UNITED
NATIONS

EP

UNEP/MED WG.502/Inf.10

UNEP

**UNITED NATIONS
ENVIRONMENT PROGRAMME
MEDITERRANEAN ACTION PLAN**

22 May 2021
Original: English

Fifteenth Meeting of SPA/BD Focal Points

Videoconference, 23-25 June 2021

Agenda Item 7: Status of implementation of the Ecosystem Approach (EcAp) Roadmap

7.1. Implementation of the second phase (2019-2021) of the Integrated Monitoring and Assessment Programme (IMAP - Biodiversity and non-indigenous species) in the framework of the EcAp Roadmap

Comparative Analysis undertaken with regard to IMAP and the European Commission GES Decision 2017/848/EU for Biodiversity

Table of Contents

List of tables 1
List of figures 1
List of Abbreviations / Acronyms 1
1. Comparative analysis 1
1.1. State-related assessment – Biodiversity 1
1.1.1. Criteria and indicators 1
1.1.2. Reference habitat types, species and ecosystems 5
1.1.3. Methodological standards 8
1.1.4. Key gaps of the first assessment based on IMAP 11
1.1.5. Conclusions and recommendations – biodiversity assessment 14
1.2. Pressure and impact related assessment - Non-indigenous species (NIS) 17
1.2.1. Criteria and indicators 17
1.2.2. Reference NIS species 18
1.2.3. Methodological standards 19
1.2.4. Keys gaps of the first assessment based on IMAP 20
1.2.5. Conclusions and recommendations – NIS assessment 20
2. References 23
~~*Appendix 1. List of species relevant for assessment of the mortality rate (D1C1) in the Mediterranean Sea, as extracted from the Table 1D of the Commission Implementing Decision (EU) 2016/1251*~~ *24*

List of tables

Table 1. Overview of IMAP's Ecological objectives and common indicators on biodiversity

Table 2. Relation between the main state-related assessment elements of the MSFD GES and IMAP/2017 MED QSR

Table 3. Comparison of relevant species groups to be assessed under D1 as stipulated in the 2017 Commission Decision and under EO1 of the IMAP Decision, 2017 ~~Relevant species groups stipulated in the 2017 Commission Decision~~

~~Table 4. Species addressed in the 2017 MED QSR under indicators CI3 to CI5 (species distribution range, population abundance and population demographic), based on species listed in the SPA/BD Protocol~~

Table 4. Initial comparison of scale of assessments for species (under D1 and EO1) as defined in 2017 Commission Decision and in the initial proposal of 2016 IMAP

Table 5. Gaps related to the assessment of EO1 -Biodiversity identified through 2017 MED QSR

Table 6. Relation between the main elements of the NIS assessment of the MSFD GES and IMAP/2017 MED QSR

List of figures

Figure 1. Final EUNIS habitat map for the Mediterranean

List of Abbreviations / Acronyms

2017 MED QSR	2017 Mediterranean Quality Status Report
ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area
Barcelona Convention	Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean
C	Criteria (under the EU MFSD)
CI	Common Indicator (under the Barcelona Convention IMAP)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
D	Descriptor (under the EU MFSD)
EASIN	European Alien Species Information Network
EC	European Commission
EcAp	Ecosystems Approach
EO	Ecological Objective (under the Barcelona Convention IMAP)
EU	European Union
EUNIS	European Nature Information System
GES	Good Environmental Status
GFCM	General Fisheries Commission for the Mediterranean
HELCOM	Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention)
IAS	Invasive alien species
ICES	International Council for the Exploration of the Sea
IMAP	Integrated Monitoring and Assessment Programme and related Assessment Criteria
MAMIAS	Marine Mediterranean Invasive Alien Species database
MSFD	Marine Strategy Framework Directive
NIS	Non-indigenous species
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention)
RFMO	Regional Fisheries Management Organization
SPA/BD Protocol	Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, under the Barcelona Convention
SPA/RAC	Specially Protected Areas Regional Activity Centre

1. Comparative analysis

1.1. State-related assessment – Biodiversity

1. The state of biodiversity assessment starts with setting up the objectives, criteria or indicators, reference biodiversity components and thresholds, against which it would be possible to measure whether and to what extent a good environmental status is achieved. This chapter provides detailed analyses of these elements and comparison between IMAP/2017 MED QSR and MSFD.

1.1.1. Criteria and indicators

2. IMAP defines 11 ecological objectives, starting with biodiversity (EO1), which should be maintained and enhanced (Table 1). EO1 and its five common indicators provide insight in the state of biodiversity, which is to significant extent result of anthropogenic pressures and impacts, addressed by other ecological objectives.

Table 1. Overview of IMAP's Ecological objectives and common indicators on biodiversity (IMAP, 2016)

Ecological Objectives with GES Descriptions	Indicators
EO1 Biodiversity	**Common Indicator 1**: Habitat distributional range (EO1) to also consider habitat extent as a relevant attribute
Biological diversity is maintained or enhanced. The quality and occurrence of coastal and marine habitats and the distribution and abundance of coastal and marine species are in line with prevailing physiographic, hydrographic, geographic and climatic conditions*	**Common Indicator 2**: Condition of the habitat's typical species and communities (EO1)
	Common Indicator 3: Species distributional range (EO1 related to marine mammals, seabirds, marine reptiles)
	Common Indicator 4: Population abundance of selected species (EO1, related to marine mammals, seabirds, marine reptiles)
	Common indicator 5: Population demographic characteristics (EO1, e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates related to marine mammals, seabirds, marine reptiles)

**Equals MSFD GES D1*

3. In the same manner, determination of MSFD's GES is based on 11 elements – descriptors, describing the state of biodiversity, pressures and impacts. Descriptors are based on defined assessment criteria, which correspond to the IMAP's common indicators[1]. The main state-relevant descriptor is Descriptor 1 (D1), describing biodiversity. This descriptor is also linked to several other descriptors.

4. Namely, according to the Commission Decision (EU) 2017/84, the state of biodiversity (Descriptor 1) encompasses 4 main themes. Two themes are solely related to D1 and two also including descriptor D4 of ecosystems and food webs and D6 of sea-floor integrity (Table 2):

[1] Further in text a term "criterion or criteria" will be used when associated to the MSFD process and "indicator" for IMAP

- Species groups of birds, mammals, reptiles, fish and cephalopods (D1)
- Pelagic habitats (D1)
- Benthic habitats (D1 and D6)
- Ecosystems, including food webs (D1 and D4)

5. Such an assessment approach, that takes into account all biodiversity components, enables more comprehensive overview of the state of biodiversity. Furthermore, it is not only based on habitats and threatened species, but also on those species commercially exploited (elaborated further in Chapter 3.1.2), as well as functional connectivity within and between the ecosystems.

6. IMAP/2017 MED QSR on the other hand focuses foremostly on EO1 (Biodiversity) and its common indicators to assess the state of biodiversity, it partly considers objective EO3 (Harvest of commercially exploited fish and shellfish) and does not yet consider relevant ecological objectives recognised in the MSFD GES's assessment approach; Marine food webs (EO4) and Sea-floor integrity (EO6), as these 2 EOs related common indicators need to be developed under the Barcelona Convention.

7. More specifically, the main MSFD GES's elements (themes and criteria) are comparable to EO1 and its common indicators of state of habitats (CI1 and CI2) and species (CI3-CI5) (Table 2). Some of the common indicators under other ecological objective - EO3 fit to MSFD GES's elements too. For example, MSFD GES's D1 Species - Birds theme is comparable to EO1 specific common indicators CI1-CI5, together with EO3 common indicators on total landings and bycatch of vulnerable non-targeted species (CI8 and CI12). It should be noted that IMAP/2017 MED QSR species related common indicators focus on 3 groups of species: marine mammals (cetaceans and monk seal), birds and sea turtles, which are mainly threatened groups of species. Fish and cephalopods, which are mostly commercially used, are not assessed in the 2017 MED QSR as part of the assessment of state of biodiversity (EO1), but rather from the position of anthropogenic pressures and impacts (EO3), concerning fish and shellfish (which includes cephalopods and other molluscs, as well as crustaceans). However, information on these species' groups under EO3, could be amended with reference species and used in the context of state of biodiversity assessment under EO1 (see Chapter 3.1.2).

8. The MSFD GES's habitats assessments (benthic and pelagic habitats) are associated with EO1's common indicators, while EO6 common indicators (relevant for benthic habitats) are still not developed. Unlike MSFD, pelagic habitats under IMAP/2017 MED QSR are not addressed under EO1, but rather under EO3 (nursery areas of commercially important fish and shellfish) and EO5 (Eutrophication). Ecosystems and food webs theme of the MSFD's D1 could not be associated with relevant IMAP/2017 MED QSR Ecological objective EO4 (Marine food webs) and its indicators, since the latter were not yet developed.

Criteria and indicators' thresholds

9. One of the most important elements of any assessment are clear targeted goals and values against which the assessment of state and trends could be carried out. The marine environment is a complex system with many interconnected components, which makes quantification of GES particularly challenging. In addition, there is a lack of biodiversity data to establish baselines, which is the issue that will be elaborated in Chapter 3.2.4.

10. Both MSFD and IMAP recognize a need to identify thresholds for particular criteria and common indicators, which could be qualitative or quantitative. According to the 2017 Commission Decision, for majority of the D1 criteria this task is left to Member States through regional and sub-regional cooperation. Only for indicators of benthic habitats, it specifically refers to cooperation at Union level, taking into account regional and sub-regional specificities. IMAP emphasizes a need to establish baselines and reference conditions to which current status could be compared. When it comes to quantification of desired targets, IMAP points to the related EU processes (i.e. determination of conservation status under Habitats Directive) and processes under other regional conventions. For example, for threshold values for level of habitat loss, EU Member States have generally adopted the 5% tolerance above the baseline to represent "stable" condition. However, IMAP proposes options, but it is not clear which thresholds should be used. In general, quantification of thresholds still remains an issue that is very much under development.

