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Athens, Greece, 9-10 October 2014

GFCM proposal on common indicators related to EO3 (Fisheries)

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**GENERAL FISHERIES COMMISSION
FOR THE MEDITERRANEAN
COMMISSION GÉNÉRALE DES PÊCHES
POUR LA MÉDITERRANÉE**



Proposal on the definition of Good Environmental Status and associated indicators and targets related to EO3: “*Harvest of commercially exploited fish and shellfish populations*” and additional EOs

**CONTRIBUTION OF GFCM TO THE EcAp PROCESS WITHIN THE EXISTING
MEMORANDUM OF UNDERSTANDING
BETWEEN UNEP/MAP AND GFCM**

4th Meeting of the EcAP Coordination Group (Athens, 9-10th October 2014)

INTRODUCTION

Within the framework of the Memorandum of Understanding signed with UNEP-Map in 2012, and supported by the FWP¹ project *Medsuit: A Mediterranean Cooperation for the Sustainable Use of Marine Biological Resources* funded by the Italian Ministry of Environment and, an ongoing work on harmonizing the definition and assessment of good environmental status for marine living resources has been carried out by the GFCM Secretariat in the period of December 2013 – September 2014.

As a first result of this work, a technical proposal for the identification of operational objectives, indicators, Good Environmental Status (GES) and targets for Ecological Objective 3 (Harvest of commercially exploited fish and shellfish) within the UNEP-MAP Ecosystem Approach Process (EcAP) was prepared by the GFCM Secretariat. This proposal partially contributes as well to Ecological Objective 1 (Biodiversity) and Ecological Objective 4 (Food webs). The proposal took into account initial drafts discussed through the EcAP, and especially the work done by the different GFCM technical bodies, including the work by the Scientific Advisory Committee (SAC) and in particular in the Subcommittee of Stock Assessment, the GFCM Guidelines for multiannual management plans², and the technical aspects on indicators and reference points discussed during the Framework Programme meetings on management plans³. An initial draft of this document was presented in the UNEP-Map Integrated Correspondence Groups of GES and Targets meeting (Athens, Greece, 17-19 February 2014), further revised by the SAC in March 2014 and later revised d by the Correspondence Group on Monitoring, Biodiversity and Fisheries in Ankara, Turkey 25-27

¹ GFCM Framework Program (FWP): a multiannual/multidonor funding mechanism aiming at supporting the GFCM to promote sustainable development through fisheries and aquaculture for the period 2013-2018

² These guidelines are referred to as Resolution OTH-GFCM/36/2012/1 in the Compendium of GFCM decisions

³ Framework Programme Sub-Regional Workshop on Fisheries Management for Western, Central and Eastern Mediterranean (Tunisia, 7–10 October 2013) and Workshop to test the feasibility of implementing multiannual management plans in the Black Sea (Turkey, 24–25 February 2014)

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June 2014. This document is a revised version including the comments received and the developments occurred within the GFCM Data Collection Reference Framework (DCRF).

SUGGESTED ACTIONS BY THE SAC (March 2014)

SAC participants agreed that those indicators not routinely assessed during the Working Groups of Stock Assessment, as well as the requirements to obtain them, should be further analyzed by the SAC and its subcommittees and working groups, and that a special agenda item on this issue should be included in the relevant subcommittees during the next intersessional period (2015) to ensure that the GFCM members emit their opinion, in view of the next Session of the Commission (May 2015) in the most informed way.

This document is an updated draft of the proposal presented to the 2014 SAC, with additional information emanating from the work done by the GFCM Secretariat, based on the indications provided by the SAC and the 38th GFCM Session. The document is submitted for the comments of the participants of the 4th Meeting of the EcAP Coordination Group (Athens, 9-10th October 2014). A consolidated draft including the comments received during the present Working Group will be submitted for the consideration of the GFCM Subcommittees and the 17th Session of the SAC (March, 2015), which will provide the official view of the GFCM on this Ecological Objective and the indicators proposed.

In addition to these steps for the integration of the GFCM proposal into the EcAP process, further steps of the **MedSuit project** during 2014-2015 include:

- the consideration of outcomes of parallel meetings of other organisations dealing with GES in the region (*i.e.*: ICES)
- a regional workshop/meeting on GES and targets, to be held next November 2014
- the possibility to launch a case study at sub-regional level (possibly in the Adriatic Sea).

