



ENGLISH



## Meeting of the Correspondence Group on GES and Targets Biodiversity and Fisheries Cluster

Rome (Italy), 07-08 February 2013

**Approaches for definition of Good Environmental Status and setting targets for the following Ecological Objectives (EO) in the framework of the Ecosystem Approach:  
EO 1(Biodiversity), EO 2(Non-indigenous species), EO 3 (Harvest of commercially exploited fish and shellfish), EO 4 (Marine food webs) and EO 6 (Sea-floor integrity)**



## 1. Introduction

During their Ordinary meeting held in Paris in February 2012, the Contracting Parties to the Barcelona Convention adopted 11 Mediterranean Ecological Objectives (Eos) associated with Operational Objectives and Indicators as part of Decision 20/4 (Implementing MAP ecosystem approach roadmap: Mediterranean Ecological and Operational Objectives, Indicators and Timetable for implementing the ecosystem approach roadmap). The list of the adopted EO appears in Annex 1 to this document. They also requested the Secretariat to work on the determination, for each EO, of Mediterranean Good Environmental Status (GES) and targets during the biennium 2012-2013, through a participatory process involving MAP components, Contracting Parties and scientific community with the view of submitting the proposed Mediterranean GES and targets to the next meeting of the Contracting Parties.

This working document aims at proposing approaches for the determination of GES for Ecological Objectives 1 (Biodiversity), 2 (Non-indigenous species), 3 (Harvest of commercially exploited fish and shellfish), 4 (Food webs), 6 (Sea-floor integrity). It also aims at proposing targets for each of these EOs.

Given the complexity of biodiversity and the number of aspects that should be considered in assessing the state of its components, a wide consultation is required involving wide range of specialists. This document should be considered as a first contribution from the Secretariat to facilitate the works of the Biodiversity and Fisheries cluster of the ECAP Correspondence Group on GES and targets. The contributions by General Fisheries Commission for the Mediterranean (GFCM) added value to the document. Nevertheless, the proposed approaches for GES and targets determination need to be reviewed by the cluster experts and where necessary adapted and/or reoriented to take into account the specificities of each living component of the Mediterranean marine environment as well as the specific conditions prevailing in the Mediterranean sub-regions or countries.

The list of the documents consulted for the elaboration of this document appears in Annex 2.

## 2. Definitions

The purpose of the following definitions is to allow a common understanding of the key terms used in this document. They will be reviewed and amended and where necessary amended by the Biodiversity and Fisheries Cluster of GES & Targets Correspondence Group.

Good Environmental Status (GES) refers to the desired status of the marine environment and its components. The determination of GES is based on the 11 Ecological Objectives adopted by the Contracting Parties.

Considering that the Mediterranean marine ecosystems are providing services in support to diverse human activities, GES should not refer to a pristine state, but should relate to a state that accommodates the use of the marine environment with a high level of resilience of the ecosystems to the impacts of human activities and of predicted Global Changes.

GES Threshold defines, for a specific Ecological Objective indicator, the limit beyond which the related Operational Objective cannot contribute to achieve the desired Good Environmental Status.

GES Target is a quantitative or qualitative value or range of values of a specific Ecological Objective indicator corresponding to the required conditions for maintaining or reaching the desired Good Environmental Status.

GES Baseline represents the Reference conditions against which current and future state is compared. Reference conditions describe a known state of the marine environment but it may not necessarily reflect “background” or “historical” conditions and it is up to the regulator to decide a specified level of disturbance from the pressure(s) and hence to define the boundary between an acceptable state (GES) and an unacceptable state (non-GES).

### **3. Spatial (Geographical) and Temporal Scales**

Analyses for the determination of geographical scale for the evaluation of GES made in other marine regions, such as for the region covered by OSPAR, concluded that region scale approach cannot adequately assess most aspects of biodiversity. For the Mediterranean, the ECAP Coordination Group recommended that scales should be national and when possible regional (Mediterranean) and transboundary or sub-regional. GES would normally be defined at a higher scale (Mediterranean or sub-regional) than the targets (which will be defined at national or sub-national level).

The temporal scale of the assessment will be harmonised with review cycle for the integrated assessment of ecosystem approach roadmap. At their 17th Ordinary Meeting (Paris, February 2012) the Contracting Parties adopted the establishment of a review cycle on a 6 year basis.

### **4. Proposed approaches for GES determination and GES targets with regard to Ecological Objective 1 (Biodiversity)**

**Ecological Objective 1:** 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.

The SPA/BD Protocol defined "Biological diversity" as the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. Maintaining or enhancing Biological Diversity involves therefore addressing issues related to not only to species and their habitats but also to ecosystem

#### **4.1 Operational Objectives and Indicators**

The Operational objectives and the indicators adopted by the Contracting Parties for EO2 are presented in the following table extracted from Decision 20/4.

Table 1 EOs, OOs and indicators for Biodiversity

| Ecological Objective                                                                                                                                                                                                                                                    | Operational Objectives                                     | Indicators                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 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. | 1.1 Species distribution is maintained                     | 1.1.1 Distributional range                                                                                                                 |
|                                                                                                                                                                                                                                                                         |                                                            | 1.1.2 Area covered by the species (for sessile/benthic species)                                                                            |
|                                                                                                                                                                                                                                                                         | 1.2 Population size of selected species is maintained      | 1.2.1 Population abundance                                                                                                                 |
|                                                                                                                                                                                                                                                                         |                                                            | 1.2.2 Population density                                                                                                                   |
|                                                                                                                                                                                                                                                                         | 1.3 Population condition of selected species is maintained | 1.3.1 Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates) |
|                                                                                                                                                                                                                                                                         | 1.4 Key coastal and marine habitats are not being lost     | 1.4.1 Potential / observed distributional range of certain coastal and marine habitats listed under SPA protocol                           |
|                                                                                                                                                                                                                                                                         |                                                            | 1.4.2 Distributional pattern of certain coastal and marine habitats listed under SPA protocol                                              |
|                                                                                                                                                                                                                                                                         |                                                            | 1.4.3 Condition of the habitat-defining species and communities                                                                            |

#### **4.2 Biodiversity components to be considered:**

The complexity of the biodiversity components makes very difficult their assessment at all levels and in all areas. The ECAP Coordination Group during its first meeting (Athens, May 2012) noting that in comparison with pollution there is not so much monitoring derived information on biodiversity, recommended that, for biodiversity, targets be addressed to specific endangered or threatened species and priority habitats for the functionality of the Mediterranean, with a combination of qualitative and quantitative targets. It was also recommended that the species listed in Annex II and III of the SPA/BD be used as the basis for the selection of a list of indicator species. For habitats, the Coordination Group recommended that targets be developed in relation to priority benthic habitats.

Considering the provisions of Decision 20/4 regarding the species and habitats to be considered for the Ecological Objective 1 (Biodiversity), as well as the relevant recommendations of the Coordination Group and taking into account concepts and methodologies developed for the determination of GES and targets within the framework of the EU MSFD, the approach presented hereinafter proposes that the biodiversity assessments for the determination of GES and targets be made for:

- Three species groups (Marine mammals, Birds and reptiles) selected from the Annex II to the SPA/BD Protocol. There is no species from Annex III to the SPA/BD Protocol, since these species are considered for the determination of GES and targets under Ecological Objective 3 (Harvest of commercially exploited fish and shellfish).
- A list of habitats that achieves representativeness across broad categories of habitat types.

The Biodiversity and Fishery Cluster will be invited to discuss the proposed approach and to agree on lists of indicator species and habitats for the assessment of GES in relation to Ecological Objective 1 (Biodiversity)

#### **4.3 Geographical scale:**

Analyses for the determination of geographical scale for the evaluation of GES made in other marine regions, such as for the region covered by OSPAR, concluded that region scale approach cannot adequately assess most aspects of biodiversity. For the Mediterranean, the ECAP Coordination Group recommended that scales should be national and when possible regional (Mediterranean) and transboundary or sub-regional. GES would normally be defined at a higher scale (Mediterranean or sub-regional) than the targets (which will be defined at national or sub-national level). However, for migratory species the assessment at national level cannot provide accurate information on the population status. For these species a regional assessment approach is recommended.

#### **4.4 Determination of GES and targets**

Despite the increasingly important effort made by Mediterranean countries, there are still critical gaps in the information and data for many key components of the Mediterranean marine biodiversity. Indeed, in many Mediterranean countries, marine species and habitats remain little studied and the Knowledge about the population abundance and distribution, as well as about their conservation status is uneven. These considerations should be kept in mind when proposing targets for the biodiversity related indicators. Furthermore, these gaps in knowledge make difficult the establishment of baselines for most of the Mediterranean Biodiversity components.

### **Proposed GES description and targets for EO1**

#### **Marine and Coastal Habitats:**

Habitats to be considered: The Contracting Parties to the Barcelona Convention adopted a Reference List of Marine Habitat Types for the Selection of Sites to be included in the National Inventories of Natural Sites of Conservation Interest<sup>1</sup>. Decision 20/4 stipulates that sufficient information exists to make a prioritization amongst the benthic habitats mentioned in the Reference List and the priority habitats in areas beyond national jurisdiction following CBD decisions VIII/24 and VIII/21 paragraph 1.