Table 2. Relation between the main state-related assessment elements of the MSFD GES and IMAP/2017 MED QSR. Based on: Commission Decision (EU) 2017/848, EC 2018 Reporting update for MSFD, 2016 IMAP and 2017 MED QSR

State-related assessment elements – MSFD GES		**Relevant state-related assessment elements – IMAP/2017 MED QSR**
Theme: Species groups of birds, mammals, reptiles, fish and cephalopods		
Descriptor - theme	*Criteria (**primary** and secondary)*	**Relevant common indicators**
D1 Birds	**D1C1 Mortality rate from incidental by-catch**	CI12 Bycatch of vulnerable and non-targeted species (EO3), CI5 Population demographic characteristics (EO1)
	D1C2 Population abundance	CI4 Population abundance of selected species (EO1)
	D1C3 Population demographic characteristics	CI5 Population demographic characteristics (EO1)
	D1C4 Population distributional range and pattern	CI3 Species distributional range (EO1)
	D1C5 Habitat for the species	This is not a specific indicator under IMAP, but partly addressed by CI 1 and 2. CI1 Habitat distributional range (EO1) CI2 Condition of the habitat's typical species and communities (EO1)
D1 Mammals	**D1C1 Mortality rate from incidental by-catch**	CI12 Bycatch of vulnerable and non-targeted species (EO3), CI5 Population demographic characteristics (EO1)
	D1C2 Population abundance	CI4 Population abundance of selected species (EO1)
	D1C3 Population demographic characteristics	CI5: Population demographic characteristics (EO1)
	D1C4 Population distributional range and pattern	CI3 Species distributional range (EO1)
	D1C5 Habitat for the species	This is not a specific indicator under IMAP, but partly addressed by CI 1 and 2. CI1 Habitat distributional range (EO1)

State-related assessment elements – MSFD GES		Relevant state-related assessment elements – IMAP/2017 MED QSR
		CI2 Condition of the habitat's typical species and communities (EO1)
D1 Reptiles	**D1C1 Mortality rate from incidental by-catch**	CI12 Bycatch of vulnerable and non-targeted species (EO3), CI5 Population demographic characteristics (EO1)
	D1C2 Population abundance	CI4 Population abundance of selected species (EO1)
	D1C3 Population demographic characteristics	CI5: Population demographic characteristics (EO1)
	D1C4 Population distributional range and pattern	CI3 Species distributional range (EO1)
	D1C5 Habitat for the species	This is not a specific indicator under IMAP, but partly addressed by CI 1 and 2. CI1 Habitat distributional range (EO1) CI2 Condition of the habitat's typical species and communities (EO1)
D1 Fish*	D1C1 Mortality rate from incidental by-catch	CI9 Fishing mortality (EO3), CI12 Bycatch of vulnerable and non-targeted species (EO3)
	D1C2 Population abundance	-CI7 Spawning stock and biomass (EO3) -CI8 Total landings (E03)
	D1C3 Population demographic characteristics	-CI7 Spawning stock and biomass (EO3) -CI8 Total landings (E03)
	D1C4 Population distributional range and pattern	-CI7 Spawning stock and biomass (EO3) -CI8 Total landings (E03)
	D1C5 Habitat for the species	-CI1 Habitat distributional range (EO1) -CI2 Condition of the habitat's typical species and communities (EO1)
D1 Cephalopods*	D1C1 Mortality rate from incidental by-catch	CI9 fishing mortality (E03), CI12 Bycatch of vulnerable and non-targeted species (EO3)
	D1C2 Population abundance	-C17 Spawning stock and biomass (EO3) -CI8 Total landings (E03)
	D1C3 Population demographic characteristics	-CI7 Spawning stock and biomass (EO3) -CI8 Total landings (E03)
	D1C4 Population distributional range and pattern	-CI7 Spawning stock and biomass (EO3) -CI8 Total landings (E03)
	D1C5 Habitat for the species	-CI1 Habitat distributional range (EO1) -CI2 Condition of the habitat's typical species and communities (EO1)
Theme: Pelagic habitats		
D1 Pelagic habitats	**D1C6 Pelagic habitat condition**	CI2 Condition of the habitat's typical species and communities (EO1). In addition, in 2017 MED QSR specifically, reference was made to EO3 and EO5
Theme: Benthic habitats		
D1/D6 Benthic habitats	**D6C4 Benthic habitat extent**	-CI1 Habitat distributional range to also consider habitat extent as a relevant attribute (EO1) -To be further developed (EO6)
	D6C5 Benthic habitat condition	-CI2: Condition of the habitat's typical species and communities (EO1) -To be further developed (EO6)
Theme: Ecosystems and food webs		

State-related assessment elements – MSFD GES		Relevant state-related assessment elements – IMAP/2017 MED QSR
D1/D4 Ecosystems, food webs	**D4C1 Trophic guild species diversity**	To be further developed
	D4C2 Abundance across trophic guilds	To be further developed
	D4C3 Trophic guild size distribution	To be further developed
	D4C4 Trophic guild productivity	To be further developed

**Also linked to the criteria under D3*

11. Development of the IMAP EO4 and EO6 is expected to be done during the SPA/RAC Programme of Work of 2022-2023. This will be developed with the support of the EU funded project "*Support coherent and coordinated assessment of biodiversity and measures across Mediterranean for the next 6-year cycle of MSFD implementation" (*ABIOMMED) developed under the call for proposals: "DG ENV/MSFD 2020" Marine Strategy Framework Directive: Support to the preparation of the next 6-year cycle of implementation.

1.1.2. Reference habitat types, species and ecosystems

12. GES assessment both under IMAP/2017 MED QSR and MSFD focuses on specific habitat types and species. In general, under the 2017 Commission Decision, ~~selection of~~ habitat types and species should be selected ~~is foremostly left to~~ by ~~the Member States~~ through regional and subregional cooperation of the Member States, based on certain requirements. In the similar manner~~, while~~ IMAP defines more precisely selected biodiversity components under EO1 relevant for the Mediterranean region. The main difference between both approaches regarding the selection of species and habitat types is related to the fact that pelagic habitats, fish and cephalopods are not assessed as biodiversity components under IMAP's EO1.

13. More specifically, indicators CI1 and CI2 of the IMAP/2017 MED QSR include altogether 27 major benthic habitats types (Figure 1). The benthic habitats are classified according to the EUNIS habitat classification - version 2007-2011 and have also been updated to align with benthic broad habitat types listed in the 2017 Commission Decision. The list of 22 benthic broad habitat types specified in the Commission Decision (based on 2016 version of EUNIS), under the D6C4 and D6C5 criteria, is compiled to allow consistency between basins, while the EUNIS map is region-specific and more detailed, reflecting specific conditions of the region.

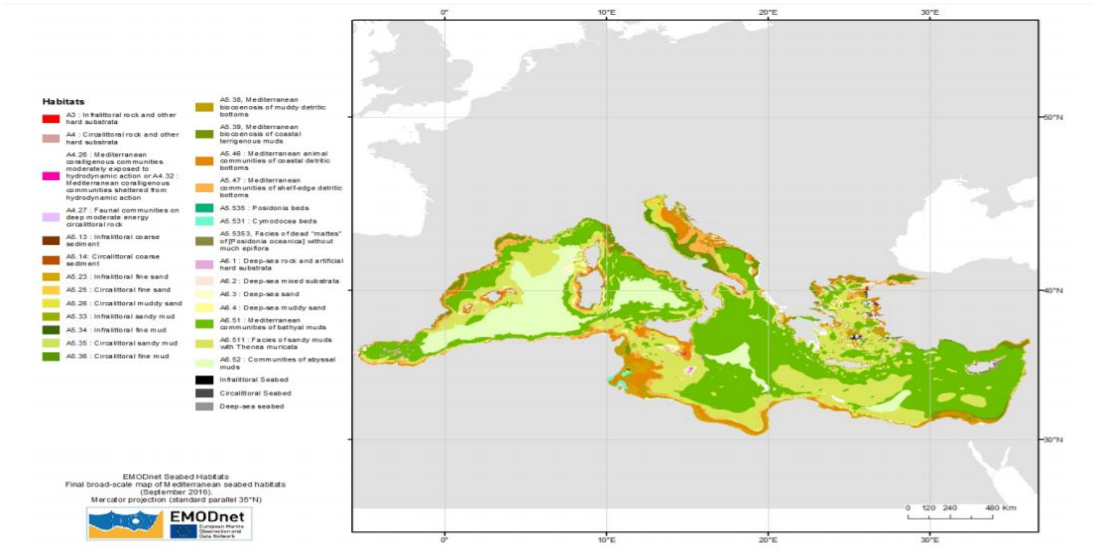

Figure 1. Final EUNIS habitat map for the Mediterranean. Source: *Populus et al.*, 2017

14. Moreover, the Contracting Parties to the Barcelona Convention adopted in 2019 the Updated Classification of Benthic Marine Habitat Types for the Mediterranean Region and the Updated Reference List of Marine Habitat Types for the Selection of Sites to be included in National Inventories of Natural Sites of Conservation Interest in the Mediterranean (Decision IG.24/07). The adopted lists are aligned with the updated structure of the revised marine component of EUNIS habitats classification. This will enable a coherent use of the proposed lists in national inventories and monitoring programmes as well as a homogenous and adequate assessment of the IMAP EO1 and its respective common indicators in the whole Mediterranean. Identification of the benthic habitat types that could be used for the assessment should be identified, as soon as possible, based on the updated Reference List of Marine Habitat Types for the Selection of Sites to be Included in the National Inventories of Natural Sites of Conservation Interest in the Mediterranean (UNEP-MAP-SPA/RAC, 2019)[2] and harmonized with the EMODnet broad habitats.

15. MSFD GES's D1C6 criteria includes pelagic broad habitat types (variable salinity, coastal, shelf and oceanic/beyond shelf), if present in the region or subregion, and other habitat types which Member States may select, through regional or sub regional cooperation, according to the defined criteria. Pelagic habitat types under IMAP/2017 MED QSR are not yet defined. However, the process is ongoing to develop the first elements for the elaboration of the Reference list of Pelagic Habitat Types in the Mediterranean Sea. This process in developed based on a first attempt towards the identification and Reference List of Pelagic Habitat Types in the Mediterranean Sea in 2013[3]. This is planned to be discussed during the Fifteenth Meeting of SPA/BD Focal Points (Videoconference, 23-25 June 2021).

16. 2017 Commission Decision requests Member States to establish lists of relevant species for criteria D1C1 to D1C5 through regional and sub-regional cooperation, taking into account lists encompassed in relevant EU regulations such as Habitats and Birds Directives, together with obligations deriving from regulations on fisheries or through international agreements such as Regional Sea Conventions. IMAP focuses on the species listed in the Annex I of the SPA/BD Protocol. Since the final selection of the species under the 2017 Commission Decision is left to Member States, it is not possible to clearly compare selected species under the Decision and IMAP. However, when selecting species, Mediterranean Member States could make a use of the SPA/BD species list (Annex II) as a starting ~~point, and~~ point and add some specific species if ~~necessary~~ needed.

