



Food and Agriculture
Organization of the
United Nations

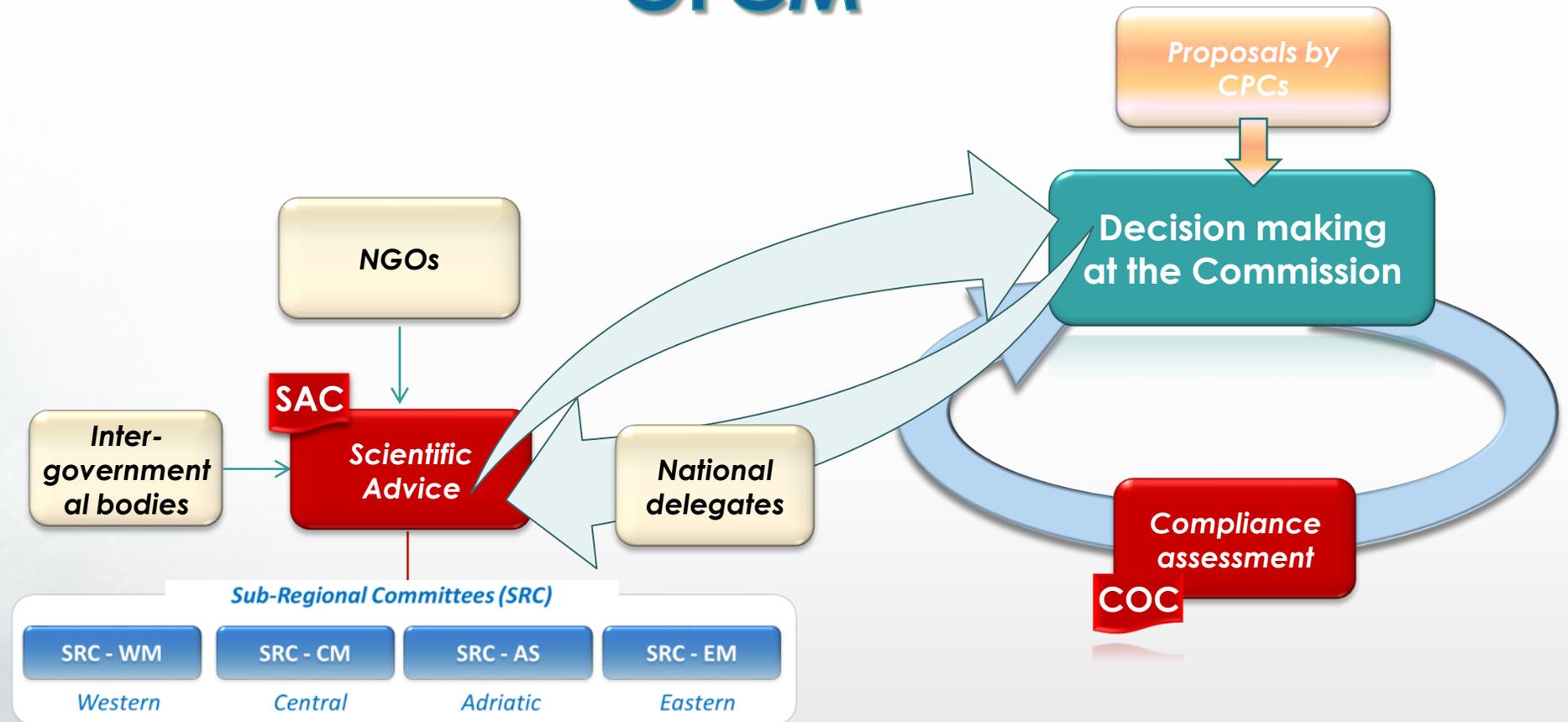


General Fisheries Commission
for the Mediterranean
Commission générale des pêches
pour la Méditerranée

Meeting of the Correspondence Group on Monitoring (CORMON), Biodiversity and Fisheries

Madrid, Spain, 28th February – 1st March 2017

Provision of advice and decision making in the GFCM



- +
- **Thematic expert groups:**
 - Data collection
 - Stock assessment
 - Marine Protected areas
 - Socioeconomic aspects
 - **Sub-regional integrated advice on management plans**