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

1. Operational Objectives and Indicators

To inform about the Ecological Objective for commercially exploited fish and shellfish populations, three operational objectives have been included with the aim to collect information from commercial species directly related with fishing, but also from non-commercial species and vulnerable species, directly related with biodiversity and food web issues. These ecological objectives are defined to assess the stock status but also the health of the stocks as a whole and the impact of fishing on the community and the ecosystem with the aim to ensure the long term sustainability of fishing with a low impact on marine species, communities and ecosystems. Thus, the indicators are applied to populations (exploited), to communities (including both exploited and non-exploited species) and to the ecosystem as a whole, capturing the different levels of biodiversity organization (see Table 4).

In the present document, indicators are identified as **common** indicators when their estimation is currently possible at Mediterranean level, thanks to the work undertaken regularly by GFCM. Although not all Mediterranean sub-regions are evenly covered yet, efforts are being put to expand the geographical coverage to the whole region, and the information expected to be available is enough to be able to estimate the indicator at Mediterranean level. In addition, other indicators are identified as **candidate** indicators meaning that those will be calculated only after the required data is available, which is expected to happen after the full implementation of the GFCM-DCRF, not expected before 2016. The list of Indicators within each of the three operational Objectives of EO3 with their description and prospective for monitoring are presented in table 1.

Table 1. Operational objectives, indicators, targets and prospective for monitoring

Operational objective	Indicator	Proposed GES Description	Proposed Targets	Prospective for monitoring
3.1 Level of exploitation by commercial fisheries allows populations to be within biological safe limits	3.1.1. Total Official Landings (TOL) and Total Catch (TC)	<p>Total catch (or total official landings) of commercial species does not exceed the Maximum Sustainable Yield (MSY).</p> <p><i>Description:</i> <i>The total catch is the quantity of fish which is retained by the fishing gear during fishing operations. This should ideally include official landings by commercial fleet, recreational fishing, by catch and IUU estimates. The Maximum Sustainable Yield is the theoretical maximum catch that can be extracted from a stock. Due to difficulties to calculate MSY, this should be a limit. This indicator is linked with sustainable fishing and conservation of biodiversity.</i></p>	<p>Pressure: -Long-Term High Yields -TC < MSY As a proxy TOL < MSY</p>	<p>Total Official Landings (TOL) is a common indicator which is already available from the GFCM.</p> <p>Total Catch (TC) is a candidate indicator to be available after implementation of the GFCM-DCRF.</p>
	3.1.2 .Fishing mortality (F)	<p>Fishing mortality in the stock does not exceed the level that allows MSY ($F \leq F_{MSY}$).</p> <p><i>Description:</i> <i>The Maximum Sustainable Yield is, theoretically, the maximum yield that can be obtained from a species, and it is associated with a maximum fishing mortality (F_{MSY}). When F is higher than F_{MSY} the yield decreases. F_{MSY} is considered as a limit due to the consequences of overestimating F. Only available if the stock has been assessed. Fishing mortality (F) reflects all deaths in the stock that are due to fishing per year (not only what is actually landed). It is</i></p>	<p>Pressure: -F_{MSY} -$F_{0.1}$ a proxy of F_{MSY} (more precautionary)</p>	<p>Fishing mortality (F) is a common indicator which is already available from the GFCM for exploited species with valid formal assessments (priority species of Group I, see table 2).</p>