Decision's criterion D1C1 (incidental mortality rate) focuses on birds, mammals, reptiles and non-commercially exploited fish and cephalopods, which are at risk from incidental by-catch in the region or subregion. It is left to the Member States to establish such lists of species through regional and sub-regional cooperation, pursuant to the Regulation (EU) No 1380/2013 for data collection activities and taking into account species list in Table 1D of the Annex to the Commission Implementing Decision (EU) 2016/1251, which expired on 31 December 2019 and was followed with Commission Delegated Decision (EU) 2019/910. The list of relevant species is being developed under IMAP and it will be submitted to CORMON in 2021. ~~. Extraction of species relevant for the Mediterranean Sea is provided in Appendix 1~~

17. Criteria D1C2-D1C5 (population abundance, population demographic characteristics, population distributional range and pattern, habitat for the species) focus on species groups listed in Table 3. Member State should establish a set of species representatives of each species groups, including marine mammals and reptiles listed in Annex II of the Habitats Directive and may include species under other Directive's Annexes, as well as through the Regulation 1380/2013 and international agreements, such as Regional

[2] https://www.rac-spa.org/sites/default/files/doc_fsd/reference_list_en.pdf
[3] http://www.rac-spa.org/nfp11/nfpdocs/working/WG_382_11_ENG_1706.pdf

Conventions. In the 2017 IMAP of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP, 2017) species groups were identified and it in principal they correspond to those of the MSFD. As already mentioned, fish and cephalopods are not included in the EO1 Common indicators, but nevertheless, these groups were elaborated in the IMAP, 2017 (Table 3).

18. Common indicator CI3 (species distribution range) in the 2017 MED QSR focuses on 12 regularly present marine mammals (cetaceans and Monk seal) in the region, 2 sea turtles and 8 selected seabirds listed on Annex II of SPA/BD Protocol (Table 4), accompanied with more extensive species list for the Alboran Sea.

~~19. Common indicator CI4 (population abundance) in the 2017 MED QSR focuses on similar set of species as CI1 (Table 4). CI5 (population demographic) also deals with incidental mortality (as D1C1), but focuses on the Mediterranean Monk seal, fin whales and common bottlenose dolphin, 2 sea turtle species and 3 bird species.~~

20. Regarding ecosystems and D4C1 to D4C4 criteria, Member States should establish the list of trophic guilds through regional or sub regional cooperation. As already indicated, IMAP/2017 MED QSR considers the issue of ecosystems and food webs as subject for further development.

Table 3. Comparison of relevant species groups to be assessed under D1 as stipulated in the 2017 Commission Decision and under EO1 of the IMAP Decision, 2017.*Fish and cephalopods are not assessed under EO1. Still, division is made by IMAP, 2017 and thus it is included in this table.

Ecosystem component (MSFD)/ Species class (IMAP)	Species groups (MSFD)	Species groups (IMAP)
Birds	Grazing birds	Coastal top predators
	Wading birds	
	Surface-feeding birds	Inshore surface feeders Offshore surface feeders
	Pelagic-feeding birds	Inshore pelagic feeders Offshore pelagic feeders
	Benthic-feeding birds	Intertidal benthic feeders Inshore benthic feeders
Mammals	Small toothed cetaceans	Toothed whales
	Deep-diving toothed cetaceans	
	Baleen whales	Baleen whales
	Seals	Seals
Reptiles	Turtles	Turtles
Fish*	Coastal fish	Diadromous bony fish
	Pelagic shelf fish	Pelagic coastal bony fish Pelagic coastal elasmobranchs Pelagic offshore bony fish Pelagic offshore elasmobranchs
	Demersal shelf fish	Demersal coastal bony fish Demersal coastal elasmobranchs Demersal offshore bony fish Demersal offshore elasmobranchs
	Deep-sea fish	

Cephalopods*	Coastal/shelf cephalopods	Coastal cephalopods
	Deep-sea cephalopods	Offshore cephalopods

Table 4. Species addressed in the 2017 MED QSR under indicators CI3 to CI5 (species distribution range, population abundance and population demographic), based on species listed in the SPA/BD Protocol

Scientific name	Common name	CI3 species	CI4 species	CI5 species
MAMMALS				
Monachus monachus	Mediterranean monk seal	ü	ü	
Balaenoptera physalus	Fin whale	ü	ü	ü
Delphinus delphis	Short-beaked common dolphin	ü	ü	
Globicephala melas	Long-finned pilot whale	ü	ü	
Grampus griseus	Risso's dolphin	ü	ü	
Orcinus orca	Killer whale	ü	ü	
Phocoena phocoena relicta	Harbour porpoise	ü	ü	
Physeter macrocephalus	Sperm whale	ü	ü	
Steno bredanensis	Rough-toothed dolphin	ü	ü	
Stenella coeruleoalba	Striped dolphin	ü	ü	
Tursiops truncatus	Common bottlenose dolphin	ü	ü	ü
Ziphius cavirostris	Cuvier's beaked whale	ü	ü	
BIRDS				
Larus audouinii	Audouin's gull	ü	ü	ü
Phalacrocorax aristotelis	Mediterranean shag	ü		
Puffinus mauretanicus	Balearic shearwater	ü	ü	ü
Puffinus yelkouan	Yelkouan shearwater	ü	ü	ü
Sternula albifrons	Little tern	ü	ü	
Thalasseus bengalensis	Lesser-crested tern	ü		
Gelochelidon nilotica	Gull-billed tern	ü	ü	
Thalasseus Sterna sandvicensis	Sandwich tern	ü	ü	
REPTILES[4]				
Caretta caretta	Loggerhead turtle	ü	ü	ü
Chelonia mydas	Green turtle	ü	ü	ü

1.1.3. Methodological standards

21. After guidance on criteria, reference components of biodiversity and criteria thresholds, the 2017 Commission Decision further describes methodological standards to be applied for criteria under each theme. These standards include scale of assessment and use of criteria, with general guidelines for standardized methods for monitoring and assessment. In this chapter, these elements are compared to relevant assessment elements under the IMAP, as used in the 2017 MED QSR.

1.1.3.1. Scale of assessment

22. The scale and areas for environmental status assessment are still not fully defined and agreed under IMAP. The work on assessment elements, monitoring scale and thresholds/baseline values is ongoing for

[4] Leatherback turtle (*Dermochelys coriacea*) is also present in the Mediterranean, but it does not breed in the region, hence this species is not used as a reliable indicator on the status of biodiversity.

the Biodiversity Common Indicators and by species group (within the EU funded Projects IMAP-MPA and EcAp-MEDIII). Aggregation modalities must be discussed to agree on a common approach for interpretation, that must be developed in synergy with the MFSD. So far, division into 4 sub-regions was proposed for practical reasons and for the unique purpose of initial assessment: Western Mediterranean Sea, Adriatic Sea, Central and Ionian Seas, and Aegean and Levantine Seas (Decision IG.20/4 of the Barcelona Convention COP 17). This division is in line with the sub-regions defined by the MSFD. Furthermore, IMAP also foresees sub-division of the sub-regions, but this level is not even proposed. If presumed that proposed sub-regional division is valid under IMAP, initial comparison could be further made in relation to the specific biodiversity components (Table 4~~5~~). In general, two approaches are harmonized, with more detailed sub-division proposed under IMAP for certain elements.

23. More specifically, regarding all **habitats** criteria, the 2017 Commission's Decision prescribes regional or sub-regional scales, reflecting biogeographic differences in species composition of the broad habitat type. IMAP's initial proposal suggested sub-division as geographical unit for both, benthic and pelagic, groups of habitats.

24. **Species** related criteria are assessed using a scale of assessment which is adjusted to specific species groups. The scale of assessment of the 2017 Commission Division is in line with IMAP's proposal Region; the largest scale is used for highly migratory species, such as large cetaceans and deep-sea fishes, whilst smaller scales are used for coastal birds and coastal fishes. According to the IMAP, more detailed division is proposed for the Mediterranean regarding the Mediterranean monk seal and coastal fishes.

25. 2017 Commission Decision proposes a regional level for assessing **ecosystems, including food webs**, with possibility to use sub-divisions, if appropriate. IMAP proposes sub-regional level for ecosystems (even though this theme is not yet being elaborated under IMAP process).

26. Refinement of the monitoring and assessment scales of EcAp Common indicators is ongoing. Progress towards realisation of workable regional assessments is expected to be discussed and agreed by the Contracting Parties before the development of the 2023 regional assessment.

Table 4. Initial comparison of scale of assessments for species (under D1 and EO1) as defined in 2017 Commission Decision and in the initial proposal of 2016 IMAP

Geographical unit – Commission's Decision	Species groups	Geographical unit – IMAP	Species groups
Region (Mediterranean)	Deep-diving toothed cetaceans, baleen whales, deep-sea fish	Region (Mediterranean)	Large cetaceans, deep-sea fish
Sub-region for the Mediterranean Sea (4 sub-regions are defined)	Birds, small toothed cetaceans, seals, turtles, pelagic and demersal shellfish, cephalopods	Sub-region (possibly 4 sub-regions)	Offshore birds, small cetaceans, turtles, pelagic and demersal fish
~~**Sub-region for the Mediterranean Sea (4 sub-regions are defined)**~~	~~Seals, turtles, cephalopods~~	~~Sub-region (possibly 4 sub-regions)~~	~~Turtles~~
Sub-region or region	Coastal fish	Sub-division (not yet defined)	Coastal birds, Mediterranean monk seal, coastal fish
Based on consultations with relevant scientific bodies (reference to Descriptor 3). Decision points to use GFCM geographic sub-areas (GSA).	Commercially-exploited fish and cephalopods	-	-

27. Results of regional monitoring activities (i.e. ACCOBAMS Survey Initiative) must be taken into consideration to adapt the assessment scale to each group species.

