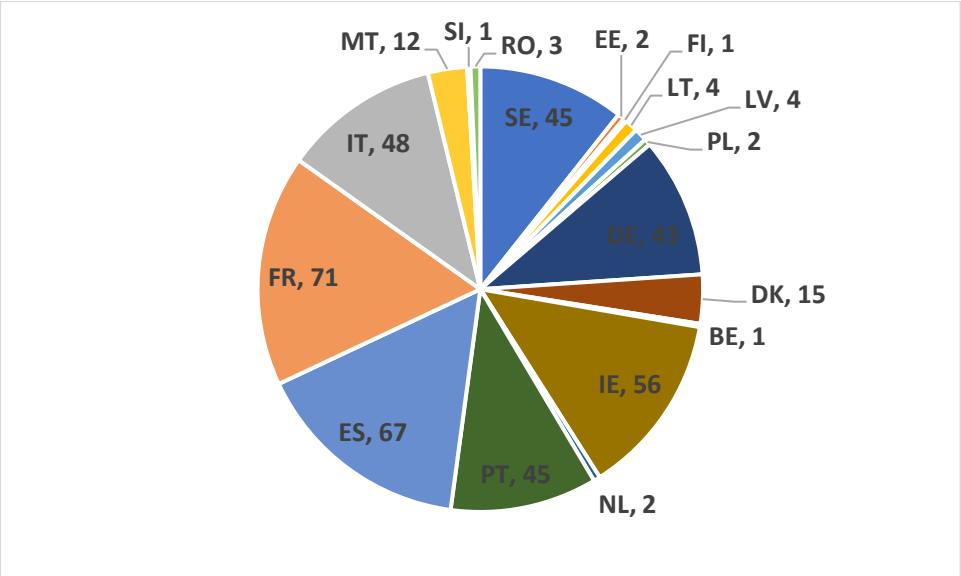


Figure 9. Number of fish species reported by MS.

Findings:

It is obvious from the Table 40 to Table 44 that there is good harmonisation at regional level, but only for a few species. This could be caused by the very few operational fish indicators from the RSCs and by the limited regional coordination. In addition, the use of CFP data to the MSFD is not clear through

the reporting (only one MS referred to CFP), probably because of methodological issues and gaps in a common approach from the MSFD side, but also because of administrative issues.

Gap: Regarding the reported species the gaps are related more to the luck of common rules or guidelines for the species selection for inclusion to the MSFD, which is also evident by the discrepancies in the number of species reported, even across neighbouring MS (Figure 9).

Recommendations for reporting: The species lists that were developed for the reporting greatly improved the consistency in the reporting of species, compared with the 2012 reporting. Synonyms, typos, or misreported species were derived from MS that provided paper reports. Given the number of species reported, the harmonisation compared with 2012 is remarkable.

Recommendations for implementation and methodological standards: The organisation of information in the Table 40 to Table 44, indicates that more work is required to harmonise the set of species to be reported and the assignment of species to the species groups. MS with the support of the experts should prioritise which species to include in D1 and which in D3. For this action, common agreed guidelines need to be developed for the MS. On the same subject, a common understanding across MS for which species to be included in the assessment at regional level need to be developed to harmonise the species, their number and source. This work could be done through the MSFD Biodiversity expert network (fish group) and with the ICES collaboration.

Objective: The MS reported the sources of the elements (species), i.e., whether the species are selected from EU (e.g., Habitats Directives), regional (e.g., regional sea conventions) or national lists. The analysis of the sources will reveal the level of harmonisation across the MS and the level of exploitation of available information. This information combined with the source of threshold can reveal whether the MS claim to use, for instance, national sources instead of regional to HD. Something that was evident in the MSFD reporting for the monitoring programmes of 2014.

Data: We analysed the data reported in column M "Element source".

Findings: The MS reported one of the sources for their elements in the first column of Table 48:

Table 48. Element source by region and MS

Element source	Reported in:				Tot. MS
	BAL	**NEA**	**MED**	**BLK**	
EU	DE, EE	DE, IE		RO	4
CFP			MT		1
ICES	DE, DK, EE, LT, LV, SE	BE, DE, DK, ES, SE			8
HELCOM	DK, FI, LT, LV, SE				5
OSPAR		DE, NL			2
National	DE, DK, SE	DE, DK, ES, FR, PT, SE	FR, IT, SI		8
MS in (sub)region		PT			1

There is no consistency at regional level. For instance, among the BAL MS there is a mixture of EU, national and ICES and HELCOM sources assigned to element sources. However, there are no references to the CFP, except of Malta. National element source could be derived from the CFP, based on our evaluation of the species reported, however the reported information cannot verify this assumption. HECOM has developed indicators for fish (summarised in Palialexis *et al*. 2019), covering

though a low proportion of the species that could potentially be reported (e.g., species reported by FI, LT, PL, EE).

Gap: All MS reported for all entries. No gaps in terms of reporting.

Recommendations for implementation: The MS accurately reported elements that are included in other EU, or international agreements and policies. However, there are some inconsistencies in the way the MS reported the element source, which can be refined through coordination across the MS or by developing some common hierarchical rules to determine how to report the element source.

Recommendations for methodological standards: Not relevant.

5.1.2 Extension in use of MSFD Criteria (primary and secondary) reported at EU, regional and (sub)regional level

Objective:

Table 45 provides a variety of information and overviews related with the progress of the assessments.

- Overview of the use of primary and secondary criteria. The number in each cell indicates the number of MS reported each criterion out of the total number of MS reported for each species.

- Overview of the species assessments and threshold values per criterion and region. The traffic light approach (green, orange, red) corresponds to the level of assessment of the parameters for each criterion and species, including the report of threshold values. Green: Indicates that for those criteria a complete assessment has been made by comparing the threshold value with the value achieved. Orange: Indicates that either a threshold value is available, or an achieved value (estimated parameter), so assessment is not complete. Red: Indicates that no threshold value or achieved value are reported.

- Overview of the assessed parameter for each species and criterion. The bold borders around the cells indicate those species and criteria for which the achieved parameter has reported (either negative or positive).

- Which species were reported under D3 (3rd column in Table 45), which can support the discussion on how to harmonise the assessment and reporting of species between D1 and D3.

Data: The reported information in column N was used for the use of the criteria (Appendix 2, Art.8 fish). The species assessment was based on the information in columns Q, R, S and V. The overview of the assessed parameters was based on the information in column AD. The assumption for the traffic light approach is that the any reported category was aggregated to the higher level, so if only one MS provided threshold value and value achieved for a single species and in a single MRU, this is assigned to the species and region or subdivision. We assume that all MS in the same region or subdivision should have available methods to perform a similar assessment.

Table 45. Reported threshold values and/or estimated parameters are shown for each species and criterion as: i) green, for those criteria with both the threshold value and the value achieved reported, ii) orange, when either a threshold value is available, or the value achieved (estimated parameter), so assessment is not complete, and iii) red, when neither threshold values nor values achieved are reported. The numbers reflect the MS that reported each criterion to allow for an overview of the usage between primary against secondary criteria. The bold-framed cells show the criteria of the

species that were reported to have a final assessment (positive or negative). The table also indicates which species were reported under D3 for the same region.

BAL	Species	Reported in D3.	D1C1 primary	D1C2 primary	D1C3 I / II	D1C4 I / II	D1C5 I / II
Coastal fish DE, DK, EE, LT, LV, PL, SE	*Abramis brama*	x	1/1	1/1	1/1	1/1	1/1
	Acipenser oxyrinchus		1/1	1/1	1/1	1/1	1/1
	Anguilla anguilla	x	1/2	2/2	1/2	1/2	1/2
	Coregonus maraena		1/1	1/1	1/1	**1**/1	1/1
	Esox lucius	x	1/1	1/1	1/1	1/1	1/1
	Lampetra fluviatilis		0/1	1/1	0/1	1/1	1/1
	Leuciscus aspius		0/1	1/1	0/1	1/1	1/1
	Perca fluviatilis	x	0/1	1/1	0/1	0/1	0/1
	Platichthys flesus	x	1/1	1/1	0/1	1/1	0/1
	Salmo salar	x	0/1	0/1	0/1	1/1	1/1
	Sander lucioperca	x	0/1	1/1	0/1	0/1	0/1
	Vimba vimba		0/1	1/1	0/1	0/1	0/1
	Zoarces viviparus		1/1	0/1	0/1	0/1	0/1
	Coastal fish grouped		1/1	0/1	1/1	1/1	0/1
Demersal shelf fish DE, DK, LV, PL, SE	*Amblyraja radiata*		1/1	1/1	0/1	0/1	0/1
	Anguilla anguilla	x	0/1	1/1	0/1	0/1	0/1
	Coregonus lavaretus	x	0/1	1/1	0/1	0/1	0/1
	Enchelyopus cimbrius		0/1	1/1	0/1	0/1	0/1
	Gadus morhua	x	0/1	2/2	0/1	0/1	0/1
	Limanda limanda	x	0/1	1/1	0/1	0/1	0/1
	Lumpenus lampretaeformis		0/1	1/1	0/1	0/1	0/1
	Petromyzon marinus		0/1	1/1	0/1	1/1	1/1
	Platichthys flesus		0/1	1/1	0/1	0/1	0/1
	Pleuronectes platessa	x	0/1	1/2	0/1	0/1	0/1
	Scophthalmus maximus		0/1	1/2	0/1	0/1	0/1
	Scophthalmus rhombus		0/1	1/2	0/1	0/1	0/1
	Solea solea (sin. vulgaris)		0/1	1/1	0/1	0/1	0/1
	Thymallus thymallus		0/1	1/1	0/1	0/1	0/1
	Trachinus draco		0/1	1/1	0/1	0/1	0/1
Pelagic Shelf fish DE, FI, LV, LT, SE	*Alosa fallax*		0/1	1/1	0/1	1/1	0/1
	Belone belone	x	0/1	0/1	0/1	1/1	0/1
	Clupea harengus	x	0/1	1/1	0/1	0/1	0/1
	Clupea harengus membras		0/1	1/1	0/1	0/1	0/1
	Coregonus albula		0/1	1/1	0/1	0/1	0/1
	Cyclopterus lumpus		0/1	1/1	0/1	1/1	0/1
	Salmo salar	x	0/1	2/2	0/1	1/1	0/1
	Salmo trutta trutta		1/2	1/2	1/2	1/2	0/1
	Sprattus sprattus	x	0/1	2/2	0/1	0/1	0/1

NEA	Species	Reported in D3	D1C1 primary	D1C2 primary	D1C3 I / II	D1C4 I / II	D1C5 I / II
Coastal fish DE, DK, FR, IE, PT, SE	*Acipenser sturio*		1/1	1/1	1/1	1/1	1/1
	Alepocephalus bairdii		1/1	1/1	0/1	1/1	1/1
	Alopias vulpinus		1/1	1/1	0/1	1/1	1/1
	Alosa fallax		2/2	2/2	1/2	2/2	2/2
	Anarhichas denticulatus		1/1	1/1	0/1	1/1	1/1
	Anguilla anguilla	x	2/3	3/3	1/3	2/3	2/3
	Antimora rostrata		1/1	1/1	0/1	1/1	1/1
	Aphanopus carbo	x	1/1	1/1	0/1	1/1	1/1
	Apristurus spp.		1/1	1/1	0/1	1/1	1/1
	Beryx spp.	x	1/1	1/1	0/1	1/1	1/1
	Cataetyx laticeps		1/1	1/1	0/1	1/1	1/1
	Centrophorus squamosus	x	1/1	1/1	0/1	1/1	1/1
	Centroscyllium fabricii		1/1	1/1	0/1	1/1	1/1
	Centroscymnus coelolepis	x	1/1	1/1	0/1	1/1	1/1
	Centroselachus crepidater		1/1	1/1	0/1	1/1	1/1
	Cetorhinus maximus		1/1	1/1	0/1	1/1	1/1
	Chelon labrosus		1/1	1/1	0/1	0/1	0/1
	Chimaera spp.		1/1	1/1	0/1	1/1	1/1
	Coregonus maraena		1/1	1/1	1/1	1/1	1/1
	Coryphaenoides rupestris	X	1/1	1/1	0/1	1/1	1/1
	Dalatias licha	x	1/1	1/1	0/1	1/1	1/1
	Deania calcea		1/1	1/1	0/1	1/1	1/1
	Dentex dentex		1/1	1/1	1/1	1/1	1/1
	Dicentrarchus labrax	x	1/1	1/1	1/1	1/1	1/1
	Dipturus batis	x	1/1	1/1	0/1	1/1	1/1
	Dipturus nidarosiensis		1/1	1/1	0/1	1/1	1/1
	Epigonus telescopus		1/1	1/1	0/1	1/1	1/1
	Epinephelus marginatus		0/1	1/1	0/1	0/1	0/1
	Etmopterus princeps		1/1	1/1	0/1	1/1	1/1
	Etmopterus spinax		1/1	1/1	0/1	1/1	1/1
	Gadus morhua	x	1/2	2/2	1/2	1/2	1/2
	Galeorhinus galeus	X	1/1	1/1	0/1	1/1	1/1