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Operational objective	Indicator	Proposed GES Description	Proposed Targets	Prospective for monitoring
		<i>usually expressed as a rate ranging from 0 (for no fishing) to high values (1.0 or more). This indicator is linked with sustainable fishing.</i>		
	3.1.3. Biomass index (B)	<p>Stable or increasing biomass indices (relative or absolute), with absolute value at or above biomass that produces MSY.</p> <p><i>Description:</i> <i>Biomass indices can be calculated when scientific surveys (trawling, acoustics, etc.) or stock assessments are available. Different targets can be used, such as acceptable stock size, safe biological limits, historical level of Catch per unit of effort (CPUE), Trend of CPUE increasing per year, historical level of standardized index of abundance from scientific surveys. This indicator is linked with sustainable fishing and conservation of biodiversity.</i></p>	<p>State</p> <ul style="list-style-type: none"> -Positive trend -Biomass at MSY (Bmsy) (when MSY available) 	Biomass index (B) is a candidate indicator that will be available from the GFCM after implementation of the GFCM-DCRF for commercial and non-commercial species derived from surveys at sea.
	3.1.4. Ratio between catch and biomass index (C/B ratio)	<p>The catch/biomass ratio allows to recover the stock or to maintain it at a level where it can produce the MSY</p> <p><i>Description:</i> <i>The Catch/Biomass ratio should entail a low risk of collapse of the species, and a high probability of recovery of the stock. If the species is at risk, it should entail a low time frame of recovery. This indicator is linked with sustainable fishing.</i></p>	<p>Pressure</p> <ul style="list-style-type: none"> - Negative trend 	Catch/biomass ratio (C/B) is a candidate indicator that will be available from the GFCM after implementation of the GFCM-DCRF for commercial species.

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Operational objective	Indicator	Proposed GES Description	Proposed Targets	Prospective for monitoring
	3.1.5. Spatial distribution (SD) of the population	<p>The spatial distribution of the population is maintained or increases.</p> <p><i>Description:</i> It is important to know the spatial distribution of species: Species with wider distributions are less vulnerable to fishing. This indicator is linked with sustainable fishing and conservation of biodiversity.</p>	<p>State</p> <p>- Positive trend</p>	<p>The Spatial Distribution (<i>SD</i>) of the population is a candidate indicator that will be available from the GFCM for species with surveyed data after implementation of the GFCM-DCRF.</p>
	3.1.6. Proportion of the stocks sustainably fished (SS)	<p>The amount of sustainably fished stocks is maintained or increases</p> <p><i>Description:</i> This indicator can be calculated when stock assessments are available for more than one commercial species. It is expressed as a proportion of all sustainable stocks over the total amount of stocks assessed. As such, it is highly dependent on the amount of stocks that are assessed.</p>	<p>State</p> <p>- Positive trend</p>	<p>The proportion of the Stocks Sustainably fished (<i>SS</i>) is a common indicator which is already available from the <i>GFCM</i> for exploited species with valid formal assessments, priority species of Group I (see table 2). GFCM is making efforts to increase the number of stocks assessed yearly.</p>
3.2 The reproductive capacity of stocks is maintained	3.2.1. Mean Length of the population in the catch (mLc) and in the surveyed community (mLsc)	<p>The mean length of the population in the catch (<i>mLc</i>) is larger than the mean size at first maturity (<i>Lm</i>)</p> <p><i>Description:</i> This indicator reflects the extent of undesirable genetic effects of exploitation in commercial populations. To calculate this indicator, the mean size at first maturity is needed by species in the catch, in addition to the size of species in the catch. It can also be used to compare it with the minimum conservation size (for example, to protect juveniles with minimum sizes).</p>	<p>Pressure</p> <p>- $mL > Lm$</p>	<p>The mean Length of the population in the catch (<i>mLc</i>) and in the surveyed community (<i>mLsc</i>) are both candidate indicators in the future after implementation of the GFCM-DCRF including commercial and non-commercial species.</p>

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Operational objective	Indicator	Proposed GES Description	Proposed Targets	Prospective for monitoring
	<p>3.2.2. Spawning Stock Biomass (SSB)</p>	<p>The Spawning Stock Biomass is at a level at which reproduction capacity is not impaired</p> <p><i>Description:</i></p> <p><i>The Spawning Stock Biomass, usually referred to as SSB, is the total weight of the spawning stock. The SSB is available through stock assessment. When both 3.1.3 and 3.2.3 indicators are available (only for few species) the most precautionary will be adopted. Only available if the stock has been assessed. This indicator is linked with sustainable fishing.</i></p>	<p>State</p> <p>-SSB > SSB_{thr} (2xSSB_{lim})</p>	<p>The Spawning Stock Biomass (SSB) is a common indicator regularly monitored by GFCM for priority species of Group I (see table 2).</p>