1.1.3.2. Use of criteria and indicators

28. It is challenging to compare in more details the use of criteria/indicators for assessing the state of biodiversity under the 2017 Commission Decision and IMAP, foremostly due to differences in GES assessments criteria for certain components, as already elaborated in chapter 3.1.1. Still, at very general level, it could be concluded that MSFD and IMAP approach follow similar principles; criteria/indicators must be assessed against set threshold values and at the defined scale of assessment. However, based on the 2017 Commission Decision, the assessment of some criteria can serve for several descriptors, which is not the case for IMAP's indicators. For example, as stipulated in the 2017 Commission Decision, for assessing benthic **habitats** criteria (D6C4 and D6C5), a single assessment per habitat type serves both D1 and D6 assessments. Regarding **species** GES assessment under the criteria D1C2 to D1C5, each species must be assessed individually, on the basis of the criteria selected for use, and these criteria then should be used to express the extent to which GES has been achieved for each species group for each area assessed, including expression of achievement of threshold values. For **ecosystems**, specifically where values do not fit into the threshold values scope, this may trigger further research and investigation to understand the causes for the failure.

29. Under IMAP, particularly in the decisions and working documents prepared after 2016 (notably Decision IG.21/3, Decision IG. 22/7 and the document UNEP(DEPI)/MED WG.444/6/Rev.1: IMAP Common Indicators Guidance Fact Sheets for Biodiversity and NIS), for each Common Indicator GES is

defined, related operational objectives and targets are set, with explanation on how to carry out the assessment. For example, benthic **habitats** distributional range (CI1**)** is assessed as proportion of the area of habitats that are permanently or for a longer period lost or subject to change in habitat type due to anthropogenic pressures. As a target, the damaged or lost area per habitat type, could be set as to not exceed an acceptable percentage of the baseline value. For assessing **species** distributional ranges (CI3), changes in breeding, feeding and wintering area ranges are being compared against certain reference points (such as data from previous years).

1.1.3.3. Standardized methods for monitoring and assessment

30. Both the 2017 Commission Decision and IMAP define standardized methods for monitoring and assessments, with the EU Decision being more general, anticipating that more technical work should follow. The Decision particularly prescribes that for **habitats** related assessments, results of assessments of adverse effects from pressures under Descriptors 2, 5, 7 and 8 are taken into account. Furthermore, it stresses that selection of species and habitats to be assigned to the species groups and pelagic and benthic broad habitat types are based on scientific criteria with additional practical criteria including monitoring/technical feasibility, monitoring costs and adequate time-series of data. Regarding **species**, linkages are made with relevant assessments under the Habitats Directive, Birds Directive and fisheries regulations and assessments of other pressure-impact descriptors. For D1C1 related to fisheries, data should be provided from each ICES or GFCM Geographical Sub-Area (GSA). **Ecosystem**'s species composition refers to the lowest taxonomic level appropriate for the assessment. Trophic guilds should be selected based on certain criteria.

31. The IMAP defines some key methodological principles: adequacy, coordination and coherence, data architecture and interoperability, the concept of adaptive monitoring programme, risk-based approach to monitoring and assessment, as well as precautionary principle. Furthermore, specific Indicators Monitoring Fact Sheets were developed under the 2016 IMAP, as well as an overview of standards and methods for biodiversity monitoring, which elaborate in more details methods and techniques used for assessment of specific indicators or sub-indicators. A brief overview of methodology is also a part of the already mentioned document UNEP(DEPI)/MED WG.444/6/Rev.1: IMAP Common Indicators Guidance Fact Sheets for Biodiversity and NIS).

Practical example of assessment under IMAP: MED QSR 2017 – identified key gaps ~~of the first assessment based on IMAP~~

32. Although this comparative analysis is focused on analyses of methodological approaches to the GES assessments, comparing the 2017 Commission Decision and the IMAP/2017 MED QSR, there is one important issue that always challenges assessments of the state of biodiversity; actual lack of biodiversity data and information. This limitation results with lack of knowledge on biodiversity, both baseline knowledge and periodical changes. Finally, it affects adequate conservation actions planning and implementation efforts. The issue has already been identified through analyses provided in previous chapters, but will be further tackled in this chapter, using the 2017 MED QSR results as a practical example. All information displayed in following paragraphs are summoned and extracted from the 2017 MED QSR report, which was ~~prepared, presented to and~~ already adopted by Parties of Barcelona Convention.

33. The 2017 MED QSR report is based on existing data, with inputs from numerous diverse sources where appropriate including national data provided from the Contracting Parties and other partners programmes. Although some information and knowledge exist, the report identified a set of gaps under each common indicator (Table 5~~6~~).

34. Specifically, for **habitats**, research and monitoring is usually focussed on few benthic habitat types, such as *Posidonia* meadows and coralligenous. Deep-sea habitats (in particular habitats associated with seamounts, canyons, aphotic hard beds and chemo-synthetic phenomena in the Mediterranean Sea), as well as pelagic habitats are unconsidered for the present cycle of EcAp. In general, lack of baseline data is identified, as well as lack of understanding of connectivity/functionality. Long-term research and monitoring depend on financial sustainability, which is not ensured.

35. **Species** are better known than habitats, particularly seabirds. Information on gulls and terns is good, but information is lacking from southern and eastern countries Knowledge on species distributional range and habitats preferences of marine mammals is limited with unbalanced research effort, which ultimately hampers identification (and implementation) of protection measures. Certain knowledge exists on sea turtles mainly on nesting, but information on wintering, feeding, developmental sites is still lacking, as well as understanding of connectivity among sites is lacking. Research material is also scattered in the region. Even less information exists on population abundance and demographics of all groups of species. For the latter, there are limited systematic monitoring programmes over time, to collect time series and allow the assessment of trends over time and space.

36. To sum up, the key identified gaps could be grouped as follows:

- Lack of baseline data;
- Lack of understanding of processes;
- Uneven research effort (geographic gaps, particularly in southern and eastern countries);
- Limited systematic monitoring;
- Lack of financial sustainability to perform regular monitoring;
- Subsequently, lack of enforcement and monitoring to properly identify and implement conservation measures.

37. However, in the 2017 MED QSR, not much emphasis is given to the practical needs related to data collection, processing and availability, which are financial and human resources. For assessing the state of biodiversity, one needs certain targets, set of indicators and methodologies for their measurement, but to implement these activities, at least certain sustainable financing should be ensured (i.e. monitoring is continuous effort, maintenance of databases and IT systems is a life-time venture) and pool of qualified and skilled experts, particularly those who are up to date with latest monitoring techniques and who have solid technical (IT related) knowledge. It is very much upon national authorities to ensure these capacities, but international organizations should continue to invest more efforts in addressing these practical, but important aspects of data acquisition.

Table 5. Gaps related to the assessment of EO1 -Biodiversity identified through 2017 MED QSR

IMAP Ecological objective: E01 Biodiversity
Common indicator 1. Habitat distributional range ***Common indicator 2. Condition of habitat-defining species and communities***
Gaps
• In practice focus on few habitats (*Posidonia* meadows, coralligenous, *Lithophyllum byssoides* rims) • Deep sea habitats (in particular habitats associated with seamounts, canyons, aphotic hard beds and chemo-synthetic phenomena in the Mediterranean Sea) under-sampling • Lack of baseline data • Lack of knowledge/understanding on connectivity processes • Assessment mainly qualitative • Financial sustainability of monitoring at risk
Common indicator 3. Species distributional range
Gaps
Marine mammals • Limited, and regionally biased, current knowledge about the presence, distribution, habitat use and preferences of Mediterranean marine mammals[5] • Unbalanced distribution of research effort during the last decades, mainly focused on specific areas and species • Current knowledge gap (availability of data) is hampering the implementation of protection measures *Sea Birds* • Information on gulls and terns is reasonably good, although some southern and eastern countries might need updating their surveys. For the shearwaters, it is more difficult to find information for these same countries • The priority actions implementation lacking, including effective site protection (for example, for IBA), removal of invasive alien species and reduction of bycatch (implementation of ecosystem approach to fisheries) *Sea turtles* • Lack of knowledge on locations of potential nesting, wintering, feeding, developmental sites • Lack of understanding of connectivity among the various sites, their vulnerability, pressure/impact relationships for these sites and definition of qualitative GES, impacts of climate change • All research material on sea turtles is scattered – need for assimilation into a single database
Common indicator 4. Population abundance of selected species
Gaps
Marine mammals • Gaps on baseline information such as abundance and density for many species of cetaceans • For none of the cetacean species there are available estimates at the regional scale • Lack of baseline critical information is therefore detrimental for conservation *Sea Birds* • Geographic gaps are similar to those described for CI3 • For many eastern and southern countries, as well as some Adriatic countries, the information on seabird breeding populations is patchy or completely lacking *Sea turtles* • Major gaps exist in estimating the population abundance of sea turtles • Knowledge on location of potential nesting sites and of all wintering, feeding, developmental sites • Understanding of connectivity among the various sites, their vulnerability, pressure/impact relationships for these sites and definition of qualitative GES, impacts of climate change • All research material on sea turtles is scattered – need for assimilation into single database

[5] Results of the ACCOBAMS Survey Initiative (ASI) Project are relevant to improve knowledge and provide guidance on the conservation status of cetaceans in the Mediterranean Sea.

Common indicator 5. Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates related to marine mammals, seabirds, marine reptiles)
Gaps
Marine mammals • Limited systematic monitoring programmes over time, to collect time series and allow the assessment of trends over time and space *Sea Birds* • Information on seabird demographic parameters is extremely scarce in the Mediterranean region, except for Audouin's gull • Special attention must be paid to main threats, particularly predation by introduced mammals in the colonies and fishing bycatch at sea *Sea turtles* • Patchy knowledge about the various demographic parameters of sea turtles (see CI4)

1.1.4. Conclusions and recommendations – biodiversity assessment

Conclusions	Related recommendations to the IMAP/MED QSR in relation to the 2017 Commission Decision
Methodological approach	
General conclusions and recommendations	
• The Commission Decision (EU) 2017/848 (further in text: Decision) displays a more comprehensive and integrated approach to assessment of the state of biodiversity, encompassing under one envelope habitats, both threatened/protected and species of commercial interest, as well as ecosystems and food webs, • The IMAP/2017 MED QSR still fosters a more conservative approach, measuring the state of biodiversity foremostly based on habitat types and only threatened species groups, • Decision's starting point for assessment under Descriptor 1 are themes, which correspond to biodiversity components (i.e. species, habitats etc.), and assessment of each theme is further based on set of criteria (criteria, as assessment element, correspond to the IMAP's common indicators). In the IMAP/2017 MED QSR's, the starting point for EO1 assessment are common indicators and each of them is then assessed further for each biodiversity component, • In the 2017 MED QSR particularly, for future efforts on practical assessment of some criteria and indicators elements, a clear reference was made to	• The IMAP maybe amended in the future, so that the assessment of the state of biodiversity (Objective EO1) is based on all relevant biodiversity components: habitats, species (protected and commercial), ecosystems and food web and associated indicators. This should be reflected in the selection of common indicators and addition of new reference species groups under EO1, • Organisation of assessment based on theme, could be also appropriate for the IMAP's process. This would provide a better overview of the state of biodiversity, • Enhance cooperation and exchange of knowledge with other Regional Seas Conventions, particularly with those that already advanced better in assessing some elements (i.e. quantification of criteria threshold values, improvement of knowledge on pelagic habitats, etc.)