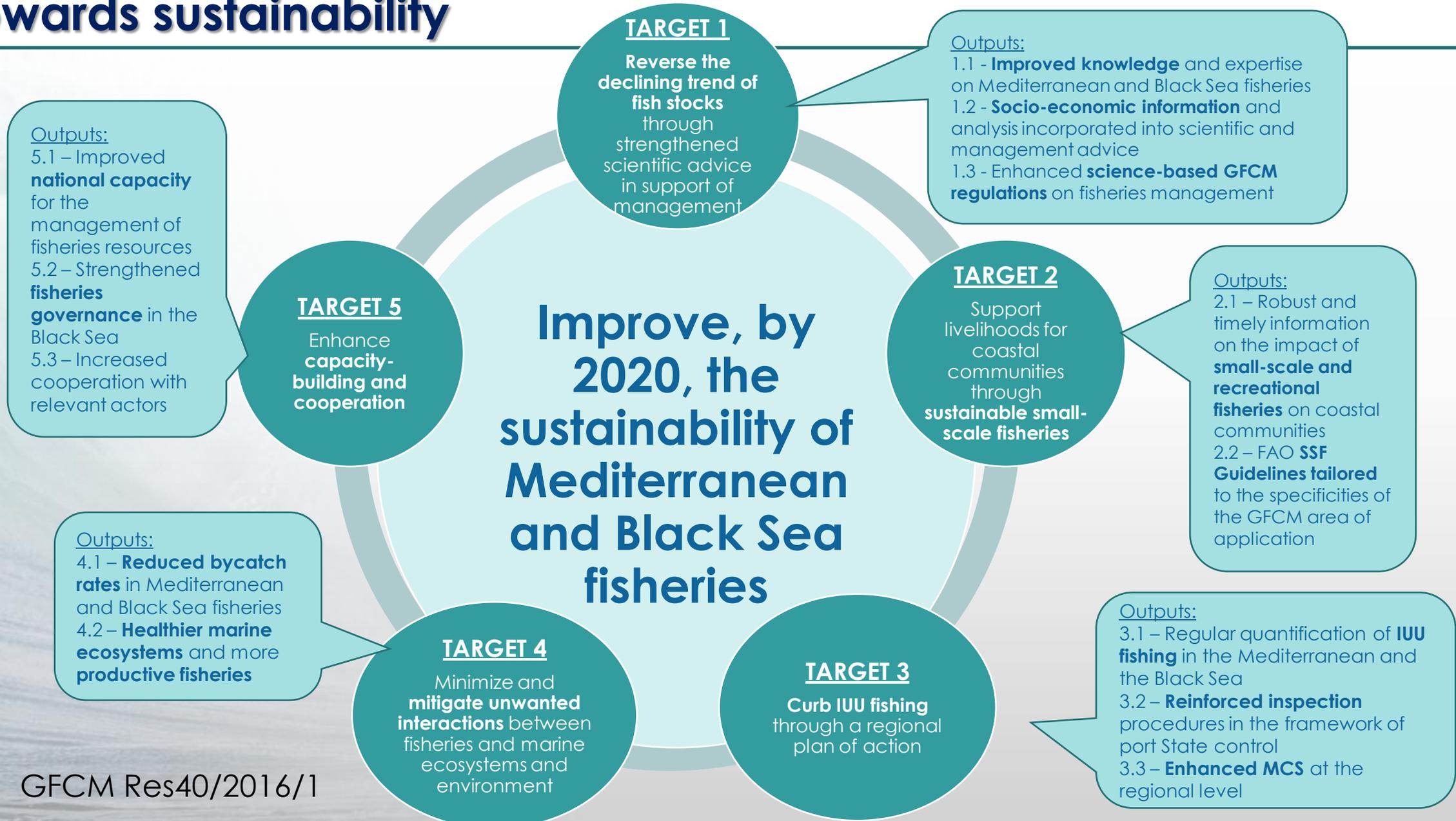


GFCM mid-term strategy (2017–2020) towards the sustainability of Mediterranean and Black Sea fisheries

The overall objective of the GFCM strategy is to improve, by 2020, the sustainability of Mediterranean and Black Sea fisheries, by achieving five different targets and related outputs and actions.