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Operational objective	Indicator	Proposed GES Description	Proposed Targets	Prospective for monitoring
3.3. The impact of fishing activities in the ecosystem is low	3.3.1. <i>Mean Trophic Level of the catch (TLc) and of the surveyed community (TLsc)</i>	<p>The Mean Trophic Level does not decrease with time</p> <p><i>Description:</i> <i>These indicators are being used by the CBD and other programs. To calculate these indicators, time series of catch per species or biomass (tones) and trophic level of the species are needed. In addition, the Marine Trophic Index (MTI), which is the TLc with a threshold of trophic levels ≥ 3.25 can be also derived from the two previous ones. The trophic level per species can be obtained from FishBase, SeaLifeBase, or regional datasets and models. They include commercial target and not target species if calculated from the catch, in addition to non-commercial species when calculated from surveys. These indicators are linked with sustainable fishing and conservation of biodiversity.</i></p>	State -Positive trend	The mean Trophic Level of the catch (TLc) and the mean Trophic Level of the surveyed community (TLsc) are both candidate indicators that will be available in the future after implementation of the GFCM-DCRF.
	3.3.2. <i>Proportion of Large Fish in the catch (LFc) and in the surveyed community (LFsc)</i>	<p>The proportion of large fish is maintained or increases with time</p> <p><i>Description:</i> <i>The large fish indicator (LF) reflects the size structure of the fish assemblage, which is assumed to be primarily affected by size-selective exploitation but is mediated by species composition as well as the fishing-induced reduction of life expectancy of each exploited species. The $LF = W_{LargeFish} / W_{total}$, where $W_{LargeFish}$ is the weight of fish greater than a chosen length (cm) and W_{total} is the total</i></p>	State -Positive trend	LFc and LFsc are both candidate indicators in the future after implementation of the GFCM-DCRF for commercial species (and non-commercial if surveys data are available)

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Operational objective	Indicator	Proposed GES Description	Proposed Targets	Prospective for monitoring
		<i>weight of all fish in the catch or survey. For the Mediterranean Sea the definition of “Large Fish” has been established at a threshold of 20 and 30 cm by the GFCM. This indicator can be calculated from the catch and from surveys (if data is available). It includes commercial target and not target species if calculated from the catch, in addition to non-commercial species when calculated from surveys. This indicator is linked with sustainable fishing and conservation of biodiversity.</i>		
	3.3.3. Proportion of exploited species with DEclining Biomass in the population (DEB)	<p>The proportion of species with declining biomass in the population is reduced with time</p> <p><i>Description: This indicator is based on data from 3.1.3 (Biomass indices) and will be only calculated when time series of survey biomass of retained species is available. It includes commercial target and non-target species. This indicator is linked with sustainable fishing and conservation of biodiversity.</i></p>	Pressure -Negative trend	The proportion of exploited species with Declining Biomass (DEB) in the population is a candidate indicator to be available after implementation of the GFCM-DCRF for commercial species.

Definitions from the table:

MSY: The largest annual catch that may be taken from a stock every year without affecting the catch of future years.

IUU: Illegal, unreported and unregulated fishing

Surveyed species (Definition from IndiSeas project, adapted for the Mediterranean): These are species sampled by researchers during scientific surveys (as opposed to species sampled in catches by fishing vessels) of the community, and should include fisheries targeted and non-targeted species of demersal and pelagic fish (bony and cartilaginous, small and large), as well as commercially important invertebrates (squids, crabs, shrimps...). Intertidal and subtidal crustaceans and molluscs such as abalones and mussels, mammalian and avian top predators, and turtles, should be excluded. Surveyed species are those that are considered by default in the calculation of all survey-based indicators.

Retained species (Definition from IndiSeas project, adapted for the Mediterranean): These are species caught in fishing operations, although not necessarily targeted by a fishery (i.e. include by-catch species), and which are retained because they are of commercial interest, i.e. not discarded once caught, although this does not imply that sometimes certain size classes of that species may be discarded. A non-retained species is considered to be one that would never be retained for consumptive purposes. Intertidal and subtidal crustaceans and molluscs such as abalones and mussels are to be excluded. Retained species are those that are considered by default in the calculation of all catch-based indicators.