the similar processes already undertaken under both EU and Regional Seas Conventions.	
Specific conclusions and recommendations on criteria and indicators and their thresholds, reference biodiversity components and methodological standards	
• The IMAP/2017 MED QSR indicators could be mostly associated to the Decision's criteria. However, the following elements are not complementary: - IMAP/2017 MED QSR still lacks matching indicators for Decision's criteria for assessment of sea-floor integrity and marine food webs. Although, further elaboration of these components is foreseen under the EO4 and EO6 objectives, - Decision's criteria on incidental mortality (D1C1) is only partly addressed through the proposed CI12 (Bycatch of vulnerable and non-targeted species) of the ecological EO3 (Harvest of commercially exploited fish and shellfish). However, CI12 has not been assessed under 2017 MED QSR.	• Under IMAP, further elaborate common indicators for EO4 and EO6, taking into account to the extent possible criteria defined in the Decision. These common indicators should be integrated in the state of biodiversity assessment under EO1, as indicated in the previous section, • Further elaborate in the future CI12 indicator, particularly with addition of reference species (elaborated further in next sections).
• A need for criteria and indicators thresholds to which assessments could be made are recognised both in Decision and IMAP/2017 MED QSR. IMAP recommends complementarity with related EU processes (i.e. quantification of conservation status). Operationally, it is still a work in progress. In practice, limited baseline information on the state of biodiversity components hampers quantified assessment of change.	Prepare a clear proposal of thresholds for EO1 common indicators and their biodiversity components, taking into account efforts under IMAP (as elaborated in the 2017 revised IMAP Common Indicators Guidance Fact Sheets for Biodiversity and NIS) and latest processes on development of technical guidelines for assessment of particular MSFD Descriptors, such as the assessment of Descriptor 6 – Seafloor integrity (including biodiversity indicators under Descriptor 1), that has been prepared in cooperation between EC and ICES.
• Both Decision and IMAP/2017 MED QSR focus on selected species and habitat types, as follows: - Benthic broad habitat types are already well specified in both processes, but pelagic broad habitat types are not yet elaborated. For the Mediterranean region specifically, mostly due to limited knowledge,	• Finalise the broad habitat benthic types for the Mediterranean region based on the Updated classification of benthic marine habitat types for the Mediterranean region and the Updated Reference List of Marine Habitat Types for the Selection of Sites to be included in National Inventories of Natural Sites of Conservation Interest in the Mediterranean (Decision IG.24/7) and the ongoing

- Selection of reference species groups under criteria and indicators, such as marine mammals, sea birds and sea turtles, is complementary. However, as already mentioned in previous section, species are not defined under IMAP/2017 MED QSR for assessing the incidental mortality rate (D1C1 and CI12), nor are fish, crustaceans and molluscs assessed for any state of biodiversity related indicator, only partly through EO3, - Ecosystems are not yet addressed in such details, but are envisaged in more details in Decision than in IMAP.	work on determination of pelagic broad habitat types and pelagic habitat indicators in general, taking into account similar processes in the framework of other Regional Seas Conventions (i.e. OSPAR and HELCOM), • Complete ~~Dfine~~ reference species for measuring incidental mortality rate (ongoing process under IMAP) ~~taking particularly into account as appropriate the Mediterranean region relevant species listed in the Commission Implementing Decision (EU) 2016/1251 (see Appendix 1),~~ • Define protected and commercial fish, crustaceans and molluscs reference species adequate for assessing other existing common indicators under EO1. In this regard, Annex 2 of the SPA/BD Protocol, and relevant EU regulations (for nature protection and fisheries) should be taken into account, • Define trophic guilds for ecosystems assessment.
Scales of assessment under IMAP are still not defined, apart from the practical proposal to recognize 4 sub-regions, in line with MSFD.	Confirm proposed sub-regions under IMAP and define sub-divisions.
It is difficult to fully compare the use of criteria under the 2017 Commission Decision and IMAP, due to differences in selection of certain criteria/indicators. However, it could be concluded that similar general principals are followed, apart from the fact that the same criteria are used for several Descriptors under Decision.	Revise the indicators under IMAP, based on the criteria/indicators specific recommendations already indicated above in Conclusions and recommendations table.
A standardised methodical approach is set in both the 2017 Commission Decision and IMAP, with IMAP elaborating it in more details in the Indicators Monitoring Fact Sheets.	No specific recommendations.
Knowledge gap	
• Biodiversity knowledge gap is the main obstacle to adequate assessment both related to MSFD GES criteria and IMAP/2017 MED QSR, • 2017/MED QSR recognises better knowledge on selected species distribution and benthic habitats, while habitats condition, population abundance, structure and demographic are hardly known. However, in general this report defines a number of deficiencies with existence, availability of data, monitoring programme and financial sustainability, all of which disable adequate assessment. As already mentioned, lack of baseline information is an issue.	Based on 2017 MED QSR some general recommendations to better address the knowledge gaps are proposed, taking into account the mandate of the Barcelona Convention: • In view of the ongoing post-2020 SAP BIO elaboration process and proposal of future orientations and priority actions, more emphasis should be given to activities targeted to biodiversity knowledge improvement, in the next EcAp Roadmap planning phase, • Regional Action plans for conservation of various biodiversity components should address the needs for enhancement of financial and human capacities,

	• Activities on improvement of knowledge at regional level should be supported and promoted, particularly for biodiversity components with regional features (i.e. synoptic surveys for migratory species) and for regional data storages, • Countries should be assisted in capacity building for data collection, data analysis, data availability etc., based on a comprehensive regional assessment of their respective capacities. However, ultimately it is upon the countries to establish standardised national monitoring systems and ensure financial sustainability.

1.2. Pressure and impact related assessment - Non-indigenous species (NIS)

38. Non-indigenous species (NIS) are already a significant threat to the marine environment. Assessment of this pressure and its impacts on the environment starts with setting up objectives, criteria or indicators, reference species and thresholds, against which it would be possible to measure whether and to what extent a good environmental status is achieved. This chapter provides detailed analyses of these elements and comparison between IMAP and MSFD.

1.2.1. Criteria and indicators

39. The IMAP's relevant objective is E02 (Non-indigenous species), described as Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem, which corresponds to the MSFD GES's Descriptor 2. Only one common indicator is identified under IMAP so far (Common Indicator 6) encompassing trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive, non-indigenous species, notably in risk areas.

40. The MSFD GES's Descriptor 2 (D2) on NIS encompasses 3 criteria; primary one criterion D2C1 focuses on newly-introduced NIS, secondary criteria D2C2 are abundance and distribution of the established NIS, particularly invasive species, and their impacts on species and habitats - D2C3 (Table 6~~7~~). Assessment of IMAP/2017 MED QSR CI6 is complementary to first two criteria under D2, however, no assessment of adverse impacts on species and habitats is yet elaborated under IMAP.

Table 6~~7~~. Relation between the main elements of the NIS assessment of the MSFD GES and IMAP/2017 MED QSR. Based on: Commission Decision (EU) 2017/848, EC 2018 Reporting update for MSFD, 2016 IMAP and 2017 MED QSR

NIS assessment elements - MSFD		Relevant NIS assessment elements – IMAP/2017 MED QSR
Descriptor - theme	*Criteria (**primary** and secondary)*	*Relevant common indicators*
D2 NIS	**D2C1 Newly introduced NIS**	CI6 Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive non-indigenous species, notably in risk areas (EO2, in relation to the main vectors and pathways of spreading of such species)
	D2C2 Established NIS	
	D2C3 Adverse effects of NIS on species and habitats	-

Criteria and indicators thresholds

41. According to the 2017 Commission Decision, Member States should establish through regional and sub regional cooperation the threshold values for the number of new introductions of non-indigenous species (D2C1) and for the adverse alteration to species groups and broad habitat types due to non-indigenous species (D2C3~~2), both through regional and sub regional cooperation~~.

42. IMAP defines GES for CI6 as the "decreasing abundance of introduced NIS in risk areas "and proposes CI6 target as "abundance of NIS introduced by human activities reduced to levels with no detectable impact", but with no clear thresholds. Baseline information is already developed by the MSFD (Tsiamis et al., 2021) and the process is ongoing within the IMAP, ensuring a synergy between both processes. ~~still limited, particularly knowledge on state of environment before IAS introduction, as a starting point for any further impact assessments.~~

1.2.2. Reference NIS species

43. Determined list of reference NIS is only applicable to the MSFD GES secondary criteria under D2. Secondary criterion D2C2 is focused on relevant invasive alien species (IAS); those IAS of Union concern listed in accordance with Regulation (EU) No 1143/2014, and species which are relevant for use under criterion D2C3. Based on the European Commission's update that entered into force on ~~of~~ 15 August ~~March~~ 2019, the Union's list includes altogether 66 species (36~~23~~ plant ~~species~~ and 30~~26~~ animal species), but they are mostly inhabited in terrestrial and freshwater habitats. The low representativity of marine species in the list underestimate seriousness of this threat to the marine environment. D2C3 includes species groups and broad habitat types that are at risk from non-indigenous species, selected from those used for Descriptors 1 and 6. Member States should establish both lists through regional or sub regional cooperation.

44. In the scope of IMAP/2017 MED QSR, the reference lists related to CI6 considers data from the Marine Mediterranean Invasive Alien Species database (MAMIAS) developed by SPA/RAC. Each Contracting Party is required to develop the list of Invasive Alien Species (IAS) to be monitored within its national monitoring programme during the initial phase of the IMAP and will start collecting data regarding these

species. To this end, SPA/RAC developed Guidance on developing IAS national lists and a regional and or sub regional reference[6].

1.2.3. Methodological standards

45. The 2017 Commission Decision further describes methodological standards to be applied for NIS's criteria. These standards include scale of assessment and use of criteria, with general guidelines for standardised methods for monitoring and assessment. In this chapter, these elements are compared to relevant assessment elements under the IMAP, as used in the 2017 MED QSR.