	Galeus melastomus	X	1/1	1/1	0/1	1/1	1/1
	Galeus murinus		1/1	1/1	0/1	1/1	1/1
	Helicolenus dactylopterus	X	1/1	1/1	0/1	1/1	1/1
	Hexanchus griseus		1/1	1/1	0/1	1/1	1/1
	Hippocampus hippocampus		1/1	1/1	1/1	1/1	1/1
	Hippoglossus hippoglossus		1/1	1/1	0/1	1/1	1/1
	Hoplostethus atlanticus	X	1/1	1/1	0/1	1/1	1/1
	Hydrolagus mirabilis		1/1	1/1	0/1	1/1	1/1
	Isurus oxyrinchus	X	1/1	1/1	0/1	1/1	1/1
	Lamna nasus		1/1	1/1	0/1	1/1	1/1
	Lampetra fluviatilis	X	2/2	2/2	1/2	2/2	2/2
	Leucoraja circularis		1/1	1/1	0/1	1/1	1/1
	Molva dypterygia	X	1/1	1/1	0/1	1/1	1/1
	Mora moro	x	1/1	1/1	0/1	1/1	1/1
	Mustelus asterias		1/1	1/1	0/1	1/1	1/1
	Notocanthus chemnitzii		1/1	1/1	0/1	1/1	1/1
	Oxynotus paradoxus		1/1	1/1	0/1	1/1	1/1
	Petromyzon marinus		1/1	1/1	0/1	1/1	1/1
	Platichthys flesus	x	2/2	2/2	1/2	1/2	1/2
	Raja clavata	x	1/1	1/1	0/1	1/1	1/1
	Raja montagui	X	1/1	1/1	0/1	1/1	1/1
	Raja undulata	x	1/1	1/1	0/1	1/1	1/1
	Rajella fyllae	x	1/1	1/1	0/1	1/1	1/1
	Rhinochimaera atlantica		1/1	1/1	0/1	1/1	1/1
	Rostroraja alba	X	1/1	1/1	0/1	1/1	1/1
	Salmo salar		1/1	1/1	0/1	1/1	1/1
	Sciaena umbra		0/1	1/1	0/1	0/1	0/1
	Scophthalmus maximus	x	1/1	1/1	0/1	1/1	1/1
	Scymnodon ringens		1/1	1/1	0/1	1/1	1/1
	Squalus acanthias	X	1/1	1/1	0/1	1/1	1/1
	Squatina squatina	X	1/1	1/1	0/1	1/1	1/1
	Thunnus thynnus	x	1/1	1/1	0/1	1/1	1/1
	Trachyscorpia cristulata		1/1	1/1	0/1	1/1	1/1
	Zoarces viviparus		1/1	1/1	0/1	0/1	0/1
Deep sea fish DK, PT	*Alopias superciliosus*	x	1/1	1/1	0/1	0/1	0/1
	Centrophorus granulosus		1/1	1/1	0/1	0/1	0/1
	Centrophorus lusitanicus		1/1	1/1	0/1	0/1	0/1
	Centrophorus squamosus	x	1/1	1/1	0/1	0/1	0/1

	Chimaera monstrosa		1/2	1/1	0/1	0/1	0/1
	Dalatias licha	x	1/1	1/1	0/1	0/1	0/1
	Deania calcea		1/1	1/1	0/1	0/1	0/1
	Deania spp.		0/1	1/1	0/1	0/1	0/1
	Etmopterus princeps		1/1	1/1	0/1	0/1	0/1
	Etmopterus pusillus		1/1	1/1	0/1	0/1	0/1
	Etmopterus spinax		1/1	1/1	0/1	0/1	0/1
	Galeus melastomus	x	0/1	0/1	0/1	0/1	0/1
	Heptranchias perlo		1/1	1/1	0/1	0/1	0/1
	Hexanchus griseus		1/1	1/1	0/1	0/1	0/1
	Malacocephalus laevis		1/1	1/1	0/1	0/1	0/1
	Nezumia sclerorhynchus		1/1	1/1	0/1	0/1	0/1
	Phycis blennoides	x	1/1	1/1	0/1	0/1	0/1
	Sphyrna zygaena		1/1	1/1	0/1	0/1	0/1
Demersal shelf fish BE, DE, DK, ES, FR, NL, PT, SE	*Amblyraja radiata*	x	2/3	3/3	1/3	1/3	1/3
	Ammodytes spp	x	0/1	1/1	0/1	0/1	0/1
	Anarhichas lupus	x	1/1	1/1	0/1	0/1	0/1
	Anguilla anguilla	x	0/1	1/1	0/1	0/1	0/1
	Argentina	x	0/1	1/1	0/1	0/1	0/1
	Argentina silus	x	0/1	1/1	0/1	0/1	0/1
	Argentina sphyraena		1/1	1/1	1/1	0/1	1/1
	Arnoglossus imperialis		1/1	0/1	0/1	0/1	1/1
	Arnoglossus laterna		1/1	0/1	0/1	0/1	1/1
	Arnoglossus rueppelii		1/1	0/1	0/1	0/1	1/1
	Arnoglossus thori		1/1	0/1	0/1	0/1	1/1
	Blennius ocellaris		1/1	0/1	0/1	0/1	1/1
	Boops boops		1/1	0/1	0/1	0/1	1/1
	Brosme brosme	x	0/1	1/1	0/1	0/1	0/1
	Buglossidium luteum		1/1	0/1	0/1	0/1	1/1
	Callionymus lyra		1/1	0/1	0/1	0/1	1/1
	Callionymus maculatus		2/2	1/2	1/2	1/2	2/2
	Capros aper	x	1/1	0/1	0/1	0/1	1/1
	Cepola macrophthalma		1/1	0/1	0/1	0/1	1/1
	Chelidonichthys cuculus	x	2/2	1/2	1/2	1/2	2/2
	Chelidonichthys lucerna	x	2/2	1/2	1/2	1/2	2/2
	Chelidonichthys obscurus		1/1	0/1	0/1	0/1	1/1
	Citharus linguatula		1/1	0/1	0/1	0/1	1/1
	Conger conger	x	2/2	1/2	1/2	1/2	2/2

	Coryphaenoides rupestris	x	0/1	1/1	0/1	0/1	0/1
	Dasyatis pastinaca	x	1/1	1/1	0/1	0/1	0/1
	Deltentosteus quadrimaculatus		1/1	0/1	0/1	0/1	1/1
	Dicentrarchus labrax	x	0/1	1/1	0/1	0/1	0/1
	Diplodus annularis		1/1	0/1	0/1	0/1	1/1
	Diplodus bellottii		1/1	0/1	0/1	0/1	1/1
	Diplodus vulgaris	x	1/1	0/1	0/1	0/1	1/1
	Dipturus batis	x	3/4	4/4	2/4	2/4	2/4
	Echiichtys vipera	x	0/1	1/1	0/1	0/1	0/1
	Etmopterus spinax		1/1	0/1	0/1	0/1	1/1
	Eutrigla gurnardus	x	3/4	4/4	2/4	2/4	2/4
	Gadiculus argenteus		2/2	2/2	1/2	1/2	1/2
	Gadus morhua	x	1/2	2/3	0/2	0/2	0/2
	Gaidropsarus macrophthalmus		1/1	0/1	0/1	0/1	1/1
	Gaidropsarus vulgaris		1/1	0/1	0/1	0/1	0/1
	Galeorhinus galeus	x	0/1	1/2	0/1	0/1	0/1
	Galeus melastomus	x	0/2	1/1	0/1	0/1	0/2
	Glyptocephalus cynoglossus	x	0/1	1/1	0/1	0/1	0/1
	Gnathophis mystax		1/1	0/1	0/1	0/1	1/1
	Gobius niger		1/1	0/1	0/1	0/1	1/1
	Helicolenus dactylopterus	x	2/2	1/2	1/2	1/2	2/2
	Hippoglossus hippoglossus		1/1	1/1	0/1	0/1	0/1
	Lepidorhombus boscii	x	3/3	2/3	2/3	1/3	2/3
	Lepidorhombus whiffiagonis	x	1/1	0/1	0/1	0/1	1/1
	Lepidotrigla cavillone		1/1	0/1	0/1	0/1	1/1
	Lepidotrigla dieuzeidei		1/1	0/1	0/1	0/1	1/1
	Lepidotrigla spp.		1/1	1/1	0/1	0/1	0/1
	Lesueurigobius friesii		1/1	0/1	0/1	0/1	1/1
	Lesueurigobius sanzi		1/1	0/1	0/1	0/1	1/1
	Leucoraja fullonica	x	1/1	1/1	1/1	1/1	1/1
	Leucoraja naevus	x	2/3	1/3	1/3	1/3	2/3
	Limanda limanda	x	0/1	1/1	0/1	0/1	0/1
	Lophius budegassa	x	0/2	2/2	1/2	0/1	0/2
	Lophius piscatorius	x	2/3	2/3	1/3	1/3	2/3
	Melanogrammus aeglefinus	x	1/2	2/2	1/2	1/2	1/2
	Merlangius merlangus	x	0/1	1/1	0/1	0/1	0/1
	Merluccius merluccius	x	3/4	3/4	3/4	2/4	2/4
	Microchirus azevia		1/1	0/1	0/1	0/1	1/1

	Microchirus boscanion		1/1	0/1	0/1	0/1	1/1
	Microchirus ocellatus		1/1	0/1	0/1	0/1	1/1
	Microchirus variegatus		2/2	1/2	0/1	0/1	1/1
	Micromesistius poutassou	x	3/3	2/3	1/3	0/1	1/1
	Microstomus kitt	x	0/1	1/1	0/1	0/1	0/1
	Molva dypterygia	x	0/1	0/1	0/1	0/1	0/1
	Molva molva	x	2/3	3/3	1/3	1/3	1/3
	Mullus surmuletus	x	1/1	0/1	0/1	0/1	1/1
	Mustelus asterias	x	2/2	1/2	0/1	0/1	0/1
	Mustelus mustelus		1/1	1/1	0/1	0/1	0/1
	Mustelus	x	1/1	1/1	1/1	1/1	1/1
	Pagellus acarne	x	1/1	0/1	0/1	0/1	1/1
	Pagellus bellottii		1/1	0/1	0/1	0/1	1/1
	Pagellus erythrinus		1/1	0/1	0/1	0/1	1/1
	Petromyzon marinus		1/1	1/1	1/1	1/1	1/1
	Phycis blennoides	x	3/4	3/4	1/4	1/4	2/4
	Platichthys flesus	x	0/1	1/1	0/1	0/1	0/1
	Pleuronectes platessa	x	1/2	2/2	1/2	1/2	1/2
	Pollachius pollachius	x	1/2	2/2	1/2	1/2	1/2
	Pollachius virens	x	0/1	1/1	0/1	0/1	0/1
	Raja clavata	x	4/6	5/6	2/6	2/6	3/6
	Raja montagui	x	4/4	3/4	2/4	2/4	3/4
	Raja undulata	x	1/1	1/1	1/1	1/1	1/1
	Rostroraja alba	x	0/1	1/1	0/1	0/1	0/1
	Scomber scombrus	x	1/1	1/1	1/1	0/1	0/1
	Scyliorhinus canicula	x	4/5	4/5	2/5	2/5	3/5
	Scophthalmus maximus [Psetta maxima]	x	2/3	3/3	1/3	1/3	1/3
	Scophthalmus rhombus	x	1/1	2/2	0/1	0/1	0/1
	Scorpaena loppei		1/1	0/1	0/1	0/1	1/1
	Scorpaena notata		1/1	0/1	0/1	0/1	1/1
	Scyliorhinus canicula	x	1/3	2/3	0/2	0/2	0/3
	Scyliorhinus stellaris	x	2/2	1/2	1/2	1/2	2/2
	Serranus cabrilla		1/1	0/1	0/1	0/1	1/1
	Serranus hepatus		1/1	0/1	0/1	0/1	1/1
	Solea solea	x	1/1	0/1	0/1	0/1	1/1
	Spicara flexuosa		1/1	0/1	0/1	0/1	1/1
	Spondyliosoma cantharus		1/1	0/1	0/1	0/1	1/1
	Squalus acanthias	x	1/2	2/2	1/2	1/2	1/2
	Squatina squatina	x	1/1	1/1	1/1	1/1	1/1
	Symphurus nigrescens		1/1	0/1	0/1	0/1	1/1