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1.1 Species to be considered: Groups of priority species identified by GFCM

Table 2. Priority species

Group I	Group II		Group III	
<i>Engraulis encrasicolus</i>	<i>Alosa pontica</i>	<i>Sprattus sprattus</i>	<i>Alopias superciliosus</i>	<i>Siganus rivulatus</i>
<i>Merluccius merluccius</i>	<i>Aristaeomorpha foliacea</i>	<i>Squilla mantis</i>	<i>Alopias vulpinus</i>	<i>Lagocephalus sceleratus</i>
<i>Mullus barbatus</i>	<i>Aristeus antennatus</i>	<i>Trachurus mediterraneus</i>	<i>Carcharhinus plumbeus</i>	<i>Saurida undosquamis</i>
<i>Mullus surmuletus</i>	<i>Boops boops</i>	<i>Trachurus picturatus</i>	<i>Centrophorus granulosus</i>	<i>Marsupenaeus japonicus</i>
<i>Nephrops norvegicus</i>	<i>Chamelea gallina</i>	<i>Trachurus trachurus</i>	<i>Dalatias licha</i>	<i>Scomberomorus commerson</i>
<i>Parapenaeus longirostris</i>	<i>Coryphaena hippurus</i>		<i>Dipturus oxyrhincus</i>	<i>Fistularia commersonii</i>
<i>Psetta maxima</i>	<i>Diplodus annularis</i>		<i>Etmopterus spinax</i>	<i>Metapenaeus stebbingi</i>
<i>Sardina pilchardus</i>	<i>Eledone cirrhosa</i>		<i>Galeus melastomus</i>	
<i>Sprattus sprattus</i>	<i>Eledone moschata</i>		<i>Heptranchias perlo</i>	
<i>Squalus acanthias</i>	<i>Galeus melastomus</i>		<i>Hexanchus griseus</i>	
<i>Trachurus mediterraneus</i>	<i>Illex coindetii</i>		<i>Mustelus asterias</i>	
	<i>Lophius budegassa</i>		<i>Mustelus mustelus</i>	
	<i>Merlangius merlangius</i>		<i>Mustelus punctulatus</i>	
	<i>Micromesistius poutassou</i>		<i>Myliobatis aquila</i>	
	<i>Octopus vulgaris</i>		<i>Prionace glauca</i>	
	<i>Pagellus bogaraveo</i>		<i>Pteroplatytrygon violacea</i>	
	<i>Pagellus erythrinus</i>		<i>Raja asterias</i>	
	<i>Psetta maxima</i>		<i>Raja clavata</i>	
	<i>Raja asterias</i>		<i>Raja miraletus</i>	
	<i>Raja clavata</i>		<i>Raja undulata</i>	
	<i>Sardinella aurita</i>		<i>Scyliorhinus canicula</i>	
	<i>Scomber japonicus</i>		<i>Scyliorhinus stellaris</i>	
	<i>Scomber scombrus</i>		<i>Sphyrna tudes</i>	
	<i>Sepia officinalis</i>		<i>Squalus acanthias</i>	
	<i>Solea vulgaris</i>		<i>Squalus blainvillei</i>	
	<i>Sphyrna sphyraena</i>		<i>Torpedo marmorata</i>	

Table 3. Vulnerable species

Group of vulnerable species	Family	Species	Common name
Cetaceans	Balaenopteridae	<i>Balaenoptera acutorostrata</i>	Common minke whale
		<i>Balaenoptera borealis</i>	Sei whale
		<i>Balaenoptera physalus</i>	Fin whale
		<i>Megaptera novaeangliae</i>	Humpback whale
	Balenidae	<i>Eubalaena glacialis</i>	North Atlantic right whale
	Physeteridae	<i>Physeter macrocephalus</i>	Sperm whale
		<i>Kogia simus</i>	Dwarf Sperm Whale
	Phocoenidae	<i>Phocoena phocoena</i>	Harbor porpoise
	Delphinidae	<i>Steno bredanensis</i>	Rough-toothed dolphin
		<i>Grampus griseus</i>	Risso's dolphin
		<i>Tursiops truncatus</i>	Common bottlenose dolphin
		<i>Stenella coeruleoalba</i>	Striped dolphin
		<i>Delphinus delphis</i>	Common dolphin
		<i>Pseudorca crassidens</i>	False killer whale
		<i>Globicephala melas</i>	Long-finned pilot whale
		<i>Orcinus orca</i>	Killer whale
Ziphiidae	<i>Ziphius cavirostris</i>	Cuvier's beaked whale	
	<i>Mesoplodon densirostris</i>	Blainville's beaked whale	
Seals	Phocidae	<i>Monachus monachus</i>	Mediterranean monk seal
Sharks, Rays, Chimaeras*	Carcharhinidae	<i>Carcharias taurus</i>	Sand tiger
		<i>Carcharodon carcharias</i>	Great white shark
		<i>Prionace glauca</i>	Blue shark
	Cetorhinidae	<i>Cetorhinus maximus</i>	Basking shark
	Gymnuridae	<i>Gymnura altavela</i>	Spiny butterfly ray
	Lamnidae	<i>Isurus oxyrinchus</i>	Shortfin mako
<i>Lamna nasus</i>		Porbeagle	