The Mediterranean and Black Sea strategy: renewed commitment towards sustainability

STRATEGY



Since 2014 preliminary work on harmonizing the definition and assessment of good environmental status for marine living resources has been carried out.

MARCH 2014
SCIENTIFIC ADVISORY
COMMITTEE on Fisheries

November 2014:
*First MedSuit Regional
Workshop on indicators
and targets to ensure GES
of commercially
exploited marine
populations*

MARCH 2015
SCIENTIFIC ADVISORY
COMMITTEE on Fisheries

As a first result of these works a technical proposal for the identification of indicators with operational objectives, GES, and targets for ecological objective 3 was prepared.

Related Ecological Objective (EO 3): *Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock*

Common Indicator 7: Spawning Stock Biomass

Relevant GES definition	Related Operational Objective	Proposed Target(s)
Achieving or maintaining good environmental status requires that SSB values are equal to or above SSB_{MSY} , the level capable of producing maximum sustainable yield (MSY).	The Spawning Stock Biomass is at a level at which reproduction capacity is not impaired	<p><u>State</u> $B > B_{thr}$</p>

Indicator Definition

The Spawning Stock Biomass, usually referred to as SSB, is the total weight of the spawning stock. The SSB is available through stock assessment so not all species will have this information. B_{MSY} is currently not considered as a threshold for stock management in European waters and values are not available. When both biomass indices and exploitation 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.

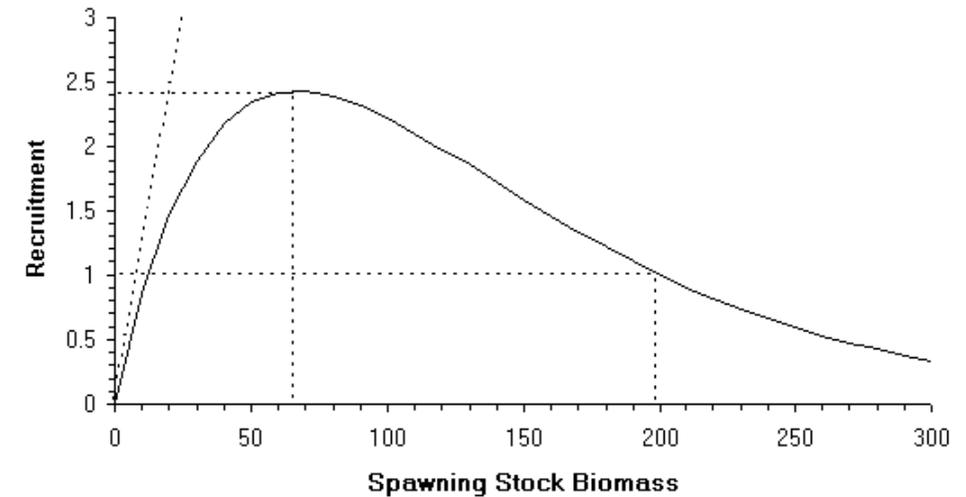


Common Indicator 7: Spawning Stock Biomass

The species considered for the evaluation for this indicator will be: first, the list of priority commercial species by subregion for which an advice should be produced (GFCM, 2016), then, priority species (Group 1, 2 and 3), as reported in Appendix A of the GFCM-Data Collection Reference Framework (GFCM-DCRF, 2016)

Indicator units

- Number of stocks for which status with respect to SSB_{MSY} is known
- The number (and proportion) of stocks above or below SSB_{MSY}
- Trends in SSB



Available Methodologies for Monitoring and Monitoring Protocols

The status of stocks is ideally based on a validated stock assessment model, from which indicators of stock status (e.g. biomass, fishing mortality, recruitment) are obtained, and reference points are agreed for the chosen indicators. **Several analytical methods, based on population dynamics of different stocks of demersal and small pelagic species, have been applied within the GFCM-WGSAs** (Working Groups on Stock Assessment) and are also available in literature. In the GFCM area, data for the assessment of stocks are collected through stock assessment forms (SAF), which also contain information on reference points and outcomes of the assessment (e.g. fishing mortality, exploitation rate, spawning stock biomass, recruitment etc.).