1.2.3.1. Scale of assessment

46. As already described in the chapter 3.1.3.1., first of all the scale and areas for environmental status assessment are still not fully defined and agreed under IMAP, apart from the initial proposal of 4 sub-regions, which is in coherence with the MSFD. If this proposal is considered valid, comparison could be made between IMAP and MSFD. In general, both approaches are quite harmonized, with IMAP's proposal for more detailed scale of assessment. More specifically, Commission Decision (EU) 2017/848 prescribes regional or sub-regional scales for NIS assessment. For newly introduced NIS specifically, those could be divided by national boundaries too. The 2017 MED QSR considered sub-regional division for NIS, although IMAP in its initial proposal suggests national part of sub-division.

1.2.3.2. Use of criteria and indicators

47. It is challenging to compare the use of criteria/indicators for assessing NIS under the 2017 Commission Decision and 2016 IMAP, foremostly due to differences in GES assessments criteria/indicators as already elaborated in chapter 3.2.1., particularly the absence of equivalent IMAP indicator to criterion D2C3 (Adverse effects on NIS). However, for the complementary criteria/indicators it should be stressed that unlike IMAP, the 2017 Commission Decision puts a longer time-component for measurement of newly introduced NIS. Hence, for criterion D2C1 (newly-introduced NIS), the extent to which good environmental status has been achieved should be expressed for each area assessed as the number of non-indigenous species newly introduced via human activity, in the 6-year assessment period, accompanied with a list of those species. Newly introduced NIS under IMAP are compared on yearly basis (one year in comparison to the previous). IMAP measures presence or absence of NIS, focusing on IAS. It further focuses on high risk locations to be monitored more frequently (annually).

1.2.3.3. Standardised methods for monitoring and assessment

48. Both the 2017 Commission Decision and IMAP define standardised methods for monitoring and assessments, with the Decision being more general, anticipating that more technical work should follow. The Decision specifically defines newly introduced (D2C1) and established NIS. For D2C1, it points out that where it is not clear whether the new arrival of NIS is due to human activity or natural dispersal from neighbouring areas, the introduction should still be counted under D2C1. Furthermore, NIS related

[6] http://rac-spa.org/nfp13/documents/02_information_documents/wg_431_inf_14_eng.pdf

monitoring programmes should be linked to those for Descriptors 1, 4, 5 and 6, where possible, as they typically use the same sampling methods.

49. Specific Indicators Monitoring Fact Sheets were developed under the 2016 IMAP, as well as the already mentioned 2017 Review of IMAP Common Indicators Guidance Fact Sheets for Biodiversity and NIS, which elaborates in more details methods and techniques used for assessment of specific indicators or sub-indicators. More specifically, monitoring strategy is defined, including selection of monitored locations, deciding what to monitor and NIS, IAS data collection method. It should be noted that collection of socio-economic information is included, particularly in relation to NIS introduction pathways. Apart from purely scientific methods, importance of citizen science is recognized.

1.2.4. Practical example of assessment under IMAP: MED QSR 2017 – identified key gaps ~~Keys gaps of the first assessment based on IMAP~~

50. Although this Comparative analysis is focused on analyses of methodological approaches to the GES assessments, comparing the 2017 Commissions Decision and IMAP/2017 MED QSR, the issue of lack of data and information will be tackled in this specific chapter.

51. This issue has been recognized during the 2017 MED QSR preparation. In the Mediterranean Sea, there is significant amount of information, but it is scattered in various databases, institutions, and the literature. Still, some progress has been made on data collection, processing and availability, i.e. through the development and updating of the regional MAMIAS database.

52. The key identified gaps could be grouped as follows:

- Weak evidence for most of the reported impacts of alien species, mostly based on expert judgement
- Assessment of trends in abundance and spatial distribution is largely lacking
- Lack of standardised, dedicated and coordinated monitoring
- Patchy monitoring effort
- NIS identification is challenged due to lack of taxonomical expertise.

53. The 2017 updated Action plan concerning Species Introductions and Invasive Species in the Mediterranean Sea (primarily elaborated in 2003) sets the objectives and actions to implement at regional and national level to address the NIS problematic. It particularly focuses on the need for data collection and processing, including enhancement of national capacities.

1.2.5. Conclusions and recommendations – NIS assessment

Conclusions	Related recommendations to IMAP based on 2017 MED QSR
Methodological approach	
MSFD GES's NIS primary criterion on newly introduced NIS has a complementary indicator in the IMAP/2017 MED QSR. However, the next two	IMAP maybe amended in the future with a new common indicator on the adverse impacts of invasive NIS on species and habitats.

secondary criteria (on established NIS and their adverse effects on biodiversity components) are only partly addressed, since IMAP still does not foresee assessment of adverse effects of NIS on species and habitats.	
A need for thresholds to which assessments could be made is recognised both in Decision and IMAP. Establishment of baselines is still limited, particularly knowledge on the state of environment before IAS introduction, as a starting point for impact assessments.	Prepare a clear proposal of thresholds for EO2 common indicators, based on more detailed overview of NIS in Mediterranean and taking into account efforts under IMAP (as elaborated in the 2017 revised IMAP Common Indicators Guidance Fact Sheets for Biodiversity and NIS) and the technical work under the MSFD.
Selection of reference NIS, particularly invasive species, is foreseen under both MSFD and IMAP/2017 MED QSR for the assessment of already established NIS. A functional and accessible Marine Mediterranean Invasive Alien Species database (MAMIAS) is a good tool to track and record IAS in the region.	• Define a list of IAS of particular interest for the Mediterranean region under the IMAP process. These IAS will represent a reference for assessments of abundance, distribution and later adverse impact on biodiversity components. • Maintain and update a Mediterranean IAS database, as a pool of information on occurrence of IAS in the region.
Scales of assessment under IMAP are still not defined, apart from the practical proposal to recognize 4 sub-regions, in line with MSFD.	Confirm proposed sub-regions under IMAP and define sub-divisions.
IMAP and 2017 MED QSR suggest different scales of assessments for NIS, with the proposal under 2017 MED QSR being in line with the MSFD approach.	IMAP guidelines/fact sheets, stipulating sub-regional scale of assessment for NIS may be considered.
It is difficult to fully compare the use of criteria under the 2017 Commission Decision and IMAP, due to differences in selection of criteria/indicators. However, regarding compatible criteria, it should be stressed that the Decision foresees longer period of time for the assessment of newly introduced NIS (6 years period), unlike annual dynamics under IMAP.	Revaluate the assessment period for newly introduced NIS.
Standardise methodical approach is set in both the 2017 Commission Decision and IMAP, with IMAP elaborating it in more details in the Indicators Monitoring Fact Sheets. The added value of IMAP is that it also foresees collection of socio-economic information and involvement of the general public in data collection (citizen science).	No specific recommendations.
Knowledge gap	
• Knowledge gap is the main obstacle to adequate assessment both related to MSFD GES criteria and IMAP, • 2017 MEDQSR recognises progress in developing national and regional inventories of alien species, but the knowledge on NIS is still very weak. This report defines a number of deficiencies with existence and availability of data, monitoring programmes, uneven research efforts and taxonomic issues, all of which disables adequate assessment,	Based on 2017 MED QSR, some general recommendations to better address the knowledge gaps are proposed, taking into account the mandate of the Barcelona Convention: • In view of the ongoing post-2020 SAP BIO elaboration and its priority actions, more emphasis should be given to activities targeted to NIS knowledge improvement. • Activities on improvement of knowledge at regional level should be supported and promoted,

• The 2017 updated Action plan concerning Species Introductions and Invasive Species in the Mediterranean Sea particularly focuses on the need for data collection and processing, including enhancement of national capacities.	• Countries should be assisted in capacity building for data collection and data analysis. However, ultimately it is upon the countries to establish standardised national monitoring and early warning systems and ensure their financial sustainability.

2. References

1. Action Plan concerning Species Introductions and Invasive Species in the Mediterranean Sea. UN Environment/MAP Athens, Greece 2017. http://www.rac-spa.org/sites/default/files/action_plans/pa_alien_en.pdf
2. 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
3. Dickey-Collas, M.; McQuatters-Gollop, A.; Bresnan, E.; Kraberg, A. C.; Manderson, J. P.; Nash, R. D. M.; Otto, Saskia A.; Sell, A. F.; Tweddle, J. F.; Trenkel, V. M. (2017). Food for thought. Pelagic habitat: exploring the concept of good environmental status. ICES Jounral of Marine Science. https://orbit.dtu.dk/files/140681090/Publishers_version.pdf
4. European Commission (2019). Consolidated list of Invasive Alien Species of Union concern. http://ec.europa.eu/environment/nature/invasivealien/list/index_en.htm
5. European Commission. Reporting on the 2018 update of articles 8, 9 & 10 for the Marine Strategy Framework Directive. DG Environment, Brussels. pp 75 (MSFD Guidance Document 14, April 2019 version).
6. Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (2017). UN Environment/MAP Athens, Greece
7. Populus J., Vasquez M., Albrecht J., Manca E., Agnesi S., Al Hamdani Z., Andersen J., Annunziatellis A., Bekkby T., Bruschi A., Doncheva V., Drakopoulou V., Duncan G., Inghilesi R., Kyriakidou C., Lalli F., Lillis H., Mo G., Muresan M., Salomidi M., Sakellariou D., Simboura M., Teaca A., Tezcan D., Todorova V., Tunesi L. (2017). EUSeaMap. A European broad-scale seabed habitat map. https://doi.org/10.13155/49975
8. UNEP/MAP (2016). Integrated Monitoring and Assessment Programme (IMAP) of the Mediterranean Sea and Coast and Related Assessment Criteria, Athens, Greece
9. UNEP/MAP (2017). 2017 Mediterranean Quality Status Report (2017 MED QSR)
10. UNEP/MAP (2017). IMAP Common Indicator Guidance Facts Sheets (Biodiversity and Fisheries)
11. Tsiamis K, Palialexis A, Connor D, Antoniadis S, Bartilotti C, Bartolo G.A, et al., (2021). Marine Strategy Framework Directive- Descriptor 2, Non-Indigenous Species, Delivering solid recommendations for setting threshold values for non-indigenous species pressure on European seas. Publications Office of the European Union, Luxembourg; 2021.