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Group of vulnerable species	Family	Species	Common name
Sharks, Rays, Chimaeras	Myliobatidae	<i>Mobula mobular</i>	Devil fish
	Odontaspidae	<i>Odontaspis ferox</i>	Small-tooth sand tiger shark
	Oxynotidae	<i>Oxynotus centrina</i>	Angular rough shark
	Pristidae	<i>Pristis pectinata</i>	Smalltooth Sawfish
		<i>Pristis pristis</i>	Common sawfish
	Rajidae	<i>Dipturus batis</i>	Common skate
		<i>Leucoraja circularis</i>	Sandy ray
		<i>Leucoraja melitensis</i>	Maltese skate
		<i>Rostroraja alba</i>	Bottlenose skate
	Rhinobatidae	<i>Rhinobatos cemiculus</i>	Blackchin guitarfish
		<i>Rhinobatos rhinobatos</i>	Common guitarfish
	Sphyrnidae	<i>Sphyrna lewini</i>	Scalloped hammerhead
		<i>Sphyrna mokarran</i>	Great hammerhead
		<i>Sphyrna zygaena</i>	Smooth hammerhead
Squatinaidae	<i>Squatina aculeata</i>	Sawback angel shark	
	<i>Squatina oculata</i>	Smoothback angel shark	
	<i>Squatina squatina</i>	Angel shark	
Triakidae	<i>Galeorhinus galeus</i>	School/Tope shark	
Sea Turtles	Cheloniidae	<i>Caretta caretta</i>	Loggerhead turtle
		<i>Chelonia mydas</i>	Green turtle
	Dermochelyidae	<i>Dermochelys coriacea</i>	Leatherback sea turtle
Seabirds	Falconidae	<i>Falco eleonora</i>	Eleonora's Falcon
	Cerylidae	<i>Ceryle rudis</i>	Pied Kingfisher
	Charadriidae	<i>Charadrius alexandrinus</i>	Kentish Plover
		<i>Charadrius leschenaultii columbinus</i>	Greater Sand Plover
	Halcyonidae	<i>Halcyon smyrnensis</i>	White-throated Kingfisher
	Hydrobatidae	<i>Hydrobates pelagicus</i>	European Storm-Petrel
		<i>Hydrobates pelagicus melitensis</i>	European Storm-Petrel
		<i>Hydrobates pelagicus pelagicus</i>	European Storm-Petrel
	Laridae	<i>Larus audouinii</i>	Audouin's Gull
<i>Larus armenicus</i>		Armenian Gull	

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Group of vulnerable species	Family	Species	Common name
Sea birds		<i>Larus genei</i>	Slender-billed Gull
		<i>Larus melanocephalus</i>	Mediterranean Gull
	Pandionidae	<i>Pandion haliaetus</i>	Osprey
	Pelecanidae	<i>Pelecanus crispus</i>	Dalmatian Pelican
		<i>Pelecanus onocrotalus</i>	Great White Pelican
	Phalacrocoracidae	<i>Phalacrocorax aristotelis</i>	European Shag
		<i>Phalacrocorax pygmaeus</i>	Pygmy Cormorant
	Phoenicopteridae	<i>Phoenicopterus ruber</i>	American Flamingo
	Procellariidae	<i>Calonectris diomedea</i>	Cory's Shearwater
		<i>Puffinus puffinus yelkouan</i>	Yelkouan Shearwater
		<i>Puffinus yelkouan</i>	Mediterranean Shearwater
		<i>Puffinus muretanicus</i>	Balearic Shearwater
	Scolopacidae	<i>Numenius tenuirostris</i>	Slender-billed Curlew
	Sternidae	<i>Sterna albifrons</i>	Little Tern
		<i>Sterna bengalensis</i>	Lesser Crested Tern
<i>Sterna sandvicensis</i>		Sandwich Tern	
<i>Sterna caspia</i>		Caspian Tern	
<i>Sterna nilotica</i>		Gull-billed Tern	