As stated in Decision 20/4 a list of indicator habitats could include (from shallow to deep): biocoenosis of infralittoral algae (facies with vermetids or trottoir), hard beds associated with photophilic algae, meadows of the sea grass *Posidonia oceanica*, hard beds associated with Coralligenous biocenosis and semi dark caves, biocoenosis of shelf-edge detritic bottoms (facies with *Leptometra phalangium*), biocoenosis of deep-sea corals, seeps and biocoenosis

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<sup>1</sup> The full list appears as Annex 3 to this document

of bathyal muds (facies with *Isidella elongata*). In addition to these habitats, the marine vegetal assemblages listed as natural monuments by the Marine Vegetation Action Plan<sup>2</sup> could be considered: Barrier reefs of *Posidonia*, organogenic surface formations, terraces (platforms with vermitids covered by soft algae) and certain *Cystoseira* belts. The Biodiversity and Fisheries Cluster of the ECAP Correspondence Group will review the list of indicator habitat taking into account the relevance of each selected habitat as well as the cost of monitoring techniques and effort for their assessment. The cluster members will have also to identify indicator habitats amongst pelagic habitats such as upwelling areas, fronts and gyres.

Availability of Data: The availability (and quality) of data varies from one habitat to another.

Geographical Scale: The assessments should be made at national level and used to compile regional assessments.

(Proposed alternative wording is enclosed in square brackets)

| Operational objective                                         | Indicator                                                                                                        | Proposed GES Description                                                                                                        | Proposed Targets                                                                                                                                                                                |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.4 Key coastal and marine habitats are not being lost</b> | 1.4.1 Potential / observed distributional range of certain coastal and marine habitats listed under SPA protocol | The habitat is present in all its potential distributional range. <sup>3</sup>                                                  | <p><b>State</b><br/>The ratio Potential / observed distributional range = 1</p> <p><b>Pressure</b><br/>Decrease in the main causes of the habitat decline</p>                                   |
|                                                               | 1.4.2 Distributional pattern of certain coastal and marine habitats listed under SPA protocol                    | The distributional pattern is in line with prevailing physiographic, hydrographic, geographic and climatic conditions.          | <p><b>State</b><br/>Zero net loss of habitat</p>                                                                                                                                                |
|                                                               | 1.4.3 Condition of the habitat-defining species and communities                                                  | The population size and density of the habitat-defining species are at levels ensuring the long term maintenance of the Habitat | <p><b>Sate</b><br/>No [human induced] decrease in population abundance and density</p> <p>The species shows a positive trends in population abundance and density (for recovering habitats)</p> |

<sup>2</sup> The Action Plan for the conservation of marine vegetation in the Mediterranean Sea has been adopted by the Eleventh Ordinary meeting of the Contracting Parties to the Barcelona Convention and its Protocols (Malta, 27-30 October 1999).

<sup>3</sup> This is not realistic for many habitats, given their slow natural expansion rate.

## Marine Mammals:

Species to be considered: Twenty four species of cetaceans occur in the Mediterranean Sea. However, only eleven cetacean species are represented by regularly occurring, resident populations: fin whales, sperm whales, Cuvier's beaked whales, orcas (limited to a small population found in the Strait of Gibraltar), long-finned pilot whales, Risso's dolphins, rough-toothed dolphins, common bottlenose dolphins, striped dolphins, short-beaked common dolphins, and harbour porpoises (limited to portions of the Northern Aegean Sea). All these regular species will be considered for the determination of GES. The Mediterranean Monk Seal is another marine mammal species occurring in the Mediterranean, it is one of the rarest marine mammals in the world. Its population is very sparse and made of individuals scattered throughout a wide distribution range. The species qualifies as Critically Endangered according to the IUCN criteria.

Availability of Data: Due to a limited availability of data about cetacean population size and distribution, the Scientific Committee of ACCOBAMS recommended that a synoptic survey be carried in the Mediterranean Sea. The survey will provide baseline information that can be used for the evaluation of population status and GES. For Monk Seal, information and data are available for the main colonies.

Geographical Scale: For cetaceans the assessments should be made at the Mediterranean level. For the Monk seal assessments should be made at national and Mediterranean scale. (Proposed alternative wording is enclosed in square brackets)

| Operational objective                         | Indicator                                                       | Proposed GES Description                                                                                                                                                                                                                                                                                  | Proposed Targets                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.1 Species distribution is maintained</b> | 1.1.1 Distributional range                                      | <p><u>Cetaceans:</u> The species continues to occur in all Mediterranean areas where formerly known.</p> <p><u>Monk Seal:</u> Monk Seal is present along all Mediterranean coasts with suitable sites for the species. [Monk Seal continues to occur in all Mediterranean areas where formerly known]</p> | <p><b>State</b></p> <p><u>Cetaceans:</u> Cetacean distribution is not significantly affected by human activities</p> <p><u>Monk Seal:</u> The distribution of Monk Seal is expanding and the species is recolonizing areas where formerly known</p> <p><b>Pressure/Response:</b> Human activities<sup>4</sup> having the potential to exclude marine mammals from their range area are regulated and controlled.</p> |
|                                               | 1.1.2 Area covered by the species (for sessile/benthic species) |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                      |

<sup>4</sup> Seismic surveys, marine noise generating activities, fishing, maritime traffic, etc.



|                                                                                       |                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.2<br/>Population<br/>size of<br/>selected<br/>species is<br/>maintained</b>      | 1.2.1 Population<br>abundance                                                                                                                       | The absolute number of individuals that compose the population allows to achieve and maintain a favourable conservation status<br>[The species population has abundance levels allowing to qualify to Least Concern Category of IUCN.] <sup>5</sup>                                                                                                                        | <b>State</b><br>No [human induced] decrease in population abundance                                                                                                                                                          |
|                                                                                       | 1.2.2 Population<br>density                                                                                                                         | <u>Cetaceans</u> : Population density allows to achieve and maintain a favourable conservation status<br><br><u>Monk Seal</u> : Number of individuals by group [colony] allows to achieve and maintain a favourable conservation status                                                                                                                                    | <b>State</b><br>Continual recovery of population density                                                                                                                                                                     |
| <b>1.3<br/>Population<br/>condition<br/>of selected<br/>species is<br/>maintained</b> | 1.3.1 Population<br>demographic<br>characteristics<br>(e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates) | <u>Cetaceans</u> :<br>Species populations are in good condition: Low by-catch induced mortality <sup>6</sup> , balanced sex ratio and no decline in calf production<br><u>Monk Seal</u> :<br>Species populations are in good condition: Low human induced mortality, appropriate pupping seasonality, high annual pup production, balanced reproductive rate and sex ratio | <b>State</b><br>(Quantitative targets may be set if baseline data on the extent of bycatch and the population size will be available)<br><br><b>Pressure/Response</b><br>Appropriate measure implemented to mitigate bycatch |

<sup>5</sup> A taxon is Least Concern when it has been evaluated and does not qualify for “Critically Endangered”, “Endangered”, “Vulnerable” or “Near Threatened”

<sup>6</sup> Baseline data are required.

|                                                               |                                                                                                                  |  |  |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--|--|
| <b>1.4 Key coastal and marine habitats are not being lost</b> | 1.4.1 Potential / observed distributional range of certain coastal and marine habitats listed under SPA protocol |  |  |
|                                                               | 1.4.2 Distributional pattern of certain coastal and marine habitats listed under SPA protocol                    |  |  |
|                                                               | 1.4.3 Condition of the habitat-defining species and communities                                                  |  |  |

#### **Birds:**

Species to be considered: The List of Endangered or Threatened Species annexed to the SPA/BD Protocol (Annex 2) include thirty bird species. From practical and feasibility point of view, it would be difficult to consider all these species for the assessment of GES. It is therefore recommended to select a set of indicator species taking into account ecological parameters (e.g: trophic level, current conservation status, etc.) and/or taxonomical criteria. The indicator species should be selected from the relevant lists applicable to the Mediterranean (Annex 2 to the SPA/BD Protocol, Annex 1 of the EU Birds Directive, Annex 3 (column A of Table 1) of the African Eurasian Waterbird Agreement (AEWA).

Availability of Data: The availability of data about bird populations is considered as good for most of the endangered species. Several high quality databases exist, most of them are updated on a regularly basis.

Geographical Scale: For Birds the assessments should be made at national and Mediterranean level.

(Proposed alternative wording is enclosed in square brackets)

| Operational objective                                        | Indicator                                                       | Proposed GES Description                                                                                                                                                                                                                            | Proposed Targets                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.1 Species distribution is maintained</b>                | 1.1.1 Distributional range                                      | The species continues to occur in all Mediterranean areas where formerly known,<br><br>[non-significant shrinkage or shift in the Mediterranean species distribution range ]                                                                        | <b>State</b><br><br>No significant shrinkage in the population distribution in the Mediterranean in all [90% of the] indicator species,<br><br>and for colonial-breeding seabirds (ie, most species in the Mediterranean): New colonies are established and the population is encouraged to spread among several alternative breeding sites <sup>7</sup> . |
|                                                              | 1.1.2 Area covered by the species (for sessile/benthic species) |                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                            |
| <b>1.2 Population size of selected species is maintained</b> | 1.2.1 Population abundance                                      | The absolute number of individuals that compose the population allows to achieve and maintain a favourable conservation status<br>[The species population has abundance levels allowing to qualify to Least Concern Category of IUCN.] <sup>8</sup> | No [human induced] decrease in population abundance.<br><br>The total number of individuals is sparse enough in different spots to allow adequate resilience.                                                                                                                                                                                              |
|                                                              | 1.2.2 Population density                                        | Population density allows to achieve and maintain a favourable conservation status                                                                                                                                                                  | <b>State</b><br>Continual recovery of population density in enough different spots to allow resilience<br>No decrease in population density in new/ recolonized critical habitat (for recovered populations)                                                                                                                                               |