	Trachinus draco		0/2	1/1	0/1	0/1	0/2
	Trachurus mediterraneus		1/1	0/1	0/1	0/1	1/1
	Trachurus picturatus		0/1	0/1	0/1	0/1	0/1
	Trachurus trachurus	x	2/2	1/2	1/2	1/2	1/2
	Trisopterus luscus	x	1/1	0/1	0/1	0/1	1/1
	Trisopterus minutus		1/1	0/1	0/1	0/1	1/1
	Zeus faber	x	2/3	1/3	1/3	1/3	2/3
	Zoarces viviparus		1/1	1/1	1/1	1/1	1/1
FishPelagicShelf DE, DK, , FR, PT, SE	*Alosa alosa*	x	1/1	1/1	0/1	1/1	1/1
	Alosa fallax	x	1/1	1/1	0/1	1/1	1/1
	Boops boops	x	0/1	0/1	0/1	0/1	0/1
	Capros aper	x	1/1	1/1	1/1	0/1	0/1
	Cetorhinus maximus		2/3	3/3	2/3	2/3	2/3
	Clupea harengus	x	1/2	2/2	1/2	1/2	1/2
	Cyclopterus lumpus		1/1	1/1	1/1	1/1	1/1
	Dicentrarchus labrax	x	1/1	1/1	1/1	1/1	1/1
	Engraulis encrasicolus	x	0/1	0/1	0/1	0/1	0/1
	Galeorhinus galeus	x	2/2	2/2	1/2	1/2	1/2
	Lamna nasus	x	2/3	3/3	2/3	2/3	2/3
	Micromesistius poutassou	x	1/1	1/1	1/1	1/1	1/1
	Salmo salar		1/1	1/1	1/1	1/1	1/1
	Sardina pilchardus	X	1/1	1/1	1/1	0/1	0/1
	Scomber colias	x	0/1	0/1	0/1	0/1	0/1
	Scomber scombrus	x	1/2	2/2	1/2	1/2	1/2
	Sprattus sprattus	x	0/1	1/1	0/1	0/1	0/1
	Squalus acanthias	x	1/1	1/1	1/1	1/1	1/1
	Thunnus alalunga	x	1/1	1/1	1/1	1/1	1/1
	Thunnus thynnus	x	1/1	1/1	1/1	1/1	1/1
	Trachurus trachurus	x	1/2	2/2	1/2	1/2	1/2
	Trisopterus esmarkii	x	0/1	1/1	0/1	0/1	0/1
	Xiphias gladius	x	1/1	1/1	1/1	1/1	1/1

MED	Species	Reported in D3	D1C1 primary	D1C2 primary	D1C3 I / II	D1C4 I / II	D1C5 I / II
Coastal fish ES (only general), FR, IT, SI	*Coris julis*		0/1	0/1	1/1	0/1	0/1
	Dentex dentex	x	1/1	1/1	1/1	1/1	1/1
	Diplodus puntazzo		0/1	1/1	1/1	0/1	0/1
	Diplodus sargus	x	0/1	1/1	1/1	0/1	0/1
	Diplodus vulgaris	x	0/1	1/1	1/1	0/1	0/1
	Epinephelus marginatus	x	1/2	2/2	2/2	1/2	1/2
	Hippocampus guttulatus		1/1	1/1	1/1	1/1	1/1
	Hippocampus hippocampus		1/1	1/1	1/1	1/1	1/1
	Labrus viridis		1/1	1/1	1/1	1/1	1/1
	Oblada melanura		0/1	1/1	1/1	0/1	0/1
	Sarpa salpa		0/1	1/1	1/1	0/1	0/1
	Sciaena umbra		1/2	2/2	2/2	1/2	1/2
	Scorpaena porcus		0/1	1/1	1/1	0/1	0/1
	Serranus cabrilla	x	0/1	1/1	1/1	0/1	0/1
	Symphodus cinereus		1/1	1/1	1/1	0/1	0/1
	Symphodus tinca		0/1	1/1	1/1	0/1	0/1
Deep sea fish **IT**	*Centrophorus granulosus*	x	0/1	1/1	1/1	0/1	0/1
	Chimaera monstrosa		0/1	1/1	1/1	0/1	0/1
	Dalatias licha		0/1	1/1	1/1	0/1	0/1
	Etmopterus spinax		0/1	1/1	1/1	0/1	0/1
	Galeus melastomus		0/1	1/1	1/1	0/1	0/1
	Helicolenus dactylopterus		0/1	1/1	1/1	0/1	0/1
	Heptranchias perlo		0/1	1/1	1/1	0/1	0/1
	Hexanchus griseus		0/1	1/1	1/1	0/1	0/1
	Phycis blennoides		0/1	1/1	1/1	0/1	0/1
	Polyprion americanus	x	0/1	1/1	1/1	0/1	0/1
Demersal Shelf fish FR, IT, MT	*Argentina*		1/1	1/1	1/1	1/1	1/1
	Arnoglossus rueppelii		1/1	1/1	1/1	1/1	1/1
	Blennius ocellaris		1/1	1/1	1/1	1/1	1/1
	Boops boops	x	0/1	1/1	1/1	0/1	0/1
	Callionymus maculatus		1/1	1/1	1/1	1/1	1/1
	Centrophorus granulosus	x	2/2	2/2	2/2	2/2	1/2
	Chelidonichthys cuculus	x	1/2	2/2	2/2	1/2	1/2
	Chelidonichthys lastoviza		0/1	1/1	1/1	0/1	0/1
	Chelidonichthys lucerna		0/1	1/1	1/1	0/1	0/1
	Chelidonichthys obscurus		1/1	1/1	1/1	1/1	1/1
	Chimaera monstrosa		2/2	2/2	2/2	2/2	1/2
	Citharus linguatula		1/2	2/2	2/2	1/2	1/2
	Coelorinchus caelorhincus		2/2	2/2	2/2	2/2	1/2
	Conger conger		1/1	1/1	1/1	1/1	1/1
	Dalatias licha		1/1	1/1	1/1	1/1	1/1

	Dasyatis pastinaca		1/1	1/1	1/1	1/1	1/1
	Dipturus batis		0/1	1/1	1/1	0/1	0/1
	Dipturus oxyrinchus		1/1	1/1	1/1	1/1	1/1
	Etmopterus spinax		2/2	2/2	2/2	2/2	1/2
	Eutrigla gurnardus		1/1	1/1	1/1	1/1	1/1
	Galeus melastomus		2/2	2/2	2/2	2/2	1/2
	Glossanodon leioglossus		1/1	1/1	1/1	1/1	1/1
	Helicolenus dactylopterus		2/2	2/2	2/2	2/2	1/2
	Heptranchias perlo		1/2	2/2	2/2	1/2	0/2
	Hexanchus griseus	x	1/1	1/1	1/1	1/1	0/1
	Hymenocephalus italicus		1/1	1/1	1/1	1/1	0/1
	Lepidopus caudatus	x	1/1	1/1	1/1	1/1	1/1
	Lepidorhombus boscii		1/1	1/1	1/1	1/1	1/1
	Leucoraja circularis		0/1	1/1	1/1	0/1	0/1
	Leucoraja melitensis		0/1	1/1	1/1	0/1	0/1
	Leucoraja naevus		1/1	1/1	1/1	1/1	1/1
	Lophius budegassa	x	1/1	1/1	1/1	1/1	1/1
	Lophius piscatorius	x	1/2	2/2	2/2	1/2	1/2
	Merluccius merluccius	x	1/1	1/1	1/1	1/1	1/1
	Molva macrophthalma		1/1	1/1	1/1	1/1	1/1
	Mustelus asterias		0/1	1/1	1/1	0/1	0/1
	Mustelus mustelus		0/1	1/1	1/1	0/1	0/1
	Mustelus punctulatus		0/1	1/1	1/1	0/1	0/1
	Myliobatis aquila		1/1	1/1	1/1	1/1	0/1
	Nezumia sclerorhynchus		1/1	1/1	0/1	1/1	0/1
	Pagellus bogaraveo	x	0/1	1/1	1/1	0/1	0/1
	Peristedion cataphractum		1/1	1/1	1/1	1/1	1/1
	Phycis blennoides		1/1	1/1	1/1	1/1	1/1
	Raja asterias		1/2	2/2	2/2	1/2	1/2
	Raja clavata	x	1/2	2/2	2/2	1/2	1/2
	Raja miraletus		1/1	1/1	1/1	1/1	1/1
	Raja polystigma		1/1	1/1	1/1	1/1	1/1
	Scophthalmus maximus		0/1	1/1	1/1	0/1	0/1
	Scorpanea notata		1/1	1/1	1/1	1/1	1/1
	Scorpaena scrofa	x	1/1	1/1	1/1	1/1	1/1
	Scyliorhinus canicula		1/2	2/2	2/2	1/2	1/2
	Solea solea	x	0/1	1/1	1/1	0/1	0/1
	Squalus acanthias	x	1/2	2/2	2/2	1/2	1/2
	Squalus blainville	x	1/1	1/1	1/1	1/1	1/1
	Squatina squatina		1/2	2/2	2/2	1/2	1/2
	Torpedo marmorata		0/1	1/1	1/1	0/1	0/1
	Trachinus draco		1/1	1/1	1/1	1/1	1/1

	Trachyrincus scabrus		1/1	1/1	1/1	1/1	1/1
	Trigla lyra		1/1	1/1	1/1	1/1	1/1
	Zeus faber		1/1	1/1	1/1	1/1	1/1
Pelagic shelf fish FR, IT	*Cetorhinus maximus*		1/1	1/1	1/1	1/1	1/1
	Engraulis encrasicolus	x	1/1	1/1	1/1	1/1	1/1
	Galeorhinus galeus		0/1	1/1	1/1	0/1	0/1
	Lamna nasus		1/1	1/1	1/1	1/1	1/1
	Mobula mobular		1/1	1/1	0/1	0/1	0/1
	Sarda sarda	x	0/1	1/1	1/1	0/1	0/1
	Scomber scombrus	x	0/1	1/1	1/1	0/1	0/1
	Spicara maena	x	0/1	1/1	1/1	0/1	0/1
	Squalus acanthias	x	0/1	1/1	1/1	0/1	0/1
	Thunnus thynnus	x	1/1	1/1	1/1	1/1	1/1
	Trachurus mediterraneus	x	0/1	1/1	1/1	0/1	0/1
	Xiphias gladius	x	1/1	1/1	1/1	1/1	1/1

BKL (RO)	Species	Reported in D3	D1C1 primary	D1C2 primary	D1C3 I / II	D1C4 I / II	D1C5 I / II
Coastal fish	*Neogobius melanostomus*		1/1	1/1	1/1	1/1	1/1
Demersal shelf fish	*Merlangius merlangus*		1/1	1/1	1/1	1/1	1/1
	Squalus acanthias		1/1	1/1	1/1	1/1	1/1

Findings:

Use of primary and secondary criteria: Although we would expect the MS to use more the primary than the secondary criteria, it seems that their selection of criteria was based on the availability of data and methods. Most of the species have complete assessments for D1C2, but rarely estimated values for other criteria. No considerable changes could be noted across the regions. In terms of absolute number of species, NEA ranked first. RO is the only BLK MS that reported electronically and for fish they included three species, all of them assessed for at least three criteria (D1C2, D1C3 and D1C4).

Species assessments and threshold values per criterion and region: Threshold values and estimated values are mainly reported for abundance (D1C2).

Assessed parameter for each species and criterion: Whenever the MS have reported values achieved, thresholds or both, they also provided and assessment for those parameters. A very small proportion of species has more than one parameter assessed (e.g., the three species reported by RO).

Gap: Data gaps exist mainly for criteria D1D5, D1C1 and D1C4. Moreover, there are gaps in coordination at regional level for the species to be included for the assessments of each species group. The species reported and assessed under D3 and D1 should also be discuss and harmonised in both the assessment and the reporting bearing in mind that theD1 species should reflect specific anthropogenic pressures that go beyond fisheries, which is covered by D3.

Recommendations for reporting: The entries analysed in this paragraph including thresholds values, achieved values, and assessed parameters are from the most informative in the Art. 8 reporting. The

MS reported the information in a consistent way, denoting that they have a good understanding of the structure of the reporting and of the concepts behind it, at least for those analysed in this section.

Recommendations for implementation: More coordination and common methods for selecting and assessing fish for assessment is required. The MSFD biodiversity expert network could facilitate this work. Better exploitation of the CFP data might increase the number of the assessed criteria. Different assessment capacity (in terms of threshold values and criteria) exists for those species that have dedicated monitoring programmes (e.g., some anadromous species included in the HD) and the bulk of species that are collected by the CFP.

5.1.3 Threshold values and parameters reported

Objective: This section aims to provide an overview of the reported threshold values (Table 46 to Table 48) and compare them with those that are developed by the RSCs other organisations (ICES, GFCM) and legislation (CFP).