- **Group I:** Species for which assessment is regularly carried out.
- **Group II:** Species that are important in terms of landing and/or economic values at regional and subregional level and for which assessment is not regularly carried out.
- **Group III:** Species under international or national management plans; species under recovery and/or action plans for conservation. This Group 3 also contains a list of non-indigenous species with the greatest potential impact.
- **Vulnerable species:** Seabirds, sea turtles, cetaceans, Mediterranean monk seal. In addition sharks and rays of species included in Annex II and III (List of Endangered and Threatened Species) of the Barcelona Convention

Table 4. Group of Species included in each indicator, biodiversity components addressed, common /candidate indicator and possible relationship/ overlap with common indicators of other Ecological Objectives

Operational objective	Indicator	Species included	GES general objective	Biodiversity components	Common or candidate Indicators	Potential overlap with other Common Indicators
3.1 Level of exploitation by commercial fisheries allows populations to be within biological safe limits	3.1.1 Total Official Landings (TOL) and Total Catch (TC)	-Priority species (I-II-III) -Vulnerable species	-Sustainable fishing -Conservation of biodiversity	- exploited populations - communities - ecosystem	TOL: common TC: candidate	
	3.1.2 Fishing mortality (F)	-Priority species (I)	-Sustainable fishing	- exploited populations	common	
	3.1.3 Biomass index (B)	-Priority species (I) -Priority species (II-III) and Vulnerable species if survey data are available	-Sustainable fishing -Conservation of biodiversity	- exploited populations - communities - ecosystem	candidate	EO1 and EO4 indicators Common indicator 4 (population abundance)
	3.1.4 Ratio between Catch and Biomass index (C/B)	-Priority species (I) - Priority species (II-III) and Vulnerable species if survey data are available	-Sustainable fishing	- exploited populations - communities - ecosystem	candidate	
	3.1.5. Spatial Distribution (SD) of the population	-Priority species (I) - Priority species (II-III) and Vulnerable species if survey data are available	-Sustainable fishing -Conservation of biodiversity	- exploited populations - communities - ecosystem	candidate	EO1 indicators Common indicator 3 (species distributional range)