<sup>7</sup> This is recommended by the conservation plans of some taxa (Audouin's G, Lesser-crested T)

<sup>8</sup> A taxon is Least Concern when it has been evaluated and does not qualify for "Critically Endangered", "Endangered", "Vulnerable" or "Near Threatened"

|                                                                                       |                                                                                                                                            |                                                                                                                                                                                                                                               |                                                                                                                             |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>1.3<br/>Population<br/>condition<br/>of selected<br/>species is<br/>maintained</b> | 1.3.1 Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates) | Species populations are in good conditions: Appropriate levels of breeding success & acceptable levels of survival of young and adult birds, bycatch mortality is at negligible levels, particularly for species with IUCN threatened status. | Population models point to long-term maintenance of populations of all taxa, particularly those with IUCN threatened status |
| <b>1.4 Key coastal and marine habitats are not being lost</b>                         | 1.4.1 Potential / observed distributional range of certain coastal and marine habitats listed under SPA protocol                           |                                                                                                                                                                                                                                               |                                                                                                                             |
|                                                                                       | 1.4.2 Distributional pattern of certain coastal and marine habitats listed under SPA protocol                                              |                                                                                                                                                                                                                                               |                                                                                                                             |
|                                                                                       | 1.4.3 Condition of the habitat-defining species and communities                                                                            |                                                                                                                                                                                                                                               |                                                                                                                             |

### Reptiles:

Species to be considered: Five turtle species are listed as Endangered or Threatened Species in the Mediterranean (Annexe 2 to the SPA/BD Protocol). Only two of them (*Caretta caretta* and *Chelonia mydas*) are common and nest along the Mediterranean Coasts. Most of the monitoring effort is focusing on these two species that could be considered as good representative species of marine reptiles in the Mediterranean..

Availability of Data: Most of the nesting areas of *Caretta caretta* and *Chelonia mydas* are covered by annual monitoring programmes that provide valuable data about nesting activity and estimates of hatching rates. Some of these monitoring programmes include also tagging of nesting females. There is however a lack of information concerning population size and human induced mortality of juveniles and adults (bycatch) since the available data on these parameters are scarce and limited to few areas.

Geographical Scale: The assessments should be made at national and Mediterranean scales for nesting activity and at Mediterranean level for the population size and condition.

(Proposed alternative wording is enclosed in square brackets)

| Operational objective                                        | Indicator                                                       | Proposed GES Description                                                                                                                                                                                                                          | Proposed Targets                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.1 Species distribution is maintained</b>                | 1.1.1 Distributional range                                      | The species continues to occur in all Mediterranean areas where formerly known, including nesting, mating, feeding and wintering sites.                                                                                                           | <p><b>State</b><br/>Turtle distribution is not significantly affected by human activities</p> <p>Turtles continue to nest in all known nesting sites</p> <p><b>Pressure/Response</b><br/>Protection of nesting turtle nesting sites.</p> <p>Human activities<sup>9</sup> having the potential to exclude marine turtles from their range area are regulated and controlled.</p> |
|                                                              | 1.1.2 Area covered by the species (for sessile/benthic species) |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>1.2 Population size of selected species is maintained</b> | 1.2.1 Population abundance                                      | The absolute number of individuals that compose the population allows to achieve and maintain a favourable conservation status [The species population has abundance levels allowing to qualify to Least Concern Category of IUCN.] <sup>10</sup> | <p><b>State</b><br/>No [human induced] decrease in population abundance</p>                                                                                                                                                                                                                                                                                                     |
|                                                              | 1.2.2 Population density                                        | Population density allows to achieve and maintain a favourable conservation status                                                                                                                                                                | <p><b>State</b><br/>Continual recovery of population density</p> <p>Stable or increased nesting density</p>                                                                                                                                                                                                                                                                     |

<sup>9</sup> Uncontrolled use of turtle nesting sites, fishing, maritime traffic, etc.

<sup>10</sup> A taxon is Least Concern when it has been evaluated and does not qualify for "Critically Endangered", "Endangered", "Vulnerable" or "Near Threatened"

|                                                                   |                                                                                                                                             |                                                                                                     |                                                             |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>1.3 Population condition of selected species is maintained</b> | 1.3.1 Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/ mortality rates) | Low bycatch induced mortality <sup>11</sup> , favourable sex ratio and no decline in hatching rates | <b>Pressure</b><br>Deliberate killing of turtles eliminated |
| <b>1.4 Key coastal and marine habitats are not being lost</b>     | 1.4.1 Potential / observed distributional range of certain coastal and marine habitats listed under SPA protocol                            |                                                                                                     |                                                             |
|                                                                   | 1.4.2 Distributional pattern of certain coastal and marine habitats listed under SPA protocol                                               |                                                                                                     |                                                             |
|                                                                   | 1.4.3 Condition of the habitat-defining species and communities                                                                             |                                                                                                     |                                                             |

<sup>11</sup> Baseline data are required.

## 5. Proposed approaches for GES determination and GES targets with regard to Ecological Objective 2 (Non-indigenous species)

**Ecological Objective 2:** Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem.

The occurrence of non-indigenous species (NIS) into the Mediterranean Sea is an increasing phenomenon involving intentional and non-intentional sources of introduction. The vectors of species introduction into the Mediterranean waters include ballast waters, aquaculture and trade in live marine organisms. However, the entry of organisms through the Suez Canal is recognised as the most important entry vector. The establishment of non-indigenous species in the eastern part of the Mediterranean is generating a deep change in the species composition of the Eastern Basin marine ecosystems. Some NIS have become valuable fisheries resources, but many proved to be invasive and caused significant damages to local species populations and assemblages. Furthermore, several examples of impacts on human health and/or economic losses caused by invasive species have been described in Mediterranean coastal waters.

Climate change may create conditions which are more suitable for NIS to survive, establish viable populations and spread widely.

### 5.1 Operational Objectives and Indicators

The Operational objectives and the indicators adopted by the Contracting Parties for EO2 are presented in the following table extracted from Decision 20/4.

| Ecological Objective                                                                                          | Operational Objectives                                                                   | Indicators                                                                                                    |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem | 2.1 Invasive non-indigenous species introductions are minimized                          | 2.1.1. Spatial distribution, origin and population status (established vs. vagrant) of non-indigenous species |
|                                                                                                               |                                                                                          | 2.1.2 Trends in the abundance of introduced species, notably in risk areas                                    |
|                                                                                                               | 2.2. The impact of non-indigenous particularly invasive species on ecosystems is limited | 2.2.1 Ecosystem impacts of particularly invasive species                                                      |
|                                                                                                               |                                                                                          | 2.2.2 Ratio between non-indigenous invasive species and native species in some well-studied taxonomic groups  |

### 5.2 Species to be considered:

Considering that not all the non-indigenous species have the potential to establish viable populations in the Mediterranean Sea, only those species having established viable populations threatening ecosystems, habitats or species will be considered for the determination of GES in relation to EO2. Such species are known under the Convention on Biological Diversity as Invasive Alien Species (IAS).

The target 9, adopted under Strategic Goal B of the CBD's Aichi Strategic Plan, stipulates that "by 2020, invasive alien species and pathways are identified and prioritized, priority

species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment". The cases of IAS occurrence in the Mediterranean Sea showed that eradicating them can be achieved only for limited surface areas or specific sites (e.g: marine protected areas). Therefore effort should be oriented to the control of pathways and vectors and to establishing early warning systems.

### **5.3 Geographical scale:**

The appropriate geographical (spatial) scale for the monitoring and the management of non-indigenous species may significantly vary from one species to another depending on the biological and ecological features of the species. It depends also on the rate of spread of the non-indigenous species which is a combined result of its capacity to adapt to the prevailing environmental conditions and of the resilience capacity of the native species and assemblages to the biological invasion.

For the purpose of the evaluation of the GES in the Mediterranean Sea, the monitoring and the assessment of impacts of non-indigenous species should be undertaken at national level with special focus for areas with high risk of non-indigenous species introduction (ballast water discharging zones, ports, marinas, aquaculture facilities, marine aquariums, etc.).

The Initial Integrated Assessment of the Mediterranean Sea and Coastal Areas, carried out as part of Step 3 of the road map for the application of the Ecosystem Approach showed that, although the spread of invasive species is an issue of concern for most of the Mediterranean Sea zones, the Eastern and Central basins are particularly affected by biological invasion. It is therefore important to use the results of national assessments regarding EO2 to compile evaluations for each of the sub-regions used for the Initial Integrated Assessment.

### **5.4 Sources and availability of data:**

During the past ten years a huge number of reports and scientific papers were issued to report about the occurrence of NIS in the Mediterranean. Furthermore some compilation efforts were undertaken to elaborate inventories. The most important of these compilations for the Mediterranean Sea are the CIESM Atlas of Exotic Species in the Mediterranean and the Database on Marine Mediterranean Invasive Species developed by RAC/SPA. There are other similar initiatives that partly cover the Mediterranean Sea (ex: DAISIE project: European Invasive Alien Species Gateway, a database for alien terrestrial and marine species in Europe).

However, despite the extensive information on NIS occurrence in the coastal waters of many Mediterranean areas, our knowledge about the exact spatial distribution, densities, population sizes and actual impacts on the ecosystems and native species remains relatively poor, except for a very limited number of IAS that caused spectacular ecological damages to marine ecosystems.