Data: We analyse the data reported in columns Q, R and S for threshold values and column T (Appendix 2, Art.8 fish) for the sources of the thresholds. This information is check against the RSCs roof reports and the Palialexis et al. (2019) report for the harmonisation of methods to set threshold values for species.

Table 46. Quantitative and qualitative (right column) reported threshold values per criterion and their sources.

Criteria	OSPAR	HELCOM	UNEPMAP / GFCM	BLK	HD	WFD	CFP	ICCAT	ICES	National	Qualitative TV
D1C1							Fishing mortality	Fishing mortality (IE)	Fishing mortality (IE)	Mortality rate	Declining trend in discards of non-commercially exploited species (MT)
D1C2	Evolution of abundance: reached if the density time series has a recent period of stability greater than the previous period or if a significant positive trend is observed over the long term	0.6: BQR-ratio	Abundance	50.0: National (ABU); 0.08: National (BIOM)	Abundance: Favourable conservation status of the population	3.3: National / others (SI index)	Mortality rate; SSB	Mortality rate; biomass; SSB ABU (IE)	ABU (IE) MSY Btrigger proxy (PT) Biomass of spawning Stock (SSB) (PT)	Abundance (IE, SI), Biomass BIOM; literature (PT)	Long term average Positive trend Below a reference point Break point analysis Median ICES advice (e.g., 2012, 2018) Safe according to red list HD FCS
D1C3	Side distribution	0.6: Mean maximum length across all fish species found in monitoring catches (MMLI);		Mean length by species; Tpm (RO)					Mean Maximum Length	LFI, size distribution (PT), Size (length) (IT), L% (PT)	River specific threshold values (FEC), ICES When biomass of large fish (>50 cm) constitutes ≥ 20% of the total biomass of fish

											Above the long-term average for the species
D1C4		Fish community trophic index (LT) (for group: coastal fish community)			Favourable conservation status of the distribution (DIST-S)						HD FCS Comparison with original species distribution HD Favourable Reference Range Trend analysis, stable or increased distribution of biomass
D1C5					Favourable state of conservation of the habitat (HAB-CON); Area Occupied Habitat Sufficient (HD 2019 assessment)						

Table 47. Regional consistency in the sources of the threshold value source (default options).

	CFP	GFCM	Habitats	HELCOM	ICCAT	National	OSPAR	WFD	MS(sub)region	Other
BAL	**19**		**21**	**14**		**3**		**6**		**16**
DE	2		18							11
DK										
EE										1
FI										2
LT						1			4	
LV				7						
PL						3		6		2
SE	17		3	7						
NEA	**74**		**17**		**18**	**11**	**62**			**59**
BE										
DE	5		17							16
DK										
ES										
FR	20				18		62			
IE			8			15				20
NL										2
PT										21
SE	49					11				
MED		**1**			**4**		**65**			
ES										
FR		1			4		65			
IT										
MT										
SI						1				
BLK						**8**				
RO						8				

Table 48. Regional consistency in the sources if the threshold value source (additional reported sources).

	HELCOM BEAT based national application	ICAAT	ICES	ICES WG BAST	ICES 2012	ICES 2014	ICES 2018	National	Red list and overall list of species of established fish and lampreys (Elasmobranchii, Actinopterygii & Petromyzontidae) of Germany's marine waters.	Probst, W. N., Stelzenmuller, V. (2015). A benchmarking and assessment framework to operationalise ecological indicators based on time series analysis, Ecological Indicators, 55: 94-106.

BAL	**1**		**3**					**2**	**8**	
DE			3						8	
DK										
EE	1									
FI				2						
LT										
LV										
PL								2		
SE										
NEA		**5**	**14**		**6**	**1**	**1**	**2**	**16**	**14**
BE										
DE									16	
DK										
ES										
FR										
IE		5	7		6	1	1			
NL								2		
PT			7							14
SE										
MED										
ES										
FR										
MT										
IT										
SI										
BLK										
RO										

Findings: Table 46 provides an overview of the reported qualitative and quantitative threshold values for fish. The outcome was expected from Table 45 and shows that there is no coordination in the way the MS reused existing threshold values for fish. This is more evident in Table 47 and Table 48 that provide a regional perspective. Regarding criteria, D1C1 has very few thresholds reported for very few species, however the thresholds are comparable and estimated in the same way. D1C2 has many different thresholds, non-comparable, corresponding to several parameters (abundance, biomass), while a threshold for mortality ratio was reported by a MS in D1C2. While it is positive that some MS made use of HD thresholds, there was not consistency across MS in the cycle used and both 2013 and 2019 HD values were reported. D1C3 has less thresholds reported compared to D1C2, but the nature of this criterion that allows the use of many parameters describing the population characteristics resulted into different thresholds corresponding to different indicators, with no coordination at any level. D1C4 and D1C5 have very few reported thresholds (only one for the latter) indicating the gap in the development or reuse of thresholds for these two criteria. Another remarkable outcome from this analysis that verifies the luck of coordination (or guidelines) is the fact that the same threshold for the same parameter (BQR-ratio) was reported by three MS for different criteria (D1C2, D1C3 and D1C5) and with different sources (HELCOM, ICES, EU).

Recommendations for reporting: The reporting of the threshold values is essential and well-structured to provide the necessary information for a comprehensive understanding of the estimation

of the assessments and use of the thresholds. The qualitative threshold does not add much to the understanding of the assessment. Hopefully, this information will be replaced by quantitative values in the future.

Recommendations for implementation: The high number of species with different ecosystem functions (from highly exploited to species under conservation) should be better grouped and assessed to facilitate a better regional (RSC) and policy coordination (HD, CFP). The analysis shows that there are (at least) two distinct sources for thresholds, estimates and species sources, the HD and the CFP. Many gaps in methods to set threshold values were noticed for several criteria and species, which should be prioritised. However, depending on the species subgroups different pools of methods should be explored for each criterion. For instance, different methods to set thresholds are developed for commercial species through CFP and different parameters are developed for species that are assessed by the RSCs or HD (see also Palialexis et al., 2019) for the variety of methods to set threshold values). The fish experts should work together at regional level and develop a common understanding for the use of threshold values and harmonise either the existing thresholds or develop a method to generate comparable thresholds across the MSFD regions. Any progress on thresholds should be reflected in the Art. 8 guidance.

5.1.4 Consistency of spatial coverage and assessment period

Objective: The MS reported the assessment period for each parameter per species and criterion. We analysed this information to explore potential discrepancies in the assessment at regional and criterion level that could potentially affect the comparability and the consistency in the final assessment of each parameter (Table 49).

Data: This information is reported in column AT "assessment period" (Appendix 2, Art.8 fish).

Table 49. Assessment period per criterion and region based on which the MS performed the assessment of their parameters. The numbers indicate how many reported parameters have the same assessment period per criterion.

	1993-2017	2000-2018	2002-2016	2007-2017	2008-2015	2010-2015	2011-2016	2011-2017	2012-2016	2012-2017	2012-2018	2013-2017	2016	2016-2017
BAL														
D1C1			1		2		2				22			
D1C2		2	1		2		35			1	22		20	
D1C3							4				22			
D1C4							2			2	22			
D1C5							1				22			
NEA														
D1C1	44			13	2	70		69		21	44	56		
D1C2	2			13	2	70	9	46	1	21	44	56	49	
D1C3	1					70	8	26	1	12	32			
D1C4	1					70		26			32	56		
D1C5	44					70		69			32	56		
MED														
D1C1						77				4	12			1
D1C2						79				149	12			2
D1C3						77				146	12			1
D1C4						77					12			1

D1C5	77	1
BLK		
D1C2	2	
D1C3	3	
D1C2	3	

Findings: There is no harmonisation in the assessment period (Table 49) of most of the parameters assessed for each criterion, indicating that the assessments might not be comparable and might have different level of uncertainty. Moreover, the 6-year assessment cycle is not reflected in the assessed parameters.

Gaps: Once again the MS used what is available in terms of data, indicators, and assessments and not assessments adjusted to the MSFD requirements – cycle in this case. Of course, longer data set can provide more accurate estimates, however, in most of the periods the duration is shorter than six years. The different assessment periods might not provide comparable assessments and might not reflect the same volume of pressures to the species.

Recommendations for reporting: No recommendation, this information is crucial and should be remail in the report.

Recommendations for implementation: The policy alignment between MSFD, CFP (if there is an agreement to use the CFP monitoring as the main source of data) and RSC assessment cycles that includes alignment of the assessment periods is crucial to reduce the burden of multiple incomparable and sometimes misleading assessments of the same element. Otherwise, the assessment period will be an additional factor added to the different parameters, methods, and thresholds, which produce incomparable and inconsistent environmental assessments. The initiatives to align the MSFD with other environmental policies could use this analysis to justify the need for temporal alignment and methodological harmonisation across the policy obligations.

5.1.5 GES achievement or date expected to be achieved

Objective: The MS reported for each species if it is in GES, or when they expect to achieve GES. We analysed the reported information to identify the proportion of species that are in GES at regional level and when most of the species in each species groups could be in GES according to the MS.

Data: The information of the GES achievement or the expected date is in column AR (Appendix 2, Art.8 fish).

Expected Outcome: The GES achievement is the basis for the MSFD. In the structure of the reporting this entry corresponds to the assessment of parameters, which are integrated at the level of criterion and then the criteria are integrated at the level of species. Given the different methods of integration at both levels and the number of parameters or criteria that contributed to each assessment the final GES assessment/achievement might not be consistent yet. The outcome will provide a quick overview of the proportion of species that are in GES and the provision for the GES achievement for the species group.

Table 50. GES status for fish or provisional date of GES achievement as it was reported by each MS per MSFD region.

	GES	GES expected to be achieved		Unknown

Species groups and species in BAL	achieved	by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)	Not assessed/ Not relevant	
FishCoastal	LV	PL		DE EE LT	PL SE	DK
FishDemersalShelf		LV PL		DE SE		DK
FishPelagicShelf	LV	LV		DE SE LT		FI

Species groups and species in NEA	GES achieved	GES expected to be achieved			Not assessed / Not relevant	Unknown
		by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
FishCoastal	PT			DE IE	SE	DK FR
FishDeepSea	PT					DK PT
FishDemersalShelf	PT			DE NL SE		BE DK ES FR
FishPelagicShelf				DE SE	PT	DK FR

Species groups and species in MED	GES achieved	GES expected to be achieved			Not assessed/ Not relevant	Unknown
		by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
FishCoastal				IT	SI	ES FR
FishDeepSea				IT		
FishDemersalShelf			MT	IT		FR
FishPelagicShelf				IT		FR

Species groups and species in BS	GES achieved	GES expected to be achieved			Not assessed/ Not relevant	Unknown
		by 2020	later than 2020 (Art.14 exception)	later than 2020 (no Art.14)		
FishCoastal	RO					
FishDemersalShelf				RO		

Findings: Only three MS reported fish species to be in GES, two species for LV, one for RO and many for PT. A few more will achieve GES by 2020. The majority were reported that the GES is unknown or not assessed or that it will be achieved after 2020.

Gap: Many gaps were noticed in data and methods, as this entry requires consideration of several assessments and integrations, which led to inconsistent decision for the GES achievement at species level. The outcome is not representative of the status of GES in the European waters for fish. The MS had different understanding on how to assess or report GES achievement and followed different approaches, which unfortunately cannot be deducted by the reported information. Thus, regional coordination is required for both assessment and reporting, to tackle gaps and inconsistencies.

Recommendations for reporting: The MS need to combine assessments of other criteria and parameters to assess the GES achievement. Thus, this entry which corresponds to the species/parameter/criterion level, depending on level of the integration should be move to a higher level in the reporting structure. Many MS conceive GES achievement differently and reported inconsistent information e.g., assessment of criterion instead of species or no assessment at all, when the relevant parameter/criterion was not assessed.

Recommendations for implementation: This entry includes information relevant to the high level MSFD scope, which is the GES achievement. All the work that is related with the harmonisation of methodological standards (thresholds, integration rules) can ensure a consistent and comparable assessment of species in the coming cycles and achieve consistency in the MS reports. The experts from the MS could develop this work and their role is essential for a consistent regional assessment and can feed the Art. 8 guidance and test the recommendations for integration rules. Contradicted assessment between MSFD, RSCs, and CFP should be avoided. To this end, an agreed analogy in the assessments of D1 and D3 should be developed by the experts.

5.2 Results of Art.9 analysis for D1 fish

5.2.1 GES determination levels

Objective: This section aims to give an overview of how the MS determined GES and explore possibilities to harmonise it.

Data: We analysed the GES description from the MS reports at the levels that were reported (column I in the Art 9 spreadsheet).

Table 51. Level of GES determination and examples of GES description. The count of entries correspond to the total number of ecosystem component per MS and subregion for which GES was determined for D1 or its criteria. This is indicative of the variety of GES descriptions. In red those MS that provided GES determination to more than one levels.