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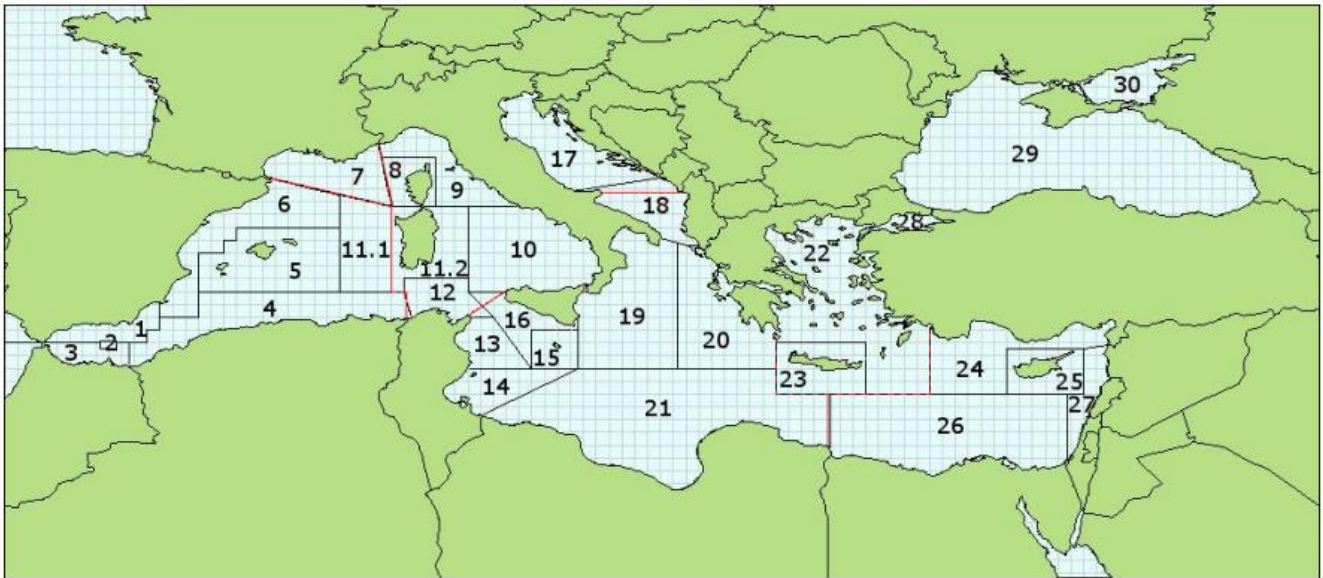
	<i>3.1.6. Proportion of the stocks sustainably fished (SS)</i>	-Priority species (I)	-Sustainable fishing	- exploited populations	common	
3.2. The reproductive capacity of stocks is maintained	<i>3.2.1. Mean Length of the population in the catch (mL) and in the surveyed community (mLsc)</i>	-Priority species (I-II-III) -Vulnerable species if survey data are available	-Sustainable fishing -Conservation of biodiversity	- exploited populations - communities	candidate	EO4 indicators Common indicator 5 (population demographic characteristics)
	<i>3.2.2 Spawning Stock Biomass (SSB)</i>	-Priority species (I)	-Sustainable fishing	- exploited populations	common	
3.3. The impact of fishing activities in the ecosystem is low	<i>3.3.1. Mean Trophic Level of the catch (TLc and MTI) and of the surveyed community (TLsc)</i>	-Priority species (I-II-III) -Vulnerable species if total catch or survey data are available	-Sustainable fishing -Conservation of biodiversity	- exploited populations - communities - ecosystem	candidate	EO1 and EO4 indicators
	<i>3.3.2. Proportion of Large Fish in the catch (LFc) and in the community (LFsc)</i>	-Priority species (I-II-III) -Vulnerable species if total catch or survey data are available	-Sustainable fishing -Conservation of biodiversity	- exploited populations - communities	candidate	EO1 and EO4 indicators
	<i>3.3.3. Proportion of all exploited species with DEclining biomass in the population</i>	-Priority species (I-II-III) -Vulnerable species which are exploited (target and non-target species in the catch)	-Sustainable fishing -Conservation of biodiversity	- exploited populations - communities - ecosystem	candidate	

1.2 Geographical scale

As part of the guidance for a common methodology to be used 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.

GFCM Geographical Sub-Areas (GSAs)



--- 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

1.3 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 EO3. 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. In table 5 stocks assessed during the last 4 years by GSA are summarised.

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 submission by its Members regarding fishing capacity by fleet segment (Task 1.1), fishing activity descriptors and resources exploited (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).

More recently a new framework for data collection and submission is being developed which will modify the way the data are collected and transmitted by the countries. The same sections as indicated for Task 1 remain and additional boxes will be available for more detailed data on by-catch and biological information. The new (Data Collection Reference Framework) DCRF is now in process of revision by members and will be submitted for adoption by the commission in the next session of 2015.

Table 5: Stocks assessed (species/GSA) by the SAC of GFCM from 2010 to 2013

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
<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>Lophius budegassa</i>																											
<i>Merluccius merluccius</i>																											
<i>Mullus barbatus</i>																											
<i>Mullus surmuletus</i>																											
<i>Nephrops norvegicus</i>																											
<i>Pagellus bogaraveo</i>																											
<i>Pagellus eryrinus</i>																											
<i>Parapenaeus longirostris</i>																											
<i>Raja asterias</i>																											
<i>Raja clavata</i>																											
<i>Sardina pilchardus</i>																											
<i>Saurida undosquamis</i>																											
<i>Scyliorhinus canicula</i>																											
<i>Sphyraean sphyraena</i>																											
<i>Solea solea</i>																											
<i>Spicara smaris</i>																											
<i>Squilla mantis</i>																											

Assessed in:

2010  2011  2012  2013  more than 1 year  more than 2 years 

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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*).

European members of the GFCM have also data available regarding abundance and size structure of commercial demersal and pelagic stocks under the Data Collection Framework Directive (such as MEDITS and MEDIAS campaigns).