~~*Appendix 1. List of species relevant for assessment of the mortality rate (D1C1) in the Mediterranean Sea, as extracted from the Table 1D of the Commission Implementing Decision (EU) 2016/1251*~~

~~Common name~~	~~Scientific name~~	~~Region/RFMO~~	~~International legal frameworks~~
~~**Bony fishes**~~	~~***Teleostei***~~	-	-
~~Sturgeons~~	~~*Acipenser spp.*~~	~~Mediterranean Sea and Black Sea; Baltic Sea; OSPAR II, IV~~	~~Annex II of the Barcelona Convention's SPA/BD Protocol (1), Annex IV of the Black Sea Biodiversity and Landscape Conservation Protocol; OSPAR (2); Helcom (3)~~
~~Smoothheads (Slickheads)~~	~~*Alepocephalidae*~~	~~All regions~~	~~Relevant for deep sea fisheries (4)~~
~~Baird's smoothhead~~	~~*Alepocephalus Bairdii*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Risso's smoothhead~~	~~*Alepocephalus rostratus*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Blue antimora (Blue hake)~~	~~*Antimora rostrata*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Black scabbardfish~~	~~*Aphanopus carbo*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Scabbardfish~~	~~*Aphanopus intermedius*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Alfonsinos~~	~~*Beryx* spp.~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Brotula~~	~~*Cataetyx laticeps*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~lumpfish~~	~~*Cyclopterus lumpus*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Annular seabream~~	~~*Diplodus annularis*~~	~~Mediterranean Sea~~	~~Council Regulation (min. cons. size) (EC) No 1967/2006 (5)~~
~~Sharpsnout sea bream~~	~~*Diplodus puntazzo*~~	~~Mediterranean Sea~~	~~Regulation (EC) No 1967/2006 (min. cons. size)~~
~~White sea bream~~	~~*Diplodus sargus*~~	~~Mediterranean Sea~~	~~Regulation (EC) No 1967/2006 (min. cons. size)~~
~~Two-banded sea bream~~	~~*Diplodus vulgaris*~~	~~Mediterranean Sea~~	~~Regulation (EC) No 1967/2006 (min. cons. size)~~
~~Patagonian toothfish~~	~~*Dissostichus eleginoides*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Antarctic toothfish~~	~~*Dissostichus mawsoni*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Groupers~~	~~*Epinephelus* spp.~~	~~Mediterranean Sea~~	~~Regulation (EC) No 1967/2006 (min. cons. size) & Annex III of the Barcelona Convention's SPA/BD Protocol~~
~~Black cardinalfish~~	~~*Epigonus telescopus*~~	~~All regions~~	~~Vulnerable species Relevant for deep sea fisheries~~
~~Bluemouth (Bluemouth redfish)~~	~~*Helicolenus dactylopterus*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Atlantic halibut~~	~~*Hippoglossus hippoglossus*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Orange roughy~~	~~*Hoplostethus atlanticus*~~	~~All regions; OSPAR I, V~~	~~Vulnerable species Relevant for deep sea fisheries~~
~~Silver roughy (Pink)~~	~~*Hoplosthetus mediterraneus*~~	~~All regions~~	~~Relevant for deep sea fisheries~~

Silver scabbard fish (Cutless fish)	*Lepidopus caudatus*	All regions	Relevant for deep sea fisheries
Stripped sea bream	*Lithognathus mormyrus*	Mediterranean Sea	Regulation (EC) No 1967/2006 (min. cons. size)
Greater eelpout	*Lycodes esmarkii*	All regions	Relevant for deep sea fisheries
Grenadiers (rattails) other than roundnose grenadier and roughhead grenadier	*Macrouridae other than Coryphaenoides rupestris and Macrourus berglax*	All regions	Relevant for deep sea fisheries
Roughhead grenadier (Rough rattail)	*Macrourus berglax*	All regions	Relevant for deep sea fisheries
Blue ling	*Molva dypterygia*	All regions	Relevant for deep sea fisheries
Common mora	*Mora moro*	All regions	Relevant for deep sea fisheries
Black gemfish	*Nesiarchus nasutus*	All regions	Relevant for deep sea fisheries
Snubnosed spiny eel	*Notocanthus chemnitzii*	All regions	Relevant for deep sea fisheries
Spanish sea bream	*Pagellus acarne*	Mediterranean Sea	Regulation (EC) No 1967/2006 (min. cons. size)
Blackspot seabream	*Pagellus bogaraveo*	Mediterranean Sea	Regulation (EC) No 1967/2006 (min. cons. size)
Common sea bream	*Pagrus pagrus*	Mediterranean Sea	Regulation (EC) No 1967/2006 (min. cons. size)
Wreckfish	*Polyprion americanus*	Mediterranean Sea	Regulation (EC) No 1967/2006 (min. cons. size)
Wreckfish	*Polyprion americanus*	All regions	Relevant for deep sea fisheries
Small redfish (Norway redfish)	*Sebastes viviparus*	All regions	Relevant for deep sea fisheries
Spiny (deep sea) scorpionfish	*Trachyscorpia cristulata*	All regions	Relevant for deep sea fisheries
Cartilaginous fishes	***Chondrichthyes***	-	-
Sandbar shark	*Carcharhinus plumbeus*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II
Sand tiger shark	*Carcharias taurus*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II
Gulper shark	*Centrophorus granulosus*	All oceans and seas	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex III; OSPAR
Gulper shark species	*Centrophorus spp.*	All regions	Relevant for deep sea fisheries
Leafscale gulper shark	*Centrophorus squamosus*	All oceans and seas	RFMOs, High priority; OSPAR
Basking shark	*Cetorhinus maximus*	All oceans and seas	RFMOs, High priority; OSPAR; Helcom & Annex II of the Barcelona Convention's SPA/BD Protocol
Rabbit fish (rattail)	*Chimaera monstrosa*	All regions	Relevant for deep sea fisheries

~~Common skate~~	~~*Dipturus batis*~~	~~All oceans and seas~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II; OSPAR; Helcom~~
~~School shark, tope shark~~	~~*Galeorhinus galeus*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II; Helcom~~
~~Spiny butterfly ray~~	~~*Gymnura altavela*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II~~
~~Sharpnose sevengill shark~~	~~*Heptranchias perlo*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex III~~
~~Bluntnose six-gilled shark~~	~~*Hexanchus griseus*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II; Helcom~~
~~Large-eyed rabbitfish (Ratfish)~~	~~*Hydrolagus mirabilis*~~	~~All regions~~	~~Relevant for deep sea fisheries~~
~~Sandy skate~~	~~*Leucoraja circularis*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II~~
~~Maltese skate~~	~~*Leucoraja melitensis*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II~~
~~Starry smooth-hound~~	~~*Mustelus asterias*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex III~~
~~Common smooth- hound~~	~~*Mustelus mustelus*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex III~~
~~Blackspotted smooth-hound~~	~~*Mustelus punctulatus*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex III~~
~~Smalltooth sawfish~~	~~*Pristis pectinata*~~	~~All oceans + Mediterranean and Black Sea~~	~~RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II~~

Common sawfish	*Pristis pristis*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II
Round skate	*Raja fyllae*	All regions	Relevant for deep sea fisheries
Arctic skate	*Raja hyperborea*	All regions	Relevant for deep sea fisheries
Norwegian skate	*Raja nidarosiensus*	All regions	Relevant for deep sea fisheries
Blackchin guitarfish	*Rhinobatos cemiculus*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II
Common guitarfish	*Rhinobatos rhinobatos*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Conventio's SPA/BD Protocol n Annex II
Straightnose rabbitfish	*Rhinochimaera atlantica*	All regions	Relevant for deep sea fisheries
Bottlenose skate	*Rostroraja alba*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II
Spurdog, spiked dogfish	*Squalus acanthias*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex III, OSPAR; Helcom
Sawback angelshark	*Squatina aculeata*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention' SPA/BD Protocol Annex II
Smoothback angelshark	*Squatina oculata*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II
Angel shark	*Squatina squatina*	All oceans + Mediterranean and Black Sea	RFMOs, High priority, Barcelona Convention's SPA/BD Protocol Annex II, OSPAR; Helcom
Mammals	***Mammalia***	-	-
Cetaceans — all species	*Cetacea — all species*	All areas	Council Directive 92/43/EEC (7)
Minke whale	*Balaenoptera acutorostrata*	Mediterranean Sea	Rec. GFCM (8)/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol
Sei whale	*Balaenoptera borealis*	Mediterranean Sea	Rec. GFCM/36/2012/2 & Annex II of the Barcelona's SPA/BD Protocol Convention
Fin whale	*Balaenoptera physalus*	Mediterranean Sea	Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol

~~Short-beaked common dolphin~~	~~*Delphinus delphis*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~North Atlantic right whale~~	~~*Eubalaena glacialis*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Long-finned pilot whale~~	~~*Globicephala melas*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Risso's dolphin~~	~~*Grampus griseus*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Dwarf sperm whale~~	~~*Kogia simus*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Humpback whale~~	~~*Megaptera novaeangliae*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Blainville's beaked whale~~	~~*Mesoplodon densirostris*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Killer whale~~	~~*Orcinus orca*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Harbour porpoise~~	~~*Phocoena phocoena*~~	~~Mediterranean Sea; OSPAR II, III~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol; Directive 92/43/EEC; OSPAR~~
~~Sperm whale~~	~~*Physeter macrocephalus*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~False killer whale~~	~~*Pseudorca crassidens*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Striped dolphin~~	~~*Stenella coeruleoalba*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Rough-toothed dolphin~~	~~*Steno bredanensis*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Bottlenose dolphin~~	~~*Tursiops truncatus*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Cuvier's beaked whale~~	~~*Ziphius cavirostris*~~	~~Mediterranean Sea~~	~~Rec. GFCM/36/2012/2 & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Monk seal~~	~~*Monachus monachus*~~	~~All areas~~	~~Rec. GFCM/35/2011/5 & Annex II of the Barcelona Convention's SPA/BD Protocol; Directive 92/43/EEC~~
~~Saimaa ringed seal~~	~~*Phoca hispida saimensis*~~	~~All areas~~	~~Directive 92/43/EEC~~
~~Grey seal~~	~~*Halichoerus grypus*~~	~~All areas~~	~~Directive 92/43/EEC~~
~~Harbour seal~~	~~*Phoca vitulina*~~	~~All areas~~	~~Directive 92/43/EEC~~