The determination of GES in relation to EO3 will require therefore the development and implementation of monitoring programmes at national level related to abundance and distribution of NIS as well as early warning systems covering in particular risk areas and MPAs. The harmonisation and coordination of the national monitoring programmes and warning systems could be ensured through the implementation of the Action Plan concerning Species Introductions and Invasive Species in The Mediterranean Sea adopted by the Contracting Parties. The Action Plan requires that Parties prepare programmes for data collection and monitoring, particularly of:



- the presence of non-indigenous marine species and the state of their population trends, including those used in aquaculture
- the impact of non-indigenous species on the indigenous biodiversity
- the origin of ballast water discharged into their territorial waters, using the monitoring protocols used by relevant International Organisations.

### 5.5 Definition of the key terms used in the indicators adopted for EO2

The following definitions will be used for the purpose of determination of GES and GES targets in relation to Ecological Objective 2.

Non-indigenous species (NIS): Species, subspecies or lower taxa whose presence in the Mediterranean Sea is due to intentional or unintentional introduction resulting from human activities.

(Remark: Decision 20/4 stipulates that the term non-indigenous refers to an organism that may survive and subsequently reproduce, outside of its known or consensual range. Non-indigenous may be further characterized as un-established or vagrant, established, invasive and noxious or particularly invasive.)

Invasive Alien Species (IAS): Non-indigenous species which have spread or are known to have the potential to spread and to threaten ecosystems, species and/or their habitats.

Introduction pathway: The route by which a Non-indigenous species enter or spread in the Mediterranean Sea.

Introduction Vector: The human activity or the physical means involved in the entry or the spread of NIS in the Mediterranean Sea.

### 5.6 Determination of GES and targets

According to Decision 20/4, the Ecological Objective 2 (Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem) could be achieved by minimizing the introductions of invasive non-indigenous species (Operational Objective 2.1) and by mitigating their impacts on ecosystems (Operational Objective 2.2).

Two options may be used for the determination of the GES and targets in relation to the Operational Objective 2.1 (Invasive non-indigenous species introductions are minimized):

- Option 1: Given the difficulties in collecting accurate data about the spatial distribution of NIS and about the status of their populations (established or vagrant), the determination of GES could be based on the **assessment of introduction and spread risks** through the evaluation of the effectiveness of the measures taken to control introduction pathways and vectors.
- Option 2: GES determination will be based on regular monitoring to detect NIS having established viable populations and to **assess the geographical distribution of priority (indicator) NIS**. The list of priority (indicator) NIS, will be derived by consensus and regularly updated, based on information from the CIESM Atlas of Exotic Species, MAMIAS and DAISIE databases.

The proposed approach for the determination of GES in relation to the Operational Objective 2.2 (The impact of non-indigenous particularly invasive species on ecosystems is limited) is based on the detection and evaluation of impacts generated by IAS to the species and

habitats selected as indicators for the determination of GES in relation to Ecological Objectives 1 and 3. The evaluation of adverse impacts of IAS requires (at least for areas which are at a high risk of new introductions) initial baseline assessments against which ecosystem status will be compared to detect changes.

Proposed GES description and targets for EO2

| Operational objective                                           | Indicator                                                                                                     | Proposed GES Description                                                                                                                                                                                                                                                                                                                             | Proposed Targets                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.1 Invasive non-indigenous species introductions are minimized | 2.1.1. Spatial distribution, origin and population status (established vs. vagrant) of non-indigenous species | <p>[Option 1: Significant reduction in the risk of introduction and spread of NIS linked to human activities, in particular for potential IAS]</p> <p>[Option 2:</p> <ul style="list-style-type: none"> <li>– Limited spread of NIS introduced by human activities</li> <li>– Limited number of NIS having established viable population]</li> </ul> | <p><u>State</u><br/>No new IAS introduced as a result of human activities</p> <p><u>Pressure/Response</u></p> <ul style="list-style-type: none"> <li>– Improved management of the main human related pathways and vectors of NIS introduction (early warning systems, etc.)</li> <li>– Action plans developed to address high risk NIS, should they appear in the Mediterranean.</li> </ul> |
|                                                                 | 2.1.2 Trends in the abundance of introduced species, notably in risk areas                                    | Decreasing abundance of introduced NIS in risk areas                                                                                                                                                                                                                                                                                                 | <p><u>State</u><br/>Abundance of NIS introduced by human activities is reduced towards zero</p> <p><u>Pressure/Response</u></p>                                                                                                                                                                                                                                                             |

| Operational objective                                                                    | Indicator                                                                                                    | Proposed GES Description                                                                                                                                                                                | Proposed Targets                                                                                                       |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 2.2. The impact of non-indigenous particularly invasive species on ecosystems is limited | 2.2.1 Ecosystem impacts of particularly invasive species                                                     | No decrease in native species abundance, no decline of habitats and no change in community structure that have been generated by IAS via competition, predation or any other direct or indirect effect. | <u>Pressure/Response</u><br>Impacts of NIS reduced to the feasible minimum                                             |
|                                                                                          | 2.2.2 Ratio between non-indigenous invasive species and native species in some well-studied taxonomic groups | Stable or decreasing rate of NIS                                                                                                                                                                        | <u>State</u><br>To be set upon species choice and their related impact degree of the invasive upon the indigenous ones |

## 6. Proposed approaches for GES determination and GES targets with regard to Ecological Objective 3 (Harvest of commercially exploited fish and shellfish)

**Ecological Objective 3:** Populations of selected commercially exploited fish and shellfish are within biologically safe limits, exhibiting a population age and size distribution that is indicative of a healthy stock

### 6.1 Operational Objectives and Indicators

The Operational objectives and the indicators adopted by the Contracting Parties for EO3 are presented in the following table extracted from Decision 20/4.

| Ecological Objective                                                                                                                                                                           | Operational Objectives                                                               | Indicators                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Populations of selected commercially exploited fish and shellfish are within biologically safe limits, exhibiting a population age and size distribution that is indicative of a healthy stock | 3.1 Level of exploitation by commercial fisheries is within biologically safe limits | 3.1.1 Total catch by operational unit                                          |
|                                                                                                                                                                                                |                                                                                      | 3.1.2. Total effort by operational unit                                        |
|                                                                                                                                                                                                |                                                                                      | 3.1.3 Catch per unit effort (CPUE) by operational unit                         |
|                                                                                                                                                                                                |                                                                                      | 3.1.4 Ratio between catch and biomass index (hereinafter catch/biomass ratio). |
|                                                                                                                                                                                                |                                                                                      | 3.1.5 Fishing mortality                                                        |
|                                                                                                                                                                                                | 3.2 The reproductive capacity of stocks is maintained                                | 3.2.1 Age structure determination (where feasible)                             |
|                                                                                                                                                                                                |                                                                                      | 3.2.2 Spawning Stock Biomass (SSB)                                             |

### 6.2 Species to be considered:

Decision 20/4 stipulated that the choice of indicator species for collecting information for Ecological Objective 3 should be derived from (i) the List of species whose exploitation is regulated appearing in Annex III of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean and (ii) the List of GFCM Priority Species.

#### List of species whose exploitation is regulated (Annex III to the SPA/BD Protocol)

This List includes five groups of species (Fishes: 19, Crustaceans: 6, Porifera: 5, Cnidaria: 2, and Echinodermata: 1).

#### **FISHES**

*Alopias vulpinus*  
*Alosa alosa*  
*Alosa fallax*  
*Anguilla anguilla*  
*Carcharhinus plumbeus*  
*Centrophorus granulosus*  
*Epinephelus marginatus*  
*Heptranchias perlo*  
*Lamoptera fluviatilis*  
*Mustelus asterias*  
*Mustelus mustelus*  
*Mustelus punctulatus*  
*Petromyzon marinus*  
*Prionace glauca*  
*Sciaena umbra*

*Squalus acanthias*  
*Thunnus thynnus*  
*Umbrina cirrosa*  
*Xiphias gladius*

#### **CRUSTACEANS**

*Homarus gammarus*  
*Maja squinado*  
*Palinurus elephas*  
*Scyllarides latus*  
*Scyllarus arctus*  
*Scyllarus pygmaeus*

#### **PORIFERA**

*Hippospongia communis*

*Spongia (Spongia)*  
*lamella(synon. Spongia*  
*agaricina)*  
*Spongia (Spongia)*  
*officinalis adriatica*  
*Spongia (Spongia)*  
*officinalis officinalis*  
*Spongia (Spongia)*  
*zimocca*

#### **ECHINODERMATA**

*Paracentrotus lividus*

#### **CNIDARIA**

*Antipathes sp. plur.*  
*Corallium rubrum*

#### **GFCM Priority Species**

This List is made of three groups of species (Fishes: 39, Molluscs: 6 and Crustaceans: 6)

#### **FISHES**

*Acipenser gueldenstaedtii*  
*Acipenser stellatus*  
*Acipenser sturio*  
*Auxis rochei*  
*Boops boops*  
*Coryphaena hippurus*  
*Engraulis encrasicolus*  
*Euthynnus alletteratus*  
*Huso huso*  
*Katsuwonus pelamis*  
*Lophius budegassa*  
*Lophius piscatorius*  
*Merlangius merlangus*  
*Merluccius merluccius*  
*Micromesistius poutassou*  
*Mullus barbatus*  
*Mullus surmuletus*  
*Orcynopsis unicolor*  
*Pagellus bogaraveo*  
*Pagellus erythrinus*  
*Pomatomus saltatrix*  
*Psetta maxima*  
*Raja alba*  
*Sarda sarda*  
*Sardina pilchardus*  
*Sardinella aurita*  
*Scomber scombrus*

*Solea solea*  
*Sprattus sprattus*  
*Squatina squatina*  
*Thunnus alalunga*  
*Trachurus mediterraneus*  
*Trachurus trachurus*  
*Anguilla anguilla*  
*Isurus oxyrinchus*  
*Lamna nasus*  
*Prionace glauca*  
*Thunnus thynnus*  
*Xiphias gladius*

#### **MOLLUSCS**

*Eledone cirrosa*  
*Eledone moschata*  
*Loligo vulgaris*  
*Octopus vulgaris*  
*Pecten jacobaeus*  
*Sepia officinalis*

#### **CRUSTACEANS**

*Aristaeomorpha foliacea*  
*Aristeus antennatus*  
*Nephrops norvegicus*  
*Palinurus mauritanicus*  
*Parapenaeus longirostris*  
*Palinurus elephas*

Out of the 94 species included in these two lists, 4 fish species and 1 crustacean species are common to both lists.