Related Ecological Objective (EO 3): Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock

Common Indicator 8: Total landing

Relevant GES definition	Related Operational Objective	Proposed Target(s)
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.	Total catch of commercial species does not exceed the Maximum Sustainable Yield (MSY) and the by-catch is reduced.	<p>State</p> <ul style="list-style-type: none"> -Long-Term High Yields -Catch < MSY <p>Pressure</p> <ul style="list-style-type: none"> -Reduction of IUU catch -Minimization of discarding and incidental catch of vulnerable species

Indicator Definition

*The total catch is the quantity of fish that is retained by the fishing gear during fishing operations. This should ideally include landings by commercial fleet, national landings in foreign ports, and foreign landings in domestic ports, recreational fishing, bycatch and IUU estimates. The **Maximum Sustainable Yield (MSY)** 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.*

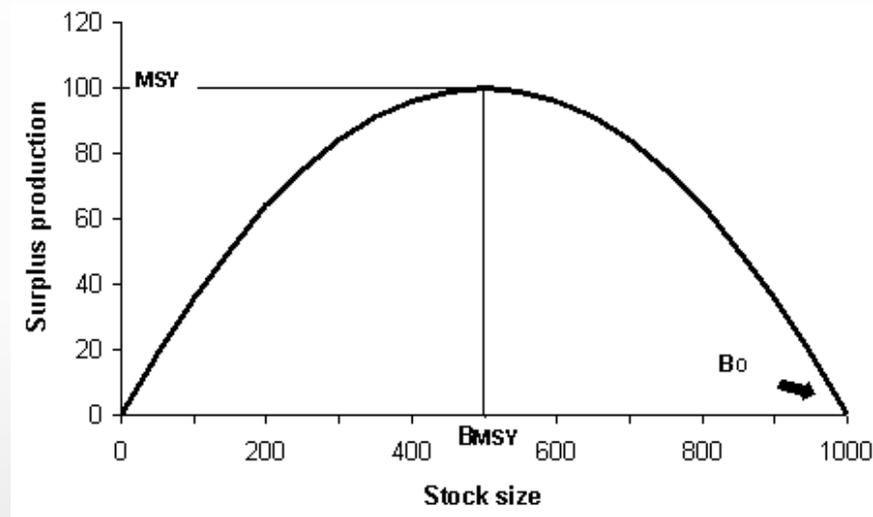


Common Indicator 8: Total landing

The species considered for the evaluation for this indicator will be: first, the list of priority commercial species by subregion for which an advice should be produced (GFCM, 2016), then, priority species (Group 1, 2 and 3; GFCM-DCRF, 2016), and also vulnerable species (Appendix E of the GFCM-DCRF). Other biodiversity components such as exploited populations, communities and ecosystem, will be investigated.

Indicator units

- Total catch/landing (weight in tons)
- Trends of the biomass
- Trends of discards behavior (i.e. weight of discarded target species by fleet segments; total volume discarded)
- The number of stocks for which catch is below MSY



Available Methodologies for Monitoring and Monitoring Protocols

Information on capture production is collected annually from relevant national offices concerned with fishery statistics, by means of the form GFCM-STATLANT 37A. This form is part of the STATLANT system of questionnaires developed by the Coordinating Working Party on Fishery Statistics (CWP) and dispatched by FAO on behalf of regional fisheries management organizations (RFMO) to the relevant national authorities. **Total landing figures can be obtained from different sources and are usually derived from a combination of catch reports, logbooks, observers, market and/or landing survey or landing statistics from port authorities.** Landing data can be further measured and classified by species, area, fishing gear used, and other factors.