Baltic ringed seal	*Phoca hispida bottnica*	All areas	Directive 92/43/EEC
Birds	***Aves***	-	-
Cory's Shearwater	*Calonectris borealis*	All areas	Directive 2009/147/EC of the European Parliament and of the Council (9)
Great Cormorant	*Phalacrocorax carbo*	All areas	Directive 2009/147/EC
Northern Gannet	*Morus bassanus*	All areas	Directive 2009/147/EC
Atlantic Puffin	*Fratercula arctica*	All areas	Directive 2009/147/EC
Balearic Shearwater	*Puffinus mauretanicus*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Black-headed Gull	*Larus ridibundus*	All areas	Directive 2009/147/EC
Common Scoter	*Melanitta nigra*	All areas	Directive 2009/147/EC
European Shag	*Phalacrocorax aristotelis*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Great Shearwater	*Ardenna gravis*	All areas	Directive 2009/147/EC
Manx Shearwater	*Puffinus puffinus*	All areas	Directive 2009/147/EC
Northern Fulmar	*Fulmarus glacialis*	All areas	Directive 2009/147/EC
Scopoli's Shearwater	*Calonectris diomedea*	All areas	Directive 2009/147/EC
Sooty Shearwater	*Ardenna grisea*	All areas	Directive 2009/147/EC
Yelkouan Shearwater	*Puffinus yelkouan*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Audouin's Gull	*Larus audouinii*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Barrow's Goldeneye	*Bucephala islandica*	All areas	Directive 2009/147/EC
Bulwer's Petrel	*Bulweria bulwerii*	All areas	Directive 2009/147/EC
Common Goldeneye	*Bucephala clangula*	All areas	Directive 2009/147/EC
European Herring Gull	*Larus argentatus*	All areas	Directive 2009/147/EC
Glaucous Gull	*Larus hyperboreus*	All areas	Directive 2009/147/EC
Great Black-backed Gull	*Larus marinus*	All areas	Directive 2009/147/EC
Great Skua	*Catharacta skua*	All areas	Directive 2009/147/EC
Greater Scaup	*Aythya marila*	All areas	Directive 2009/147/EC; Annex IV of the Black Sea Biodiversity and Landscape Conservation Protocol
Common pochard	*Aythya ferina*	Black Sea	Annex IV of the Black Sea Biodiversity and Landscape Conservation Protocol
Lesser Black-backed Gull	*Larus fuscus*	All areas	Directive 2009/147/EC
Little Auk	*Alle alle*	All areas	Directive 2009/147/EC

~~Long-tailed Jaeger~~	~~*Stercorarius longicaudus*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Razorbill~~	~~*Alca torda*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Arctic Jaeger~~	~~*Stercorarius parasiticus*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Arctic Loon~~	~~*Gavia arctica*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Audubon's Shearwater~~	~~*Puffinus lherminieri*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Black Guillemot~~	~~*Cepphus grylle*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Black Scoter~~	~~*Melanitta americana*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Black-necked Grebe~~	~~*Podiceps nigricollis*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Caspian Gull~~	~~*Larus cachinnans*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Common Eider~~	~~*Somateria mollissima*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Common Guillemot~~	~~*Uria aalge*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Common Loon~~	~~*Gavia immer*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Common Merganser~~	~~*Mergus merganser*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Great Crested Grebe~~	~~*Podiceps cristatus*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Harlequin Duck~~	~~*Histrionicus histrionicus*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Horned Grebe~~	~~*Podiceps auritus*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Iceland Gull~~	~~*Larus glaucoides*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~King Eider~~	~~*Somateria spectabilis*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Long-tailed Duck~~	~~*Clangula hyemalis*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Mediterranean Gull~~	~~*Larus melanocephalus*~~	~~All areas~~	~~Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Mew Gull~~	~~*Larus canus*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Red-breasted Merganser~~	~~*Mergus serrator*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Red-necked Grebe~~	~~*Podiceps grisegena*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Red-throated Loon~~	~~*Gavia stellata*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Slender-billed Gull~~	~~*Larus genei*~~	~~All areas~~	~~Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol~~
~~Steller's Eider~~	~~*Polysticta stelleri*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Pomarine Jaeger~~	~~*Stercorarius pomarinus*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Thick-billed Murre/ Brünnig's Guillemot~~	~~*Uria lomvia*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Velvet Scoter~~	~~*Melanitta fusca*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Yellow-billed Loon~~	~~*Gavia adamsii*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Yellow-legged Gull~~	~~*Larus michahellis*~~	~~All areas~~	~~Directive 2009/147/EC~~
~~Zino's Petrel~~	~~*Pterodroma madeira*~~	~~All areas~~	~~Directive 2009/147/EC~~

Pallas's Gull	*Larus ichthyaetus*	All areas	Directive 2009/147/EC
Black-legged Kittiwake	*Rissa tridactyla*	All areas	Directive 2009/147/EC
Great White Pelican	*Pelecanus onocrotalus*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Leach's Storm-petrel	*Oceanodroma leucorhoa*	All areas	Directive 2009/147/EC
Red Phalarope	*Phalaropus fulicarius*	All areas	Directive 2009/147/EC
Red-necked Phalarope	*Phalaropus lobatus*	All areas	Directive 2009/147/EC
Wilson's Storm-petrel	*Oceanites oceanicus*	All areas	Directive 2009/147/EC
Arctic Tern	*Sterna paradisaea*	All areas	Directive 2009/147/EC
Band-rumped Storm- petrel	*Hydrobates castro*	All areas	Directive 2009/147/EC
Black Tern	*Chlidonias niger*	All areas	Directive 2009/147/EC
Caspian Tern	*Hydroprogne caspia*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Common Gull-billed Tern	*Gelochelidon nilotica*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Common Tern	*Sterna hirundo*	All areas	Directive 2009/147/EC
Desertas Petrel	*Pterodroma deserta*	All areas	Directive 2009/147/EC
Ivory Gull	*Pagophila eburnea*	All areas	Directive 2009/147/EC
Lesser Crested Tern	*Thalasseus bengalensis*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Little Gull	*Hydrocoloeus minutus*	All areas	Directive 2009/147/EC
Little Tern	*Sternula albifrons*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Monteiro's Storm- petrel	*Hydrobates monteiroi*	All areas	Directive 2009/147/EC
Roseate Tern	*Sterna dougallii*	All areas	Directive 2009/147/EC
Ross's Gull	*Rhodostethia rosea*	All areas	Directive 2009/147/EC
Sabine's Gull	*Xema sabini*	All areas	Directive 2009/147/EC
Sandwich Tern	*Thalasseus sandvicensis*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Thayer's Gull	*Larus thayeri*	All areas	Directive 2009/147/EC
White-faced Storm- petrel	*Pelagodroma marina*	All areas	Directive 2009/147/EC
European Storm- petrel	*Hydrobates pelagicus*	All areas	Directive 2009/147/EC & Annex II of the Barcelona Convention's SPA/BD Protocol
Reptiles	***Reptilia***	-	-

Kemp's ridley sea turtle	*Lepidochelys kempii*	All areas	Directive 92/43/EEC; Rec. GFCM/35/2011/4 & Annex II of the Barcelona Convention's SPA/BD Protocol
Loggerhead turtle	*Caretta caretta*	All areas	Directive 92/43/EEC; Rec. GFCM/35/2011/4 & Annex II of the Barcelona Convention's SPA/BD Protocol; OSPAR
Leatherback turtle	*Dermochelys coriacea*	All areas	Directive 92/43/EEC; Rec. GFCM/35/2011/4 & Annex II of the Barcelona Convention's SPA/BD Protocol; OSPAR
Hawksbill sea turtle	*Eretmochelys imbricata*	All areas	Directive 92/43/EEC; Rec. GFCM/35/2011/4 & Annex II of the Barcelona Convention's SPA/BD Protocol
Green turtle	*Chelonia mydas*	All areas	Directive 92/43/EEC; Rec. GFCM/35/2011/4 & Annex II of the Barcelona Convention's SPA/BD Protocol
Nile soft-shelled turtle	*Trionyx triunguis*	Mediterranean Sea	Rec. GFCM/35/2011/4 & Annex II of the Barcelona Convention's SPA/BD Protocol
Molluscs	***Mollusca***	-	-
Eledone especies	*Eledone spp.*	All areas	National management plans
Mediterranean mussel	*Mytilus galloprovincialis*	All areas out of Med	National management plans
Patella	*Patella spp.*	Mediterranean Sea	Annex II of the Barcelona Convention's SPA/BD Protocol
Tuberculate cockle	*Acanthocardia tuberculata*	All areas	National management plans
Murex	*Bolinus brandaris*	All areas	National management plans
Hard clam	*Callista chione*	All areas	National management plans
Wedge shell	*Donax trunculus*	All areas	National management plans
Crustaceans	***Crustacea***	-	-
Lobster	*Homarus gammarus*	Mediterranean Sea	Regulation (EC) No 1967/2006 (min. cons. size) & Annex III of the Barcelona Convention's SPA/BD Protocol
Deep-water red crab	*Chaceon (Geryon) affinis*	All regions	Relevant for deep sea fisheries
Crawfish	*Palinuridae*	Mediterranean Sea	Regulation (EC) No 1967/2006 (min. cons. size) & Annex III of the Barcelona Convention's SPA/BD Protocol
Cnidarians	*Cnidaria*	-	-
Red coral	*Corallium rubrum*	Mediterranean Sea	Rec. GFCM/36/2012/1 & Rec. GFCM/35/2011/2 & Annex III of the Barcelona Convention's SPA/BD Protocol

(1) Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean.
(2) OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic.

(3) Helcom Convention on the Protection of the Marine Environment of the Baltic Sea Area.

(4) Council Regulation (EC) No 2347/2002 of 16 December 2002 establishing specific access requirements and associated conditions applicable to fishing for deep-sea stocks (OJ L 351, 28.12.2002, p. 6).
(5) Council Regulation (EC) No 1967/2006 of 21 December 2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea, amending Regulation (EEC) No 2847/93 and repealing Regulation (EC) No 1626/94 (OJ L 409, 30.12.2006, p. 11).
(6) Council Regulation (EC) No 894/97 of 29 April 1997 laying down certain technical measures for the conservation of fishery resources (OJ L 132, 23.5.1997, p. 1).

(7) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).
(8) General Fisheries Commission for the Mediterranean.

(9) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7).

For prohibited species: only individuals captured dead shall be used. They shall be discarded after the measurements, The data collection is annual and the updating/processing of the data must be done timely to fit the schedule of the stock assessments.