#### **FISHES**

*Anguilla anguilla*  
*Prionace glauca*  
*Thunnus thynnus*  
*Xiphias gladius*

#### **CRUSTACEANS**

*Palinurus elephas*

Furthermore, the following three fish species of the GFCM Priority Species are included in the Annex 2 of the SPA/BD Protocol (Threatened or Endangered Species)

*Acipenser sturio*  
*Huso huso*  
*Isurus oxyrinchus*  
*Lamna nasus*  
*Squatina squatina*

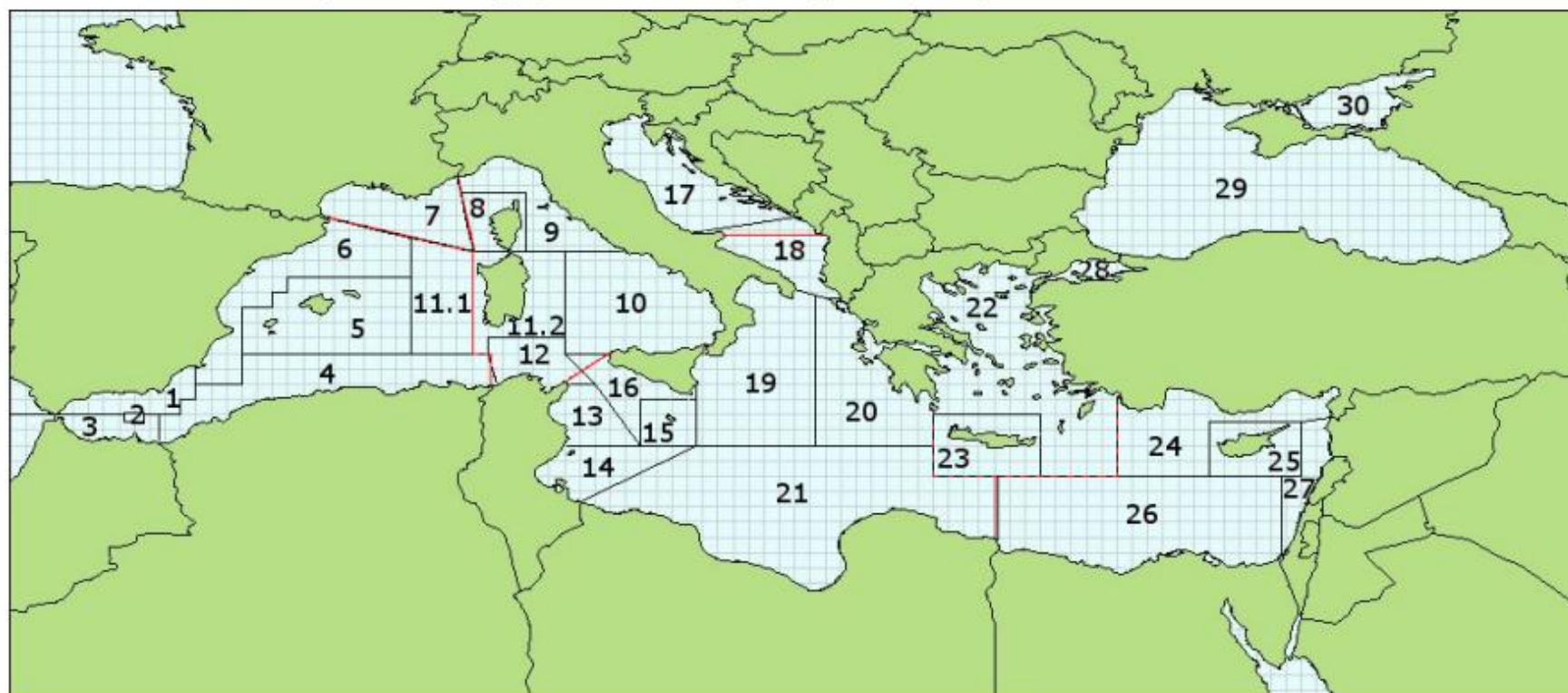
Decision 20/4 stipulated also that choice of indicators species for EO3 should cover all trophic levels, and if possible, functional groups, using the species listed in Annex III of SPA/BD Protocol, the species in the GFCM Priority Species list and/or, as appropriate the stocks covered under regulation (EC) No 199/2008 of 25 February 2008 concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy.

Considering that the calculation of the indicators set for EO3 requires series of data about commercial catches as well as data from the scientific monitoring surveys of stocks, the selection of species to be considered for EO3 should take also into account the availability and quality of these data.

### **6.3 Geographical scale:**

As part of the guidance for a common methodology to be use by clusters, the ECAP Coordination Group recommended that scales should be national and when possible regional (Mediterranean) and transboundary or sub-regional. Currently, around half of the Mediterranean countries have stock assessments for some of the stocks being fished on their national waters.

Under GFCM, stock assessments are made by Geographical Sub-Areas (GSA) established as management units in 2001 and amended in 2009 (RESOLUTION GFCM/33/2009/2). The GSA delimitation is mainly based on practical considerations rather than on the stock distribution, and many stocks extend beyond the geographic limits of GSAs. However, although the concept of their delimitation still needs further consideration, the GSAs, as established by GFCM appear as the most appropriate subdivisions for stock assessments for management purposes in the Mediterranean Sea. They are also adopted for assessments at national level.



---- FAO Statistical Divisions (red)      ---- GFCM Geographical Sub-Areas (black)

|                           |                                               |                            |                          |                    |
|---------------------------|-----------------------------------------------|----------------------------|--------------------------|--------------------|
| 01 - Northern Alboran Sea | 07 - Gulf of Lions                            | 13 - Gulf of Hammamet      | 19 - Western Ionian Sea  | 25 - Cyprus Island |
| 02 - Alboran Island       | 08 - Corsica Island                           | 14 - Gulf of Gabes         | 20 - Eastern Ionian Sea  | 26 - South Levant  |
| 03 - Southern Alboran Sea | 09 - Ligurian and North Tyrrhenian Sea        | 15 - Malta Island          | 21 - Southern Ionian Sea | 27 - Levant        |
| 04 - Algeria              | 10 - South and Central Tyrrhenian Sea         | 16 - South of Sicily       | 22 - Aegean Sea          | 28 - Marmara Sea   |
| 05 - Balearic Island      | 11.1 - Sardinia (west) 11.2 - Sardinia (east) | 17 - Northern Adriatic     | 23 - Crete Island        | 29 - Black Sea     |
| 06 - Northern Spain       | 12 - Northern Tunisia                         | 18 - Southern Adriatic Sea | 24 - North Levant        | 30 - Azov Sea      |

### GFCM Geographical Sub-Areas (GSAs)

#### **6.4 Sources and availability of data:**

In the Mediterranean, there are significant discrepancies between sub-regions in terms of availability, quality and relevance of data that could be useful for conducting GES assessments in relation to EO 3.

Furthermore a large variety of situations exist for the species, from species which are formally assessed and managed and for which a large amount of data exist, to species for which data are scarce, limited or even inexistent.

Indicators such as fishing mortality (F), biomass (B) or spawning stock biomass (SSB) are only available if a full stock assessment and/or scientific surveys are performed. Others such as length structure, spatial distribution, Biomass indices and age structure need biological sampling and monitoring programmes being routinely carried out.

A distinction should be done between catches and landings; each one needs a different sampling program in force. Commercial catches include discards and bycatch, Total catches include recreational fishery catches and IUU estimates which in most countries are not monitored or accounted for.

Within the GFCM mandate a series of stocks are assessed on an annual basis. The data, results including stock status and advice produced by scientists are gathered in Stock Assessment Forms (SAFs) which are data files managed and stored within the GFCM Information System. SAFs prepared by scientist from Mediterranean countries are reviewed by the Scientific Advisory Committee (SAC) of GFCM through its Sub-Committee on Stock Assessment (SCSA) with the view of assessing the stocks status and proposing management recommendations for the consideration and eventual adoption by the Commission.

GFCM has also a specific data requirement in force since 2010, the Task 1 data submission protocol that all its members must comply with. Task 1 includes protocols and standards for qualitative and quantitative data notification/submission by Members regarding fishing capacity by fleet segment (Task 1.1), fishing activity descriptors and resources exploited by Operational Units (Task 1.2), economic parameters by fleet segment (Task 1.3), catch/effort (Task 1.4) and biological information of the catch (Task 1.5).