Levels	Number of MS	Examples
Descriptor	5 CY DE DK FR IT	DE The good environmental status for D1 is defined, among other things, by the fact that: ... according to the WFD, the coastal waters are in a good ecological status and the entire coastal sea area is in a good chemical status. ... the habitat types of Annex I (LRT 11xx) of the Habitats Directive relevant for the marine area of the North Sea are in a favorable state of conservation. ... the species of Annex II of the Habitats Directive relevant for the marine area of the North Sea and the species of the Birds Directive relevant for the marine area of the North Sea are in a favorable state of conservation due to the quality of their food habitat.

		... the species, species groups and habitats in the Wadden Sea listed in the Wadden Sea Plan are in good condition. ... the goals of individual species or species group-specific conventions (e.g. ASCOBANS, seal agreements) have been achieved. ... the Ecological Quality Objectives (EcoQO) defined by OSPAR have been achieved. According to Commission (EU) 2017/848, the following criteria are used to assess the good environmental status of D1 fish: D1C1, D1C2, D1C3, D1C4, D1C5. The criteria D1C2, D1C4 and D1C5 could be evaluated. In contrast, an assessment was not yet possible for D1C1 and D1C3. DK Biodiversity is maintained. The quality and prevalence of habitats, as well as the prevalence and density of species, correspond to the prevailing physiographic, geographical and climatic conditions. FR Biological diversity is conserved. The quality of habitats and their number, as well as the distribution and abundance of species are adapted to existing physiographic, geographic and climatic conditions (Directive 2008/56 / EC).
Criteria	2 LV SI	Demersal and pelagic: D1C2 Species abundance Coastal: D1C2 Species population abundance
D1C1	4 DK, HR, IE, RO	RO-demersal: The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long-term viability is ensure. The mortality rate per species from incidental by-catch is below the threshold values.
D1C2	3 DK, HR, IE	DK The population density of the species is not adversely affected by man-made strains, so the long-term survival of the species is ensured.
D1C4	2 BE, IE	BE The distribution area and, if applicable, the distribution pattern of the species is in accordance with the prevailing physiographic, geographical and climatic conditions.
D1C5	IE	IE Ireland has not fully achieved Good Environmental Status within its maritime area under criterion D1C5 - the habitat for the species has the necessary extent and condition to support the different stages in the life history of the species seabed. Of 4 stocks assessed under this criterion 2 stocks have achieved GES and 2 stocks have not achieved GES.
Species group D1C3	MT	MT commercial: The size distribution of commercially exploited species of fish and cephalopods, in comparison with long-term historical average, is indicative of healthy stocks.
Species D1C1	FI	FI-coastal: Mortality of sea trout as a by-catch of net fishing is declining in each sea area.
Threshold values	PL, PT	The populations of the species are not adversely affected due to anthropogenic pressures. Threshold values established nationally.
D1C2	3 PL, RO, SE	PL The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured. Threshold values established nationally. RO coastal: The distributional range of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured. The distributional range of the species (%) does not decrease below threshold value. (RO coastal)

		SE Coastal fish species achieve GES when at least 90 % of the assessment areas reach the species-specific threshold values. Demersal and pelagic species achieve GES when at least 90 % of the species in each species group achieve their threshold values. Status is assessed separately for the three species groups coastal fish, demersal fish and pelagic fish.
D1C4	1 DK	In relation to the distribution area for fish that are not exploited commercially, good environmental status is assessed to correspond to favorable conservation status under the Habitats Directive.
Indicators D1C2	4 BE, FI, LT, RO, MT	BE The population density of the species is not affected by anthropogenic loads, thus ensuring long-term viability of the species. FI Fish are assessed first by species and then by the status of the fish on the basis of all indicators. RO-demersal: The spawning stock abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured. MT The biomass indices and the size distribution of non-commercially exploited species, as assessed through MEDITS surveys, in comparison with historical averages, are indicative of healthy status
D1C3	3 FI, NL, LT	FI Bay of Biscay migratory pigs: the average growth of spawning mother fish is accelerating and the proportion of small individuals in spawning fish is declining. Fish are assessed first by species and then by the status of the fish on the basis of all indicators. NL-coastal Increase in the share of large fish in the fishing community (OSPAR rating)
No determination D1C2	SE	SE Definition of GES at criteria level is not yet available.

Findings: Once again the GES description was inconsistent at the level which was set and in the way it was expressed. Most of the GES descriptions are qualitative and very broad, thus not informative enough to estimate the distance from GES. The few quantitative descriptions are at the level of parameter or even at the threshold value of a parameter, which is not indicative for the GES determination of the species. CY, DE, DK, IT and FR provided descriptions at the level of descriptor. Germany used the same description for all ecosystem components with no further details. Several MS, like DK, provided GES determination at different levels, from criterion to descriptor. Finally, some MS did not provide GES description at all, because there are no agreed or available determination for species and species groups or for specific criteria. The gaps in the GES determination and the different levels across region did not reveal any kind of regional coordination across MS.

Gaps: Lack of harmonisation caused by lack of common understanding and misinterpretation of the MSFD requirements in relation to the GES determination per Descriptor. This should be also clarified across the Descriptors and following the ecosystem approach to the assessment linking State with Impact and Pressures (DPSIR). For instance, when only three MS provided GES determination for cephalopods there is not much to analyse, however the experts should consider the same analysis and results for other species groups that are more informative.

Recommendations for reporting: This information is crucial for the reporting. Maybe a way to break down the detailed description of GES that some MS provided would help to extract more information from the GES determination, however, this needs further discussion. GES description should be changed to “GES determination” as this is the only place where the MS can determine GES. The GES determination should be linked with the proper and agreed level or levels e.g., a quantitative determination at species level 70% of the species within the species group. The reiteration of the general description of the descriptor or criteria from the GES decision is not helpful/necessary increasing the time of reporting.

Recommendations for implementation: The assessment flow and the Art. 8 guidance should be the basis for clarifying the GES determination in a consistent way and how the GES will be reflected at the level of species groups indicators, criteria and species. Common integration rules and common agreed methods will bring consistency to all assessment levels from parameters to species groups and ecosystem components. The reporting tool should be developed accordingly, linking GES determination to the proper level, reducing and automatizing the reporting effort.

6. Results of Art. 10 analysis

6.1 Analysis of D1 ecosystem components

Objective: Art. 10 was analysed as a single dataset for all D1 ecosystem components. The structure of the reported information and the inconsistent content did not allow the grouping of environmental targets at a lower level (e.g., species group or criteria). On the other hand, the analysis of all Art. 10 entries for D1 provides a holistic view of how the MS interpreted the need of targets for the MSFD and how they described and set targets for D1. We analysed the reported information from 18 MS, since UK, EL and BG did not provide electronic reports and IT, PT did not report for Art. 10 at the time of the analysis.

The analysis covers the following topics:

- The number of targets per MS and regions or subdivisions of the regions. The outcome of this analysis provides an overview of how the MS reported in terms of number per region and subdivision and can contribute to the harmonisation of target setting, by revealing the differences and providing potential sources of good practices.

- Assignment of targets to GES components and parameters. The outcome from this analysis can refine the reporting of target and provide input for the harmonisation of target setting across the MS.

- The quantification of the status (new, same as 2012, modified or no longer needed) of the targets.

- The evaluation of the targets according to their capacity to be quantified. This analysis provides an overview of the possible quantification of the distance to achieve GES and of monitoring the progress towards GES.

- An overview of the link between reported targets and measures, and reported targets and related indicators.

- An indicative/qualitative analysis of the content of the targets reported, to provide an overview of the level of specificity where the targets were set.

- The reported assessment periods for the targets. We explored potential patterns in the assessment periods of the targets that can potentially support regional coordination, assuming that the assessment parameters of the target will be based on common monitoring programmes from RSCs or EU legislation (HD, BD CFP).

Data: We analysed the targets reported for D1 (Art.10 xls file embedded in Appendix 2).

6.1.1 Number of targets reported and their distribution across MS per region and subdivision

In total, we analysed 3453 targets reported by 18 MS. Figure 10 presents the number of targets reported by the MS, where almost 80% were reported by three MS (FR, ES and DE) and almost 60% were reported only from ES. Of course, these three MS provide targets for two different regions, but still the number of the targets reported exceeds by far the average of the other 15 MS, which is 43 targets. Figure 11 provides a complementary view showing how the reported targets are spread across the MSFD regions and subdivisions. The discrepancies in the number of the reported targets provides already some indications for the inconsistency in the content and perception of targets from the MS.

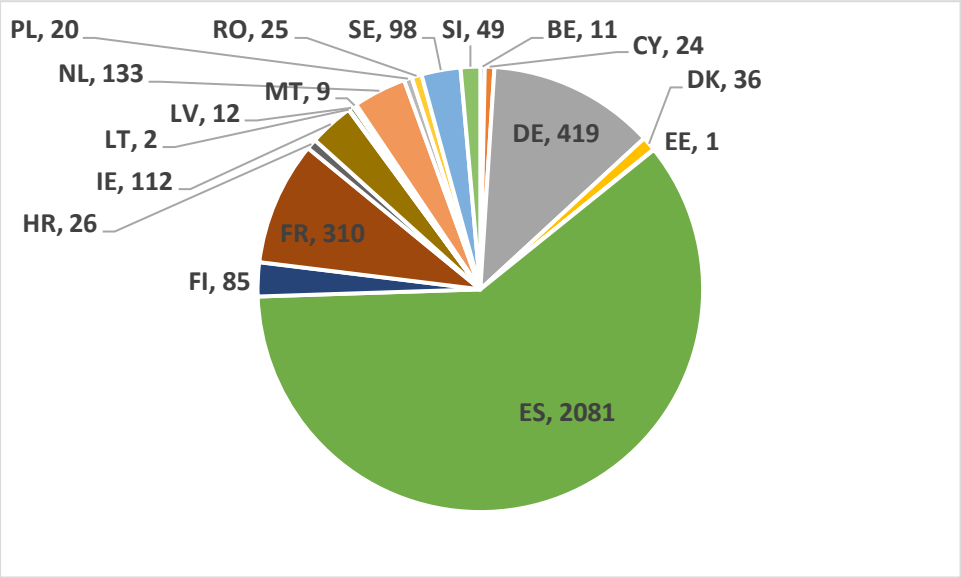


Figure 10. Number of targets reported for D1 per MS.

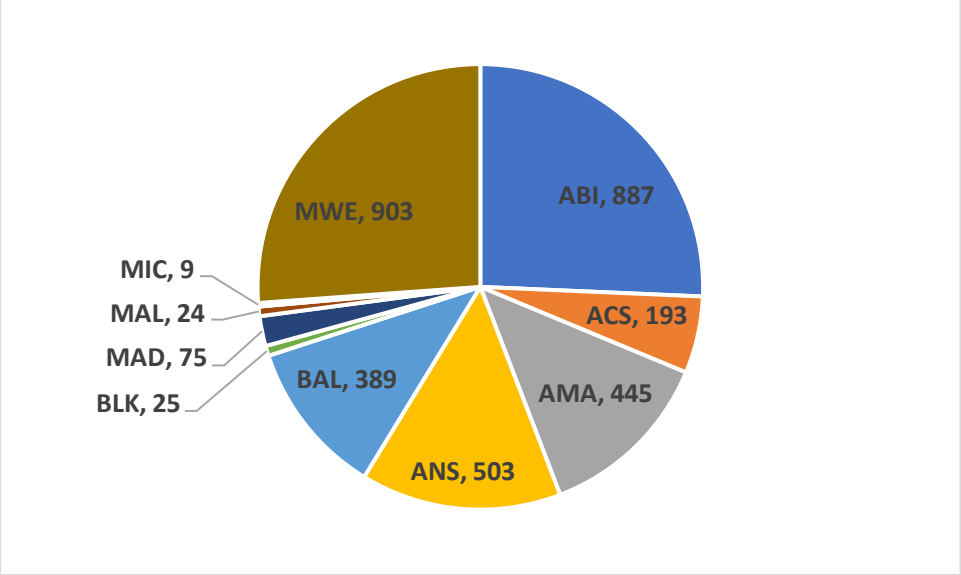


Figure 11. Distribution of Art. 10 targets at regional and Subdivision scale.

6.1.2 Assignment of targets to GES components and parameters

MS assigned the reported targets to GES components. We list in Table 52. The left column lists what the MS reported as GES components and the right column shows the number of MS reported each component.in the left column what the MS reported under GES component, and on the right column the number of MS reporting each component. The reporting guidance (European Commission, 2018) for this entry proposes for the GES component to report the "*Descriptor or Criteria to which the target applies*". The MS indeed reported at Descriptor level (11 MS) and at criterion level (two to seven MS depending on the criterion), but they also assigned targets at the species group or pelagic habitat. Although it is fully acceptable and practical to split D1 to the five species groups and pelagic habitats, the number of MS assigned targets at the level of Descriptor, criterion or species group are varying from two to 11 in the best case (high level assignment to Descriptor). This is indicative of the luck of harmonization, regional coordination and possibly common understanding for the Art. 10 requirements, something that is explored in the following sections, as well.