Stocks assessed (species/GSA) by the SAC of GFCM in 2011 and 2012.

| Species GSA                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| <i>Aristaeomorpha foliacea</i>  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Aristeus antennatus</i>      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Boops boops</i>              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Engraulis encrasicolus</i>   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Galeus melastomus</i>        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Glaucostegus cemiculus</i>   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Merluccius merluccius</i>    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Mullus barbatus</i>          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Mullus surmuletus</i>        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Nephrops norvegicus</i>      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Pagellus bogaraveo</i>       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Pagellus erythrinus</i>      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Parapenaeus longirostris</i> |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Parapenaeus longirostris</i> |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Raja asterias</i>            |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Raja clavata</i>             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Sardina pilchardus</i>       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Scyllorhinus canicula</i>    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Shpyraean sphyræna</i>       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Solea solea</i>              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <i>Spicara smaris</i>           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

Assessment in 2011  Assessment in 2012  Assessment in 2011 and 2012 

In addition to the stock assessments made within the framework of GFCM, the International Commission for the Conservation of Atlantic Tuna (ICCAT) is undertaking on regular basis assessments for the Mediterranean stocks of Bluefin Tuna (*Thunnus thynnus*) and swordfish (*Xiphias gladius*).

GFCM and ICAAT appear as the most appropriate sources of information for the indicators adopted by the Contracting Parties for the EO3. During the 1st Meeting of the EcAp Coordination Group, held in Athens (29-30 May 2012), the representative of the GFCM confirmed the interest and availability of her organisation to actively participate in the process for the definition of GES and targets related to EO adding that the data available at the GFCM would be made available to this process taking into account the applicable provisions of the data access policy adopted by GFCM Members.

## 6.5 Definition of the key terms used in the indicators adopted for EO3

The definitions hereinafter will be used for GES and target determination regarding EO3. Most of them are extracted from or harmonised with or adapted from the definitions provided by the Fisheries Glossary of scientific terms used by GFCM.

### Total catch by operational unit (Indicator 3.1.1)

Total catch (metric Tons) refers to the annual landings and bycatch, Operational unit being "the group of fishing vessels which are engaged in the same type of fishing operation within



the same Geographical Sub-Area (GSA), targeting the same species or group of species and belonging to the same economic segment”.

Total effort by operational unit (Indicator 3.1.2)

Fishing effort is a measure of fishing activity expressed as the product of a number of parameters related to the fishing vessel capacity and gear used on the fishing grounds over a given unit of time (e.g. hours trawled per day, number of hooks set per day or number hauls of a beach seine per day). When two or more kinds of gear are used, the respective efforts must be adjusted to some standard type before being added.

Catch per unit effort (CPUE) by operational unit (Indicator 3.1.3)

CPUE is the amount of the catch that is taken per unit of fishing effort (e.g. number of fish per long line hook, months).

Ratio between catch and biomass index (catch/biomass ratio, Indicator 3.1.4)

Catch/Biomass ratio is Total catch/Total Biomass, Total Biomass being the sum of weights of all the individuals in a stock.

Fishing mortality (Indicator 3.1.5)

Fishing mortality (F) reflects all deaths in the stock that are due to fishing per year (not only what is actually landed). It is usually expressed as a rate ranging from 0 (for no fishing) to high values (1.0 or more) and is available only for the assessed stocks.

Age structure determination (Indicator 3.2.1)

The age structure of a fish population indicates the distribution of age within the population. It is usually determined through sampling and determination of length-frequency distribution. Shifting of age structure towards predominance of immature age classes is an indication of population decline.

Spawning Stock Biomass (Indicator 3.2.2)

The Spawning Stock Biomass, usually referred to as SSB, is the total weight of the spawning stock. For the purpose of this document SSB combines males and females. SSB is available only for the assessed stocks.

Recreational Fishing

Non-commercial fishing activities exploiting marine living aquatic resources. For Mediterranean fisheries management purposes it comprises four independent segments: leisure, sport, underwater and charter fisheries.

IUU

Illegal, unreported and unregulated (fishing)

Overfished (or overexploited)

A stock is considered to be overfished when its abundance is below an agreed biomass based reference target point, like  $B_{0.1}$  or  $B_{MSY}$ . To apply this denomination, it should be assumed that the current state of the stock (in biomass) arises from the application of excessive fishing pressure in previous years. This classification is independent of the current level of fishing mortality.

Stock subjected to overfishing (or overexploitation)

A stock is subjected to overfishing if the fishing mortality applied to it exceeds the one it can sustainably stand, for a longer period. In other words, the current fishing mortality exceeds the fishing mortality that, if applied during a long period, under stable conditions, would lead

the stock abundance to the reference point of the target abundance (either in terms of biomass or numbers)

## 6.6 Determination of GES and targets

In the Mediterranean, fishing activity is not the only, but the main source of pressure on commercially exploited fish and shellfish stocks. It includes fishing for commercial purposes and also the recreational fishing by leisure boats and sport fishing (including spear fishing).

The recent assessments made within the framework of GFCM indicate that 90% of the assessed fish stocks are subject to full or overfishing status. It is therefore obvious that EO3 (Populations of selected commercially exploited fish and shellfish are within biologically safe limits, exhibiting a population age and size distribution that is indicative of a healthy stock) can be achieved only if fishing mortality decreases to levels that ensure, for each fish stock, an increase of SSB and a healthy age structure distribution allowing a full reproductive capacity.

Considering that most of the Mediterranean fisheries are multi-specific with a limited number of fisheries targeting only one species, the determination of GES for EO3 within a context of an Ecosystem Approach should be based on the assessment of the adopted indicators for a set of species belonging to different trophic levels. Considering the availability of data as analysed in section 6.4 of this document, the following species are proposed:

|                                 |                                                                                                                                                       | <b>Pelagic/<br/>Demersal</b> | <b>Province</b>     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------|
| <i>Thunnus thynnus</i>          | High trophic level fish predator                                                                                                                      | Pelagic                      | Neritic/<br>Oceanic |
| <i>Xiphias gladius</i>          | High trophic level fish predator                                                                                                                      | Pelagic                      | Neritic/<br>Oceanic |
| <i>Engraulis encrasicolus</i>   | Planktivorous fish                                                                                                                                    | Pelagic                      | Neritic             |
| <i>Sardina pilchardus</i>       | Planktivorous fish                                                                                                                                    | Pelagic                      | Neritic             |
| <i>Merluccius merluccius</i>    | Predator fish,<br>(lives between 70 and 370 m)                                                                                                        | Demersal                     | Neritic             |
| <i>Mullus barbatus</i>          | Predator Fish (medium trophic level)<br>(Sand and soft bottoms at depths less than 100 m)                                                             | Demersal                     | Neritic             |
| <i>Mullus surmuletus</i>        | Predator Fish (medium trophic level)<br>(Lives on broken and rough grounds but found also on sand and soft bottoms at depths ranging from 5 to 400 m) | Demersal                     | Neritic/            |
| <i>Parapenaeus longirostris</i> | Crustacean                                                                                                                                            | Demersal                     | Oceanic             |
| <i>Scyliorhinus canicula</i>    | Predator fish                                                                                                                                         | Demersal                     | Neritic/<br>Oceanic |
| <i>Nephrops norvegicus</i>      | Crustacean                                                                                                                                            | Demersal                     | Neritic/<br>Oceanic |

Proposed GES description and targets for EO3

| Operational objective                                                                       | Indicator                                                                      | Proposed GES Description                                                                                                                                                                                                                                                                                                                                                                                  | Proposed Targets                                                                             |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>3.1 Level of exploitation by commercial fisheries is within biologically safe limits</b> | 3.1.1 Total catch by operational unit                                          | Total catch does not exceed the Maximum Sustainable Yield (MSY) <sup>12</sup> .<br><br>Remark: If only landings by commercial fleet are considered, the total catch would not reflect all the fish biomass removed from the stock, since IUU and recreational fishing may generate significant taking in some stocks. However data on IUU and recreational fishing are missing for most areas and stocks. | 40% $B_{MSY}$ as provisional limit reference point for small pelagic stocks<br><br>$B_{MSY}$ |
|                                                                                             | 3.1.2 Total effort by operational unit                                         | Total effort does not exceed the level of effort allowing the Maximum Economic Yield (MEY) <sup>13</sup> . It includes the effort deployed by commercial fleet and estimated effort from recreational fishing and IUU operators.                                                                                                                                                                          |                                                                                              |
|                                                                                             | 3.1.3 Catch per unit effort (CPUE) by operational unit                         | Stable or increasing CPUE                                                                                                                                                                                                                                                                                                                                                                                 | Stable or positive trend.                                                                    |
|                                                                                             | 3.1.4 Ratio between catch and biomass index (hereinafter catch/biomass ratio). | The catch/biomass ratio allows to recover the stock or to maintain it at a level where it can produce the Maximum Sustainable Yield (MSY)                                                                                                                                                                                                                                                                 |                                                                                              |
|                                                                                             | 3.1.5 Fishing mortality                                                        | Fishing mortality in the stock does not exceed the level that allows MSY ( $F \leq F_{MSY}$ )                                                                                                                                                                                                                                                                                                             | $F_{MSY}$                                                                                    |
| <b>3.2 The reproductive capacity of stocks is maintained</b>                                | 3.2.1 Age structure determination (where feasible)                             | Age structure of the stocks allows to maintain or to reach the Maximum yield-per-recruit                                                                                                                                                                                                                                                                                                                  | Average size of fish caught > average size at maturity.                                      |
|                                                                                             | 3.2.2 Spawning Stock Biomass (SSB)                                             |                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                              |

<sup>12</sup> MSY: The largest annual catch that may be taken from a stock every year without affecting the catch of future years

<sup>13</sup> MEY= greatest margin of revenue over cost from the resource

## 7. Proposed approaches for GES determination and GES targets with regard to Ecological Objective 4 (Marine food webs)

**Ecological Objective 4:** Alterations to components of marine food webs caused by resource extraction or human-induced environmental changes do not have long-term adverse effects on food web dynamics and related viability.