Table 52. The left column lists what the MS reported as GES components and the right column shows the number of MS reported each component.

GES COMPONENTS	NUMBER MS REPORTED FOR EACH COMPONENT
D1 BIODIVERSITY	**11**
D1 BIRDS	**9**
D1 CEPHALOPODS	**2**
D1 FISH	**8**
D1 MAMMALS	**7**
D1 PELAGIC HABITATS	**8**
D1 REPTILES	**3**
D1C1 MORTALITY RATE FROM INCIDENTAL BY-CATCH	**7**
D1C2 POPULATION ABUNDANCE (1.2, 1.2.1)	**7**
D1C3 POPULATION DEMOGRAPHIC CHARACTERISTICS (1.3, 1.3.1)	**6**
D1C4 POPULATION DISTRIBUTIONAL RANGE AND PATTERN (1.1, 1.1.1, 1.1.2, 1.1.3)	**4**
D1C5 HABITAT FOR THE SPECIES	**2**

For each entry/target the MS assigned a parameter from the default list (drop down menu) in the reporting tool (European Commission, 2018). This information provides a direct link between quantifiable, common parameters and targets. Then we summed the parameters depending on their relevance with the D1 GES criteria and the results are shown in Figure 12. One third of the MS indeed reported one of the listed parameters for each target, another third reported "other", which in most of the cases it is not defined or it is not quantifiable. The last third of the MS did not assign any parameter (none), in cases where the targets were qualitative or too vague to be quantified.

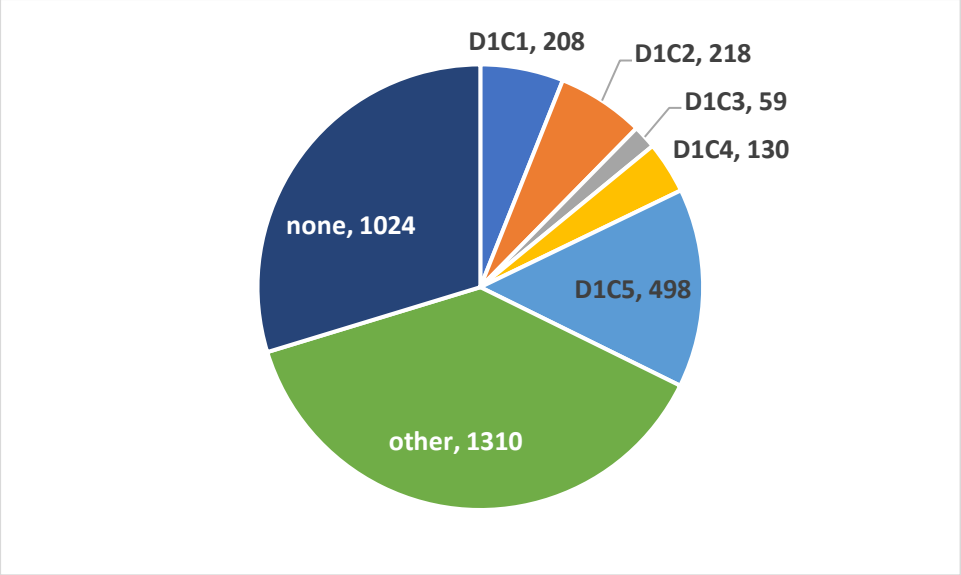


Figure 12. Number of targets assigned to each D1 criterion, based on the quantification of the parameters reported for each target.

6.1.3 Quantification of the status of the targets

The MS reported the status of each target based on four predetermined categories in the reporting tool (European Commission, 2018). They determined the status of the new targets, those that were reported in 2012, those that were modified since 2012 and those that are not needed any more, either because they are not relevant anymore or they were achieved already during the first cycle. In absolute numbers most of the targets are new, while a considerable number comes from the 2012 definitions (Figure 13). Of course, for the reading of Figure 13 we need to consider that 80% of the target were reported by three MS (Figure 10). It seems that there are differences in the way the MS decided to reuse the targets reported in 2012, where some MS, such as DE, reported the same targets as in 2012 and others, such as FR, reported only new targets. It should be noted though that in the 2012 reporting many MS did not provide targets and that the reported targets were inconsistently reported (Palialexis *et al.* 2014).

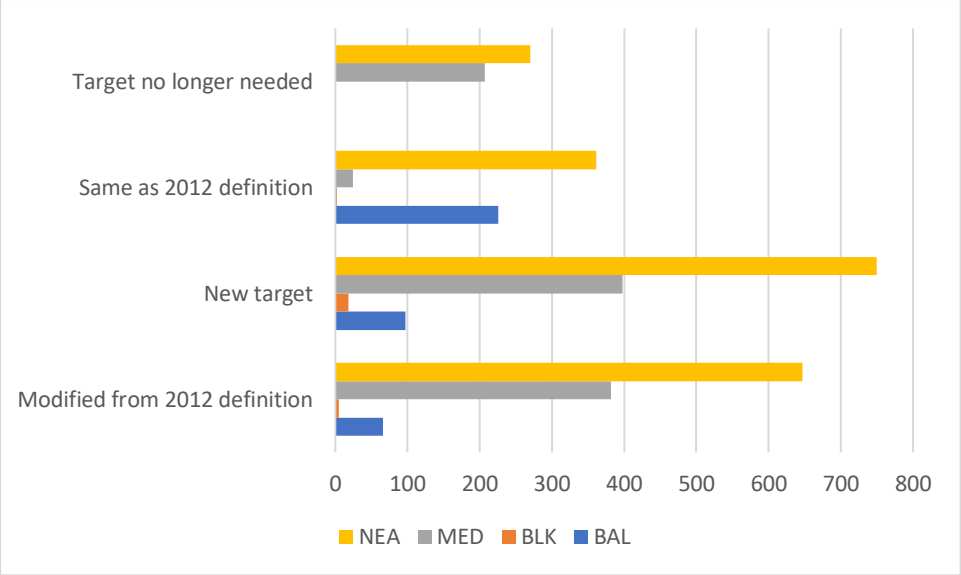


Figure 13. Number of targets per region according to their status (targets not needed, same targets as in 2012, new targets and modified from the 2012 definition).

6.1.4 Evaluation of the targets according to their capacity to be quantified.

The targets should be able to provide information about the GES achievement and to estimate how far we are from achieving GES. As such, the MS must assign a target value to each entry/target. We analysed the number of targets with reported target values to get an overview of the quantitative targets. From the 3453 targets that were analysed approximately 6% have target values, which were reported by six out of the 18 MS. It should me mentioned that many of the 6% of the targets with target values are either repetitive to other reporting units or other species, so the absolute number of values reported is much lower. It is obvious that the luck of measurable targets and joint measurable targets (since the six MS belong to 3 different regions) should be prioritised in the work plan of the WG GES. Otherwise, the contribution of Art. 10 to the MSFD implementation will remain poor in terms of assessing the progress of the targets and the GES achievement.

6.1.5 Overview of the link between reported targets and measures, and reported targets and related indicators.

For each target, the MS reported related measures from MSFD Art. 13. Practically, this information indicates which measure contributes to the GES achievement through a quantitative target. The analysis showed that two out of the three targets are linked to at least one measure. Several target, though are linked to more than one measures. Bearing in mind the inconsistency and vagueness of the measures reported in 2016, we estimated the number of unique entries assigned to each target. Eventually, only 7% of the total targets have unique measures, while the majority (approximately 60%) have repetitions of those unique measures.

A similar analysis was performed on the indicators that were assigned to each target. Those indicators were either from the RSCs or national indicators or indicators that were assigned earlier to Art.8. The MS reported related indicators for 30% of the reported targets. Once again, there were cases were

more than one indicator were assigned to a target. The unique indicators reported were 4% of the reported targets, indicating that each indicator was repeated several times.

6.1.6 Analysis of the content of the targets reported, to provide an overview of the level of specificity where the targets were set.

In the sections above, the analysis of the targets was focused on the quantification and grouping of the reported targets to show the vast amount of reported information and potential discrepancies deriving from such quantification. In this section we provide some specific descriptions of targets, the level that corresponds to the target according to our interpretation (left column, Table 53) and the GES component that was reported by the MS (right column, Table 53). First, the comparison of the level and GES components indicates that there was no consistency in the way the targets were reported. Second, most of the targets are indeed too vague to be quantified. The target in the last row (Table 53) is one of the very few qualitative targets for which the ES provided a value. The description though of this target remains vague regarding the quantity to measure potential distance from GES. Other target descriptions are too broad regarding their scope e.g., "Develop regulation…" (second target in Table 53). In other cases, the description includes state characteristics (multiple species groups and habitats), pressures (alteration of hydrographical situation) and criteria (population) making difficult to assign a single value or measure the progress to GES. The third target in Table 53 exemplifies such a description.

Table 53. Indicative targets reported at different level (Descriptor, criterion, species group) and at different GES component for D1.

Level	MSFD subregion	Description of targets	GES component
Criterion	ABI	Reduce the main causes of mortality and decrease populations of non-commercial species groups at the top of the trophic chain (marine mammals, reptiles, seabirds, pelagic and demersal industries)	D1 biodiversity
Species group	ABI	Develop regulation to prevent commercial exploitation and by-catches of elasmobranchs included in the annexes of national legislation, European Directives or applicable international conventions.	D1 biodiversity
Habitat theme and species groups	NEA	Changes in habitats and, in particular, habitat functions (e.g. spawning, nursery and feeding grounds, or migration routes of fish, birds and mammals) due to man-made alterations of the hydrographical situation do not lead, alone or cumulatively, to a risk to species or habitats or to the loss of populations respectively.	D1 biodiversity
Descriptor	BAL	Presence, species composition of species, and size distribution in the fish community must make it possible to maintain important functions in the food web.	D1 Biodiversity, D1C2 Population abundance (1.2, 1.2.1), D1C3 Population demographic characteristics (1.3, 1.3.1),

			D1C4 Population distributional range and pattern (1.1, 1.1.1, 1.1.2, 1.1.3)
Descriptor	BAL	Use of natural resources is sustainable and does not risk-achieving or providing good status.	D1 Mammals
Species group	NEA	Contribute to the further development of bird population assessment and the identification of key pressure factors at regional level	D1C2 Population abundance (1.2, 1.2.1), D1C3 Population demographic characteristics (1.3, 1.3.1)
Criterion	NEA	The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions	D1C4 Population distributional range and pattern (1.1, 1.1.1, 1.1.2, 1.1.3)
Theme habitats	AMA	Ensure that human activities not significantly increase the affected area and physical loss of the seabed with respect to the anterior cycle.	D1 biodiversity

6.1.7 The reported assessment periods for the targets.

We explored patterns in the assessment periods of the targets that can potentially support regional coordination, assuming that the assessment parameters of the target will be based on common monitoring programmes from RSCs or EU legislation (HD, BD CFP).

Table 54. Number of targets reported per region and in total with the same assessment period.

Assessment period	*BAL*	*BLK*	*MED*	*NEA*	*Grand Total*
1983-2016				2	2
1986-2015				58	58
1992-2014				47	47
1994-2016				6	6
2002-2010				6	6
2006-2016	1			1	2
2009-2018				70	70
2010-2016				4	4
2011-2015	12			12	24
2011-2016	230			224	454
2012-2010				6	6
2012-2014	18				18

2012-2017	1	21			22
2013-2013				2	2
2013-2017		3		40	43
2013-2018			22		22
2014	6				6
2015	6			12	18
2015-2021			24	78	102
2015-2024				14	14
2018-2024	102			17	119
2020-2025			9		9
2012-2018	11		534	824	1369
None	2	1	416	605	1024
Total	389	25	1011	2028	3453

As shown in Table 54 there were reported numerous assessment period for the targets, with no obvious spatial pattern (e.g., like in section 1.1.5, following the RSCs assessments or the MSFD cycle, like in the assessment period of criteria in Art. 8). The duration of the assessment varies as well, from a single year in some cases to several decades in others. One third of the targets do not have associated assessment period (none in Table 54).

6.2 Findings and Recommendations for D1 Art. 10

Findings: The MS reported substantial amount of information for Art. 10, and partially covered all the aspects that were expected. Such as, link with key pressures, measures, covering all ecosystem components and all criteria, providing qualitative targets, able to measure the distance from GES. However, all these aspects were covered with a remarkable diversity in the quantity and quality of the reported information and with no regional coordination. Ultimately and despite the vast amount of reported information we did not manage to map the progress of the targets towards achieving GES for the reported components at regional or EU level.