A healthy marine ecosystem requires a proper functioning of its food web. However, the balance of the food web may be altered by excessive taking of biomass in one or more trophic levels by fishing or through any other form of disturbance. The proposed indicators for both Operational Objectives of Ecological Objective 4 are overlapping with the indicators set for the Ecological Objective 3 (Harvest of commercially exploited fish and shellfish). The Biodiversity and Fisheries Cluster of the ECAP Correspondence Group on GES and targets will be invited give further consideration to the 4 indicators set for EO4 with the view of selecting trophic groups and keys species while ensuring harmonization with EO3 .

### 7.1 Operational Objectives and Indicators

The Operational objectives and the indicators adopted by the Contracting Parties for EO4 are presented in the following table extracted from Decision 20/4.

| Ecological Objective                                                                                                                                                                                | Operational Objectives                                                                                                                                                                   | Indicators                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Alterations to components of marine food webs caused by resource extraction or human-induced environmental changes do not have long-term adverse effects on food web dynamics and related viability | 4.1 Ecosystem dynamics across all trophic levels are maintained at levels capable of ensuring long - term abundance of the species and the retention of their full reproductive capacity | 4.1.1 Production per unit biomass estimates for selected trophic groups and key species, for use in models predicting energy flows in food webs |
|                                                                                                                                                                                                     | 4.2 Normal proportion and abundances of selected species at all trophic levels of the food web are maintained                                                                            | 4.2.1 Proportion of top predators by weight in the food webs                                                                                    |
|                                                                                                                                                                                                     |                                                                                                                                                                                          | 4.2.2 Trends in proportion or abundance of habitat-defining groups                                                                              |
|                                                                                                                                                                                                     |                                                                                                                                                                                          | 4.2.3 Trends in proportion or abundance of taxa with fast turnover rates                                                                        |

Proposed GES description and targets for EO4

| Operational objective                                                                                                                                                                   | Indicator                                                                                                                                       | Proposed GES Description                                                                                                                                                              | Proposed Targets                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1 Ecosystem dynamics across all trophic levels are maintained at levels capable of ensuring long -term abundance of the species and the retention of their full reproductive capacity | 4.1.1 Production per unit biomass estimates for selected trophic groups and key species, for use in models predicting energy flows in food webs | Production per unit biomass allows for levels of energy flows in food webs that sustain the long -term abundance of the species and the retention of their full reproductive capacity | Quantitative targets may be established if baseline information will be available.<br>(Remark: modelling energy flows in food web requires a significant amount of data)   |
|                                                                                                                                                                                         | 4.2.1 Proportion of top predators by weight in the food webs                                                                                    | The ratio of top predator is at level that will not have long-term adverse effects on food web dynamics and related viability                                                         | Threshold may be established if baseline information will be available.                                                                                                    |
|                                                                                                                                                                                         | 4.2.2 Trends in proportion or abundance of habitat-defining groups                                                                              | The population size and density of the habitat-defining species are at levels ensuring the long term maintenance of the ecosystem                                                     | No [human induced] decrease in population abundance and density<br><br>The species shows a positive trends in population abundance and density (for recovering ecosystems) |
|                                                                                                                                                                                         | 4.2.3 Trends in proportion or abundance of taxa with fast turnover rates                                                                        | Taxa with fast turnover rates significantly contribute in maintaining food web dynamics                                                                                               | The partitioning of biomass among trophic levels is adapted to the trophic structure of the ecosystem                                                                      |
| 4.2 Normal proportion and abundances of selected species at all trophic levels of the food web are maintained                                                                           |                                                                                                                                                 |                                                                                                                                                                                       |                                                                                                                                                                            |

## 8. Proposed approaches for GES determination and GES targets with regard to Ecological Objective 6 (Sea-floor integrity)

**Ecological Objective 6:** Sea-floor integrity is maintained, especially in priority benthic habitats.

Many human activities generate physical damages to the sea-floor. These include bottom trawling, towed fishing gear, bottom set nets, dredging activities, sediment disposal, seabed mining, drilling, marine installations, cable and pipeline laying, dumping, anchoring, land reclamation, sand and gravel extraction. Many Mediterranean countries have regulations aimed at controlling such activities. However given the heavy consequences of the impacts they generate, in particular to sensitive habitats and habitats with low recovering capacity, a stricter control should be enforced to minimise the physical alteration to the sea-floor.

### 8.1 Operational Objectives and Indicators

The Operational objectives and the indicators adopted by the Contracting Parties for EO6 are presented in the following table extracted from Decision 20/4.

| Ecological Objective                                                       | Operational Objectives                                                      | Indicators                                                                                  |
|----------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Sea-floor integrity is maintained, especially in priority benthic habitats | 6.1 Extent of physical alteration to the substrate is minimized             | 6.1.1 Distribution of bottom impacting activities                                           |
|                                                                            |                                                                             | 6.1.2 Area of the substrate affected by physical alteration due to the different activities |
|                                                                            | 6.2 Impact of benthic disturbance in priority benthic habitats is minimized | 6.2.1 Impact of bottom impacting activities <sup>12</sup> in priority benthic habitats      |
|                                                                            |                                                                             | 6.2.2 Change in distribution and abundance of indicator species in priority habitats        |

### 8.2 Benthic habitats to be considered:

The priority habitats to be considered for the determination of GES in relation to Ecological Objective 6 are coastal lagoons and marshes, intertidal areas, seagrass meadows, coralligenous communities, sea mounts, submarine canyons and slopes, deep-water coral, hydrothermal vents and the marine vegetal assemblages listed as natural monuments by the Marine Vegetation Action Plan<sup>14</sup> (Barrier reefs of *Posidonia*, organogenic surface formations, terraces (platforms with vermitids covered by soft algae) and certain *Cystoseira* belts).

### 8.3 Geographical scale:

The assessments for the determination of GES and targets in relation to the Ecological Objectives 6 (Sea-floor integrity) will be made at national level. National inventories of the priority habitats listed in the above section 8.2.

<sup>14</sup> The Action Plan for the conservation of marine vegetation in the Mediterranean Sea has been adopted by the Eleventh Ordinary meeting of the Contracting Parties to the Barcelona Convention and its Protocols (Malta, 27-30 October 1999).

#### 8.4 Sources and availability of data:

Considering that most of the indicators set for the two Operational Objectives of Ecological Objective 6 are pressure oriented, data for the required assessments are available in many countries at least for the declared activities. However baseline information is available only for very limited zones.

#### 8.5 Determination of GES and targets

##### Proposed GES description and targets for EO6

| Operational objective                                                              | Indicator                                                                                   | Proposed GES Description                                                                                                        | Proposed Targets                                                                                                                                                                        |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>6.1 Extent of physical alteration to the substrate is minimized</b>             | 6.1.1 Distribution of bottom impacting activities                                           | Limited distribution of bottom impacting activities                                                                             | All bottom impacting activities regulated and subject to Environmental Impact Assessment                                                                                                |
|                                                                                    | 6.1.2 Area of the substrate affected by physical alteration due to the different activities | Limited surface area of the substrate affected by bottom impacting activities                                                   | Threshold may be established if baseline information will be available.                                                                                                                 |
| <b>6.2 Impact of benthic disturbance in priority benthic habitats is minimized</b> | 6.2.1 Impact of bottom impacting activities in priority benthic habitats                    | Impact of bottom impacting activities on priority benthic habitats is minimized                                                 | No priority benthic habitat impacted by bottom impacting activities                                                                                                                     |
|                                                                                    | 6.2.2 Change in distribution and abundance of indicator species in priority habitats        | The population size and density of the habitat-defining species are at levels ensuring the long term maintenance of the Habitat | <b>Sate</b><br>No [human induced] decrease in population abundance and density<br><br>The species shows a positive trends in population abundance and density (for recovering habitats) |





## Annex 1

1. **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.
2. **Non-indigenous species** introduced by human activities are at levels that **do not adversely alter the ecosystem**.
3. **Populations of selected commercially exploited fish and shellfish are within biologically safe limits**, exhibiting a population age and size distribution that is indicative of a healthy stock.
4. **Alterations to components of marine food webs** caused by resource extraction or human-induced environmental changes **do not have long-term adverse effects** on food web dynamics and related viability.
5. **Human-induced eutrophication is prevented**, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms, and oxygen deficiency in bottom waters.
6. **Sea-floor integrity is maintained**, especially in priority benthic habitats.
7. **Alteration of hydrographic conditions does not adversely affect coastal and marine ecosystems**.
8. The **natural dynamics of coastal areas are maintained** and **coastal ecosystems and landscapes are preserved**.
9. **Contaminants cause no significant impact** on coastal and marine ecosystems and human health.
10. **Marine and coastal litter does not adversely affect coastal and marine environments**.
11. **Noise from human activities causes no significant impact on marine and coastal ecosystems**.

## **Annex 2: List of the main documents consulted**

Anonymous, 2012 - UK Initial Assessment and Proposals for Good Environmental Status published by Defra for HM Government

Cochrane S.K.J., D.W. Connor, P. Nilsson, I. Mitchell, J. Reker, J. Franco, V. Valavanis, S. Moncheva, J. Ekebom, K. Nygaard, R. Serrão Santos, I. Narberhaus, T. Packeiser, W. van de Bund & A.C. Cardoso. 2010 MARINE STRATEGY FRAMEWORK DIRECTIVE Task Group 1 Report Biological diversity, JRC Scientific and Technical Report.

European Union, 2011 - The EU Biodiversity Strategy to 2020  
ISBN 978-92-79-20762-4

FAO/GFCM 2012 - Report of the thirty-sixth session.(Marrakech, Morocco, 14–19 May 2012). GFCM Report. No. 36. Rome, FAO. 2012. 71 pp.

FAO/GFCM 2012 - Report of the Fourteenth Session of the Scientific Advisory Committee. (Sofia, Bulgaria, 20–24 February 2012), FAO Fisheries and Aquaculture Report No. 1001. Rome, FAO. 2012. 200 pp.

FAO/GFCM 2011 - Report of the Thirteenth Session of the Scientific Advisory Committee. (Marseille, France, 7–11 February 2011), FAO Fisheries and Aquaculture Report No. 974. Rome, FAO. 2011. p.254.

GFCM E-Clossary available at <http://151.1.161.77/eGlossary/>

Laurent Guérin, Éric Feunteun, Morgane Lejart, Héloïse You, Charles Gonson, Sandrine Laurand et Nicolas Lavesque, 2012 Méthodes d'évaluation de l'état écologique, caractérisation du « bon état » pour la DCSMM et recommandations pour les travaux futures. Rapport de synthèse de l'exercice 2011.

OSPAR 2012 - MSFD Advice Manual and Background Document on Biodiversity A living document - Version 3.2 of 5 March 2012 Approaches to determining good environmental status, setting of environmental targets and selecting indicators for Marine Strategy Framework Directive descriptors 1, 2, 4 and 6

Piha H. and Zampoukas N. 2011. Review of Methodological Standards Related to the Marine Strategy Framework Directive Criteria on Good Environmental Status. JRC Scientific and Technical Report.

UNEP/MAP 2012 - Approaches for definition of GES and setting Targets for the "Pollution" related Ecological Objectives in the framework of the Ecosystem Approach (EO5: Eutrophication, EO9: Contaminants, EO10: Marine Litter, EO11: Noise). UNEP(DEPI)/MED WG.372/3.

UNEP/MAP 2012 Methodologies for setting targets relating to Ecological Objectives, to further the ecosystem approach in the Mediterranean Sea. UNEP(DEPI)/MED WG.369/3

UNEP/MAP 2012 Report of the First Meeting of Ecosystem Approach (EcAp) Coordination Group (Athens, Greece, 29-30 May 2012). UNEP(DEPI)/MED WG.369/6.

## Annex 3

### Reference List of Marine Habitat Types for the Selection of Sites to be included in the National Inventories of Natural Sites of Conservation Interest

#### I. SUPRALITTORAL

##### I.2. SANDS

###### I.2.1. Biocenosis of supralittoral sands

- \*I.2.1.5. Facies of phanerogams which have been washed ashore (upper part)

#### II. MEDIOLITTORAL

##### II.1. MUDS, SANDY MUDS AND SANDS

###### II.1.1. Biocenosis of muddy sands and muds

- \*II.1.1.1. Association with halophytes

- \*II.1.1.2. Facies of saltworks

##### II.3. STONES AND PEBBLES

###### II. 3.1. Biocenosis of mediolittoral coarse detritic bottoms

- \*II.3.1.1. Facies of banks of dead leaves of *P. oceanica* and other phanerogams

##### II.4. HARD BEDS AND ROCKS

###### II. 4.1. Biocenosis of the upper mediolittoral rock

- \*II. 4. 1. 3. Association with *Nemalion helminthoides* and *Rissoella verruculosa*

- \*II. 4. 1. 4. Association with *Lithophyllum papillosum* and *Polysiphonia* spp.

###### II. 4. 2. Biocenosis of the lower mediolittoral rock

- \*II. 4. 2. 1. Association with *Lithophyllum lichenoides* (= entablature with *L. tortuosum*)

- \*II. 4. 2. 5. Facies with *Pollicipes cornucopiae*

- \*II. 4. 2. 7. Association with *Fucus virsoides*

- \*II. 4. 2. 8. *Neogoniolithon brassica-florida* concretion

- \*II. 4.2.10. Pools and lagoons sometimes associated with vermetids (infralittoral enclave)

###### II. 4. 3. Mediollittoral caves

- \*II. 4. 3. 1. Association with *Phymatolithon lenormandii* and *Hildenbrandia rubra*

#### III. INFRALITTORAL

##### III.1. SANDY MUDS, SANDS, GRAVELS AND ROCKS IN EURYHALINE AND EURYTHERMAL ENVIRONMENT

###### III.1.1. Euryhaline and eurythermal biocenosis

- \*III.1.1.1. Association with *Ruppia cirrhosa* and/or *Ruppia maritima*

- \*III.1.1.3. Association with *Potamogeton pectinatus*

- \*III.1.1.4. Association with *Zostera noltii* in euryhaline and eurythermal environment

- \*III.1.1.5. Association with *Zostera marina* in euryhaline and eurythermal environment

- \*III.1.1.8. Association with *Halopithys incurva*

##### III. 2. FINE SANDS WITH MORE OR LESS MUD

###### III. 2. 2. Biocenosis of well sorted fine sands

- \*III. 2. 2. 2. Association with *Halophila stipulacea*

###### III. 2. 3. Biocenosis of superficial muddy sands in sheltered waters

- \*III.2.3.3. Facies with *Loripes lacteus*, *Tapes* spp.

- \*III.2.3.5. Association with *Zostera noltii* on superficial muddy sands in sheltered waters

- \*III.2.3.7. Facies of hydrothermal oozes with *Cyclope neritea* and nematodes

### III.3. COARSE SANDS WITH MORE OR LESS MUD

III. 3. 1. Biocenosis of coarse sands and fine gravels mixed by the waves

\*III. 3. 1. 1. Association with rhodolithes

III. 3. 2. Biocenosis of coarse sands and fine gravels under the influence of bottom currents (also found in the Circalittoral)

\*III. 3. 2. 1. Maërl facies (= Association with Lithothamnion corallioides and Phymatolithon calcareum) (can also be found as facies of the biocenosis of coastal detritic).

\*III. 3. 2. 2. Association with rhodolithes

### III.5. POSIDONIA OCEANICA MEADOWS

\*III. 5. 1. Posidonia oceanica meadows (= Association with Posidonia oceanica)

\*III.5.1.1. Ecomorphosis of striped meadows

\*III.5.1.2. Ecomorphosis of "barrier-reef" meadows

### III.6. HARD BEDS AND ROCKS

III.6.1. Biocenosis of infralittoral algae

\*III. 6.1.2. Association with Cystoseira amentacea ( var. amentacea, var. stricta, var. spicata)

\*III.6.1.3. Facies with Vermetids

\*III.6.1.10. Association with Cystoseira tamariscifolia and Saccorhiza polyschides

\*III.6.1.14. Facies with Cladocora caespitosa

\*III.6.1.15. Association with Cystoseira brachycarpa

\*III.6.1.16. Association with Cystoseira crinita

\*III.6.1.17. Association with Cystoseira crinitophylla

\*III.6.1.18. Association with Cystoseira sauvageauana

\*III.6.1.19. Association with Cystoseira spinosa

\*III.6.1.20. Association with Sargassum vulgare

\*III.6.1.25. Association with Cystoseira compressa

\*III.6.1.35. Facies and Associations of Coralligenous biocenosis (in enclave)

## IV. CIRCALITTORAL

### IV. 2. SANDS

IV. 2. 2. Biocenosis of the coastal detritic bottom

\*IV. 2. 2. 7. Association with Laminaria rodriguezii on detritic

\*IV. 2. 2. 10. Facies with large Bryozoa

### IV. 3. HARD BEDS AND ROCKS

\*IV. 3. 1. Coralligenous biocenosis

\*IV. 3. 1. 1. Association with Cystoseira zosteroides

\*IV. 3. 1. 2. Association with Cystoseira usneoides

\*IV. 3. 1. 3. Association with Cystoseira dubia

\*IV. 3. 1. 4. Association with Cystoseira corniculata

\*IV. 3. 1. 5. Association with Sargassum spp. (indigenous)

\*IV. 3. 1. 8. Association with Laminaria ochroleuca

\*IV.3.1.9. Association with Rodriguezella strafforelli

\*IV.3.1.10. Facies with Eunicella cavolinii

\*IV.3.1.11. Facies with Eunicella singularis

\*IV.3.1.12. Facies with Lophogorgia sarmentosa

\*IV.3.1.13. Facies with Paramuricea clavata

\*IV.3.1.15. Coralligenous platforms

\*IV.3. 2. Semi-dark caves (also in enclave in upper stages)

\*IV.3.2.2. Facies with Corallium rubrum

## **V. BATHYAL**

### **V. 1. MUDS**

#### **V. 1. 1. Biocenosis of bathyal muds**

\*V.1.1.3. Facies of soft muds with *Funiculina quadrangularis* and *Apporhais seressianus*

\*V.1.1.4. Facies of compact muds with *Isidella elongata*

### **V. 3. HARD BEDS AND ROCKS**

\*V.3.1. Biocenosis of deep sea corals

\*V.3.2. Caves and ducts in total darkness (in eclave in the upper stages)