Regarding the number of targets, it was striking that 80% were reported by only three MS. A common structure of GES components, key pressures and criteria will rationalise the number of reported targets. On the other hand, several MS that reported less very few targets failed to cover all relevant pressures and ecosystem components to measure the progress to GES.

The inconsistency in the way criteria, GES components and level at which the targets were assigned indicate that more effort is required for a common understanding and harmonisation in the reporting. The staff working document (European Commission 2020) provides useful guidelines for the Art. 10 target setting that can facilitate a common understanding. However, it was under development when the MS reported for this cycle's obligation. The link with measures, key pressures and indicators could further developed with the contribution of experts and harmonised at regional level.

Gaps: Lack of harmonisation in most of the reported entries for Art. 10 was caused by the lack of common understanding and misinterpretation of the MSFD requirements in relation to measurable, linked with key pressures and GES related target setting. Gaps of information exist for several GES components as shown in Table 52. Lack of regional coordination was observed because of lack or regionally coordinated targets, as well as from inconsistency in many reported entries across neighbouring species.

Recommendations for reporting: The structure of the Art. 10 report was adequate to retrieve the necessary information for required by the MSFD. The different interpretation of some entries that cased inconsistent reporting and incomparable entries should be solved through an Art. 10 guidance document rather than further clarifications in the next reporting guidance document.

Recommendations for implementation: To improve the implementation of Art. 10 the WG GES should prioritise a guidance document to ensure common understanding of the scope of the targets and harmonised description at harmonised hierarchical level. Moreover, regional cooperation across the MS can further harmonise regional targets, which might be more relevant for mobile species and widely distributed key pressures. The poor link of targets with GES and the poor report of measurable targets is partially caused by the inconsistent GES determination, which was evident for all species groups. So, the harmonisation of the GES determination for Art. 9, with the contribution of experts and RSC can improve the Art. 10 target setting.

7. Conclusions

This report highlights at the end of each section the main gaps and recommendations to facilitate the prioritisation of outstanding issues and gaps for the MSFD implementation i.e. assessment and reporting. The recommendations should support any informed decision for the future work plan of the MSFD Common Implementation Strategy groups, the competent authorities of the MS and the European Commission's units that coordinate the MSFD and other relevant policies. In addition, the detailed technical information, presented in this report, on reporting progress, developed methods and good practices overview, mainly targets the experts that are involved in the MSFD species assessments. Considering the outcomes of all species groups, criteria and regions, this last section aims to provide overarching conclusions and recommendations relevant to all species groups, and to cross-cutting MSFD implementation processes.

First, the remarkable **effort** that the MS put into this reporting obligations should be acknowledged, covering the majority of the requirements that an ambitious policy such as the MSFD foresees. The progress made in the quality and number of assessments compared to the first reporting (2012) was impressive, especially regarding the coordination across MS and the convergence with the developed MSFD concepts described in the GES Decision (European Union 2017) and other relevant documents (European Commission 2018, European Commission 2020). Obviously, there are still many processes in progress, to further harmonise assessments and monitoring. To this end, considerable work that was recently developed in the frame of the MSFD CIS and was not reflected in this reporting cycle, tackles or will contribute to tackle many of the identified gaps. As concerns the processes in progress falling in this category, it should be mentioned the alignment and coordination of the MSFD with the RSCs work programmes and the alignment of the EU environmental policies (MSFD, HD and BH). The recently developed work on thresholds and integrations rules will also contribute to the harmonisation and comparability of the MS coming assessment and reporting. The MS' nominated experts offer substantial support to these processes, especially by bridging the national scientific and technical work with EU and regional activities.

The MSFD **Biodiversity expert network** develops tailor-made solutions and recommendation for the assessment and monitoring for D1, in line with the Art. 8 guidance document (Walmsley et al. 2017) and the requirements from the GES Decision (European Union 2017). The evaluation of the MS reports showed that the progress is evident in the quality of the reports and the in level of regional coordination, when active groups of experts are working on particular MSFD descriptors or groups of

species. Such cases include for instance, the work developed by the common OSPAR/HELCOM/ICES working group on seabirds (JWGBIRD), and the expert groups in OSPAR and HELCOM for marine mammals. Remarkable effort was made by the marine turtle expert group on the development of common indicators, covering all concerned MS. However, this work started just after the reporting deadline and it is not yet reflected in this analysis. On the other hand, for species groups like fish and cephalopods, the MSFD work is not yet fully developed and well-coordinated with other areas (notably fisheries), partially explaining the identified gaps. To conclude, during the first MSFD cycle the MS developed the conceptual frameworks to support the MSFD implementation and now the MS' experts are called to materialise the implementation with well-coordinated and common agreed methods towards comparable and robust GES assessment of the marine biological diversity. To this end the MS are encouraged to sustain the work at the technical level, providing the proper support to their experts.

Regarding MSFD **Article 8**, the work for marine mammals is more evolved than other species groups. The assessment for the birds in the south MSFD regions and for fish and cephalopods in all regions need to be further developed. The progress made in the development of common methods for sea turtles is not reflected in the reporting, as it was started after the MS assessments. The available data cover mostly criteria D1C2 and D1C4, however, in many cases there are assessments for D1C1 for species sensitive to by-catch (e.g., harbour porpoise) and for D1C3 for species where this criterion is essential for the overall assessment of their status (e.g., breeding success for some bird species). Common methods for thresholds and common integration rules will further improve the implementation for all species groups.

The main source of assessed parameters for the D1 species are the HD, BD and the RSCs indicators. Rarely the MS reported additional assessments for species with national interest. A better exploitation of the assessed parameters and indicators from the RSC and policies (including CFP) and regional coordination especially for species with distribution beyond the national jurisdiction should be prioritised to ease and harmonise the MS assessment effort and reporting burden. Each species group and region revealed different and varied gaps in knowledge and data to achieve assess GES. The MSFD introduced an ecosystem approach to management by bringing together several criteria elements (species and habitats for D1) with pressures and impacts assessments deriving from other Descriptors. The RSCs' assessments are indicator based, while the HD are species based, although the MS made mostly use of the assessed parameters, rather than reporting the status assessment of the HD species. It was very challenging for the MS to move from the indicator and parameter level to the species group GES assessment, because of the lack of agreed integration rules and harmonised GES determination. The harmonisation of the GES determination from Art. 9 and agreed integration rules for each level of integration (from Art. 8) will highly contribute to an accurate estimation of the GES achievement per species group and region, which is the ultimate scope of the D1 assessment.

With regards to **Article 9**, MS provided substantial information for the GES determination, however, more work is required to develop coordinated, and quantitative GES determination at the proper level (criteria and species groups) associated with agreed threshold values at regional level. GES determination should be consistent and comparable among MS, which can be achieved with regional agreement, as required by the GES Decision and is ecologically relevant for the highly mobile D1 species. A harmonised GES determination could be developed at the WG GES level, or at the technical level. A detailed reporting guidance on the level at which GES is achieved and against which value could support the GES harmonisation. MS need to consistently build their GES determination on the concepts described in SWD(2020)62 document (European Commission, 2020) and to request expert advice to develop guidelines and for a quantitative GES determination across descriptors. The

guidelines for the GES determination should include the level of determination as an indication of the minimum level where GES should be achieved, a common/comparable set of elements and common/comparable methods to quantify GES. The technical work for Art. 8 can support the harmonisation of the GES determination. The expert network has the capacity to develop recommendations for quantitative GES determination based on scientific sound methodologies.

For **Article 10**, inconsistencies were observed on how the MS have set their targets, even at national level. Targets were rarely measurable and/or associated with specific thresholds, which will also hamper the assessment of effectiveness of MSFD measures. The evaluation of the MS reports revealed absence of harmonisation and inconsistency in the number and content of the reported targets across MS. It was impossible to estimate the overall progress and to visualise the link between measures and targets for the GES achievement. Across Descriptors, the experts and the WG GES should further elaborate the conceptual development of target setting and their use within the MSFD concepts related to GES assessment and GES determination (Art. 8 and 9), building on the SWD(2020) 62 final (European Commission, 2020).

8. References

BSC, 2002. The Black Sea Biodiversity and Landscape Conservation Protocol to the Convention on the Protection of the Black Sea against Pollution (Bucharest Convention), Annex II and Annex IV.

European Commission 2020. 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. Brussels, 25.6.2020 SWD(2020) 62 final.

European Commission, 1992. Council Directive 92 /43 /EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. L. 206/7.

European Commission, 1999. Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean. Official Journal of the European Communities, L 322, 14 December 1999.

European Commission, 2009. Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. L 20/7.

European Commission, 2013. REGULATION (EU) No 1380/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC.

European Commission, 2018. Reporting on the 2018 update of articles 8, 9 & 10 for the Marine Strategy Framework Directive. DG Environment, Brussels. pp 72 (MSFD Guidance Document 14).

European Union 2013, 'Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009, and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004, and Council Decision 2004/585/EC. Official Journal of the European Union 28.12.2013, 40 pp.

European Union 2017, 'Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU (Text with EEA relevance.)', Official Journal of the European Union, Volume L 125, No 43, pp: 1-32.

European Union, 2008, 'Directive 2008/ 56/EC of the European Parliament and the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)', Official Journal of the European Union, Volume L 164, No 19, pp: 1-22.

HELCOM 2013. Red List of Baltic Sea underwater biotopes, habitats and biotope complexes. Baltic Sea Environmental Proceedings No. 138.

ICES 2018a, ICES, Report of the Workshop on MSFD biodiversity of species D1 aggregation (WKDIVAGG), 1–4 May 2018, ICES HQ, Copenhagen, Denmark. ICES CM 2018/ACOM:47. 53 pp. http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WKDIVExtinct/01%20WKDIVExtinct%20Report.pdf, 2018a.

ICES 2018b, ICES, Report of the Workshop on extinction risk of MSFD biodiversity approach (WKDIVExtinct), 12–15 June 2018, ICES HQ, Copenhagen, Denmark. ICES CM 2018/ACOM:48. 43pp.

http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WKDIVExtinct/01%20WKDIVExtinct%20Report.pdf.

IUCN, 2017. Red List database search following specific search criteria: http://www.iucnredlist.org/search/link/597b4cea-40d717bd

OSPAR, 2008. OSPAR list of Threatened and/or Declining Species and Habitats. OSPAR Commission (Reference number 2008-6).

OSPAR, 2017. Intermediate Assessment 2017. Available at: [https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017].

Palialexis A., A. C. Cardoso, L. Avellan, J. Batsleer, B. Campos, D. Connor, S. Greenstreet, L. Guérin, N. Häubner, J. Hawkridge, P. Heslenfeld, K. Coull, J. Krause, B. Mavri, L. Miossec, M. Orlando-Bonaca, , J. Reker, C. Romao, H. Teixeira and K. Tsiamis, 2015; Report of the JRC's Descriptor 1 workshop to support the review of the Commission Decision 2010/477/EU concerning MSFD criteria for assessing Good Environmental Status; EUR 27715; doi:10.2788/162330 .

Palialexis, A., Cardoso, A.C., Somma, F., 2018. JRC's reference lists of MSFD species and habitats, EUR 29125 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-80074-0, doi:10.2760/794186, JRC110960.

Palialexis, A., Connor, D., Damalas, D., Gonzalvo, J., Micu, D., Mitchel, I., Korpinen, S., Rees A. F, Somma, F., 2019. Indicators for status assessment of species, relevant to MSFD Biodiversity Descriptor. EUR 29820 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-09156-1, doi:10.2760/282667, JRC117126.

Probst N. W. and V. Stelzenmuller 2015, A benchmarking and assessment framework to operationalise ecological indicators based on time series analysis, Ecological Indicators, Volume 55, Pages 94-106, https://doi.org/10.1016/j.ecolind.2015.02.035.

Walmsley, S.F., Weiss, A., Claussen, U., Connor, D., 2017. Guidance for Assessments Under Article 8 of the Marine Strategy Framework Directive, Integration of assessment results. ABPmer Report No R.2733, produced for the European Commission, DG Environment, February 2017.

List of abbreviations and definitions

ABI	Atlantic Bay of Biscay
ACS	Atlantic Celtic Sea
AMA	Macaronesia
ANS	Atlantic North Sea
BAL	Baltic Sea
BARCON	Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean
BD	Birds Directive
BS	Black Sea
EC	European Commission
EU	European Union
GES	Good Environmental Status
HELCOM	Convention on the Protection of the Marine Environment of the Baltic Sea Area
ICES	International Council for the Exploration of the Sea
MAD	Mediterranean Adriatic Sea
MIC	Mediterranean Ionian Sea
MRU	Marine Reporting Unit
MS	Member State
MSFD	Marine Strategy Framework Directive
MWE	Mediterranean Western Basin
NIS	Non-indigenous species
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
RSC	Regional Sea Convention
UNEP/MAP	United Nations Environment Programme - Mediterranean Action Plan
WDF	Water Framework Directive

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9. Appendix

9.1 Appendix 1

The table in Appendix 1 provides a summary of the essential information reported by the MS for marine mammals to facilitate an easy comparison and a comprehensive view of the information analysed.

Tab. Summary of the methodology used by the MS for the assessment.

Table legend:

A = MOR/F

B = Mortality by catch rate

C = Mortality rate from ship collision

D = Percentage of (species name) stranded with signals compatible with bycatch

Q = Qualitative TV

[ ] = Not specified, extracted/assumed from info provided

Mammal groups	Region	Parameter	MS	TV source	Threshold value	Value achieved reported	Trend defined	Parameter ach. reported	Indicator	Assessment based on
Seals	**BAL**	A	FI		Q.	only for grey seal			HELCOM	OSPAR 2017 for Grey seal
Small toothed cetaceans	**BAL**	A *Phocoena phocoena*	DK	ASCOBANS	1.7	Yes	Stable	Unknown	HELCOM	
			FI	National	Q	no	Unknown	variable	National	
			SE	HELCOM			Unknown	No	National	HELCOM
	NEA	A *Phocoena phocoena*	BE	OSPAR	1.7	OSPAR 2017	Unknown	Unknown	OSPAR	OSPAR 2017
			DK	ASCOBANS	1.7	Yes	Stable	Yes	HELCOM	
			NL	CMS	1.0	Yes	Unknown	Yes	OSPAR	
			FR	National	1.7 + Q	Yes	Unknown	No	Nat. (SCANS/ SAMM)	
			ES	Other	Q (1.7)					
		D *Phocoena phocoena*	ES	OSPAR				Not assessed	National	
		A	FR	National	1.7		Unknown	No	Nat. (SCANS/ SAMM)	
			ES-ABI	OSPAR	Q	-	Unknown	Not assessed	National	-
		D	ES	OSPAR	Q			Not assessed	National	
	MED	D	ES			Yes	Unknown	Not assessed	National	
		A	MT	[UNEPMAP]	Q	No	Stable	Yes		
	BLK	B	RO	National	National	No	Unknown	Assessed		
Deep-diving toothed cetaceans	**NEA**	D	ES			Yes	Unknown	Not assessed	National	
		C	ES-AMA		1.0	No	Unknown	No	National	
	MED	D	ES			Y only some	Unknown	Not assessed		
Baleen whales	**NEA**	A, D	ES			No	Unknown	Not assessed	National	
	MED	D	ES				Stable	Not assessed	National	Lack of data

D1C2

Mammal groups	Region	Parameter	MS	TV source	TV	Value achieved present	Trend defined	Parameter assessment reported	Indicator	Assessment based on
Seals	BAL	A	DE	HD		no				HD
			DK	HD	10000	Yes			HD + National	HD
			PL	National	Q	Yes			National	
			EE	HELCOM	10000	Yes			National	
			FI			Yes			National + HELCOM	
			SE			Yes			National	Integration A + C
			LV		0.6	Yes	yes		HELCOM	
		C	SE	HELCOM	TV	Yes			National	Integration A + C
		B	FI	National	Qual.	no			National + HELCOM	
	NEA	A	DE	HD	TV + Q	Yes	Yes	Yes		
			DK	HD	10000	Yes	Yes	Y/N	HD + national	HD
			NL- *H. grypus*	National	Q	Yes	Unknown	Yes	OSPAR	
			NL - *P. vitulina*	HD	Q	yes	Unknown	Yes	OSPAR	
			SE	HELCOM	10000	Yes	parameters integrated		National	Integrated with D
		D	FR (ABI, ACS)	OSPAR	-6.0	Yes	unknown		OSPAR	OSPAR 2013
		E	FR (ANS)	OSPAR	-25.0	Yes	unknown		OSPAR	OSPAR 2013
		C	SE	HELCOM	-10.0	Yes	parameters integrated		National	Integrated with A
Small Cetaceans	BAL	A	DE	HD	Q.	Yes	Stable	no		HD
			DK	HD	22000	Yes	BAL population	no	HD+SCAN +National	HD
			FI		Q.		BAL population	no		HELCOM 2017
	NEA	A	DE	HD		Yes	Stable	Yes		HD
			DK	HD		Yes	Stable	Yes	HD+SCANS	HD
			ES			Yes	unknown	Lack of data	National	
			NL	National	Q.		unknown	Yes	OSPAR	

		D	FR (ABI, ACS)	National [OSPAR?]	-0.5 + Q	Yes	unknown	Yes	National	OSPAR
		E	FR (ANS)	OSPAR	-5.0	No	unknown	yes	OSPAR	OSPAR
	MED	A	ES			yes	unknown	Lack of data		
			HR			Yes	Stable	Y		
			MT	[UNE]	Q			2/3 sp assessed		
	NEA AMA	A	ES	MISTIC SEA	TV				National	
		F				Lit/mistic sea?			National	
		G				Lit/mistic sea?			National	
Deep		F	ES							
	MED	A	ES				Unknown	Lack of data		
	NEA	A	ES				Unknown	Lack of data		
		D	FR	National [OSPAR?]	-0.5 + Q.	Yes	Unknown	Yes	National	
Whales	NEA	D	FR- ABI	National	-0.5 + Q.	Yes	Unknown	Yes	National	
		E	FR- ANS	OSPAR	-0.5 + Q.	No	Unknown	Yes	OSPAR	OSPAR?
		A	ES				Unknown	Lack of data		
	MED	A	ES				Unknown	Lack of data		

Parameters:

A = ABU

B= Population growth rate

C= Trend in abundance

D = Relative abundance within community (short term)

E = Relative abundance within community (long term)

F = Abundance DS

G = Abundance spatial modelling

[ ] = Not specified, extracted/assumed from info provided

Q. = Qualitative threshold

D1C3

Sp. gr	Reg	PAR	MS	TV source	TV	Value	Trend assessed	Para assessed	Indicator	Criteria assessment based on
Seals	BAL	A	DE	HD			y	Unknown		HD
		B	SE	90.0	HELCOM	Y	y	BAL	National	
		B	PL	Qual	National?	n	Unknown		National	
		B	FI	90.0	HELCOM	Y	y	y	National + HELCOM	Par: FEC and SUR
		D	FI			y	y	y	National	
		~~HS~~(D?)	FI *H.gr*			y	y			
		G	LV	0.6	HELCOM	y	Unknown	n.a	HELCOM	
		E, F	SE	40.0,35.0	HELCOM	Y	Assessed together	BAL		
	NEA	A	DE		HD		y	Unknown		HD
		B	NL	-0.1	OSPAR	Y	Unknown	Y	OSPAR	
		B	SE	90.0	HELCOM	Y	Y	BAL	National	
		E, F	SE	40.0,35.0	HELCOM	Y	Assessed together	BAL	National	
Small	NEA	A	DE	HD	Qual		Y	Y		HD
		A	ES			y	unknown	Not assessed	National	Lack of data
		B	ES				unknown	Not assessed		Lack of data
		C	ES			some	unknown	Not assessed	National	Lack of data
		D	ES				unknown	Not assessed	National	Lack of data
		H, I	ES	y./		most	unknown	Not assessed	National	Lack of data
		R	FR	y	Qual	no	unknown	y	National	
	MED	A	HR				y	y		

		A	ES				Unknown	Un/not ass	National	Lack of data
		D	ES				Unknown	not ass		Lack of data
		C	ES				Unknown	Unknown	National	Lack of data
		R	FR	y	Q	no	Unknown	Y	National	
Deep	NEA	A	ES			n	Unknown	Unknown		
	MED	A	ES			n	Unknown	Unknown	Nat (for 1 species)	
		D	ES				Unknown	Not assessed		Lack of data
		H, J, K	ES			Only for K	Unknown	Not assessed	Nat (for 1 species)	Lack of data
Whales	NEA	A, B, C, D	ES				Unknown	Not assessed		Lack of data
	MED	K	ES				Unknown	Not assessed	National	Lack of data
Small	NEA-AMA	A	ES			N	Unknown	Unknown	National	
deep		D	ES			N	Unknown	Unknown	National	

D1C4

Sp. gr	Reg	PAR	MS	TV	TV source	Value	Trend assessed	Para assessed	Indicator	Criteria assessment based on
Seals	BAL	A	EE	Qual.	HELCOM		unknown	Y	National	2 param, per species
		B	EE	Y	HELCOM	y	unknown	Y	National	
		B	FI *H.gry*	Qual.	HELCOM		y	y	National, HELCOM	
		B	FI *Phoca*	Qual.	National		y	y	National, HELCOM	Variable by MRUs
		B	DK				Y	y	HD	HD
		C	DE	Qual.	HD	Y	Y	y		HD
		C	LV	0.6	HELCOM	Y	Y	Y	HELCOM	
		C	PL	Qual.	National		unknown	Y	National	
		C	SE	Qual.	HELCOM	n	unknown	y	National	
		B	SE	Qual.	HELCOM	n	unknown	y	National	
	NEA	C	DE	Qual.	HD	y	y	Y		HD
		C	FR	Qual	OSPAR	n	unknown	Y	OSPAR	OSPAR2017
		C	SE	Qual	HELCOM	N	unknown	y	National	
		B	SE	Qual	HELCOM	n	unknown	y	National	
		B	DK			Y	Stable	Y	HD	HD
Small Cetaceans	BAL	C	DE	Qual.	HD	y	Y	y		HD
		B	DK			y	y	y	HD	HD
		B	FI	Qual.				Baltic pop		
	NEA	B	DK			Y	y	y	HD	HD
		A, B, C	ES				Unknown/y	N/A	National	Lack of data
		C	DE	Q	HD	y	y	y		HD
		C	FR-ABI, ACS	Qual	National	n	unknown	Y	National	
		C	FR-ANS	Qual	OSPAR	n	unknown	Y	OSPAR	OSPAR2017
	MED	A	ES				U	n/a		Lack of data
		A, C	HR				Y	Y		
		B	MT	Q			U	n/a		
D e	NEA	A, C	ES			n	y	n/a	National	

		C	FR	Qual	National	n	Unknown	Yes	National	
	MED	A, C	ES			n	y	n/a		Lack of data
Whales	NEA	A, C	ES			n	y	n/a		Lack of data
		C	FR	Qual	National	n	Unknown	Yes	National	
	MED	A	ES			n	y	n/a		Lack of data

DiC4

Sp. gr	Reg	PAR	MS	TV	TV source	Value	Trend assessed	Para assessed	Indicator	Criteria assessment based on
Seals	BAL	A	DE	Q	HD	N	yes	yes		HD
			DK			N	yes	yes	HD	HD
			FI	Q	HD	N	yes	yes		HD
	NEA	A	DE	Q	HD	no	yes	yes		HD
			DK			No	yes	yes	HD	HD
			NL		HD	N	Unknown	no	National	HD
Small cetaceans	BAL	A	DE	Q	HD		Y	Y		HD
			DK				Y	Unknown	HD	HD
	NEA	A	DE	Q	HD	no	Stable	Y		HD
			DK			no	stable	Unknown	HD	HD
			NL		HD		Unknown	y	National	HD
			ES					Not assessed	National	Lack of data
		B	ES					Not assessed	National	
		G	ES					Not assessed	National	
		D, E	ES			some	Unknown	Not assessed	National	
		C	ES	17.0				Not assessed	National	
	MED	A	HR				Y	Y		
			ES				Y/u	Y/NA	National	
		B	ES				Y/u	Y/NA		

		A, B	MT					Not assessed		*
Deep	NEA	A	ES			n	Unknown	Unknown		Lack of data
		D, E, F	ES			Y	Unknown	Not assessed	National	Lack of data
	MED	A	ES			Y	Unknown			
		B	ES				Unknown	Not assessed		Lack of data
Whales	NEA	A	ES			no	y/ Unknown	Unknown		Lack of data
	MED	A	ES			n	Deteriorating	Unknown		Lack of data

9.2 Appendix 2

The spreadsheets containing the reported information on which the evaluation was based. Each spreadsheet (or group of spreadsheets) corresponds to Art. 8, 9 and 10 respectively. Given the size of the reported information and the intrinsic differences across the species groups, five spreadsheets were generated for the species groups corresponding to marine mammals, marine reptiles, seabirds, cephalopods and fish.

- **Art. 8 reported data**


Art.8 mammals.xlsx


Art.8 tutrles.xlsx


Art.8 Birds.xlsx


Art.8 fish.xlsx


Art.8 cephalopods.xlsx

- **Art. 9 reported data**


Art 9.xlsx

- **Art. 10 reported data**


Art.10.xlsx

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