Related Ecological Objective (EO 3): *Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock*

Common Indicator 9: Fishing mortality

Relevant GES definition	Related Operational Objective	Proposed Target(s)
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	Fishing mortality in the stock does not exceed the level that allows MSY ($F \leq F_{MSY}$).	<u>Pressure</u> $-F_{MSY}$ $-F_{0.1}$ a proxy of F_{MSY} (more precautionary)

Indicator Definition

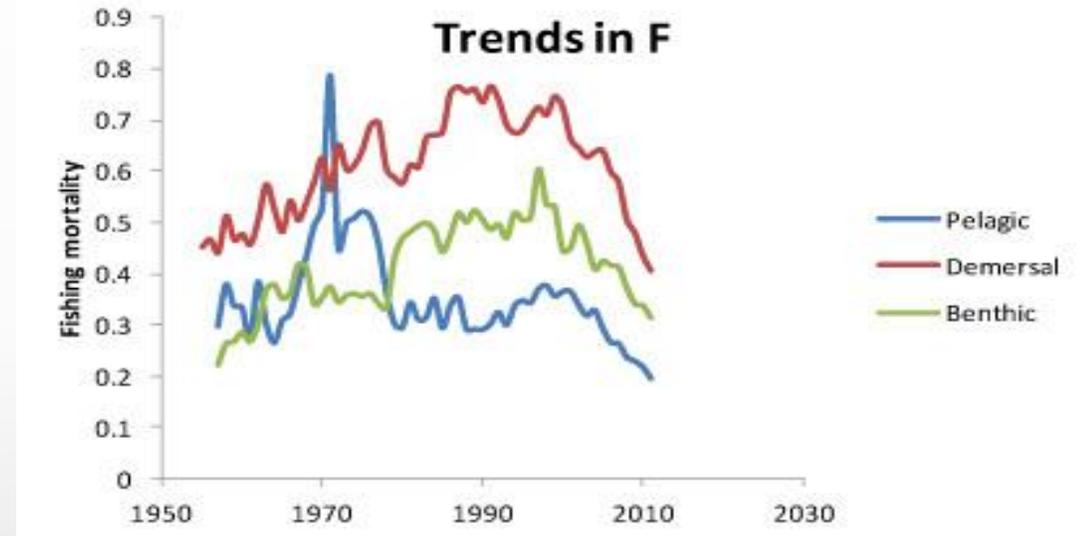
The Maximum Sustainable Yield is, theoretically, the maximum yield that can be obtained from a species, and it is associated with a maximum fishing mortality (F_{MSY}). When F is higher than F_{MSY} the yield decreases. F_{MSY} is considered as a limit due to the consequences of overestimating F . Only 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 usually expressed as a rate ranging from 0 (for no fishing) to high values (1.0 or more). It is common practice to refer F as a scalar value but it would be more appropriate to refer to it as a vector. This indicator is linked with sustainable fishing.

Common Indicator 9: Fishing mortality

The species considered for the evaluation for this indicator will be: first, the list of priority commercial species by subregion for which an advice should be produced (GFCM, 2016), then, priority species (Group 1, 2 and 3) as reported in Appendix A of the GFCM-Data Collection Reference Framework (GFCM-DCRF, 2016).

Indicator units

- Number of stocks for which status with respect to F_{MSY} is known
- The number (and proportion) of stocks above or below F_{MSY}
- Trends in F/F_{MSY}



Available Methodologies for Monitoring and Monitoring Protocols

Several analytical methods, based on population dynamics of different stocks of demersal and small pelagic species, have been applied within the GFCM-WGSAs (Working Groups on Stock Assessment) and are also available in literature. In the GFCM area, data for the assessment of stocks are collected through stock assessment forms (SAF), which also contain information on reference points and outcomes of the assessment (e.g. fishing mortality, exploitation rate, spawning stock biomass, recruitment etc.).

Related Ecological Objective (EO 3): *Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock*

Common Indicator 10: Fishing effort

Relevant GES definition	Related Operational Objective	Proposed Target(s)
Total effort does not exceed the level of effort allowing the Maximum Sustainable Yield (MSY).	Fishing effort should be reduced by means of a multi-annual management plan until there is evidence for stock recovery.	(under development)

Indicator Definition

Fishing effort is the amount of time and/or fishing capacity (e.g. GT) used to harvest fish. Effort measurements therefore allow an estimation of the pressure placed by fishing activities on fish stocks.

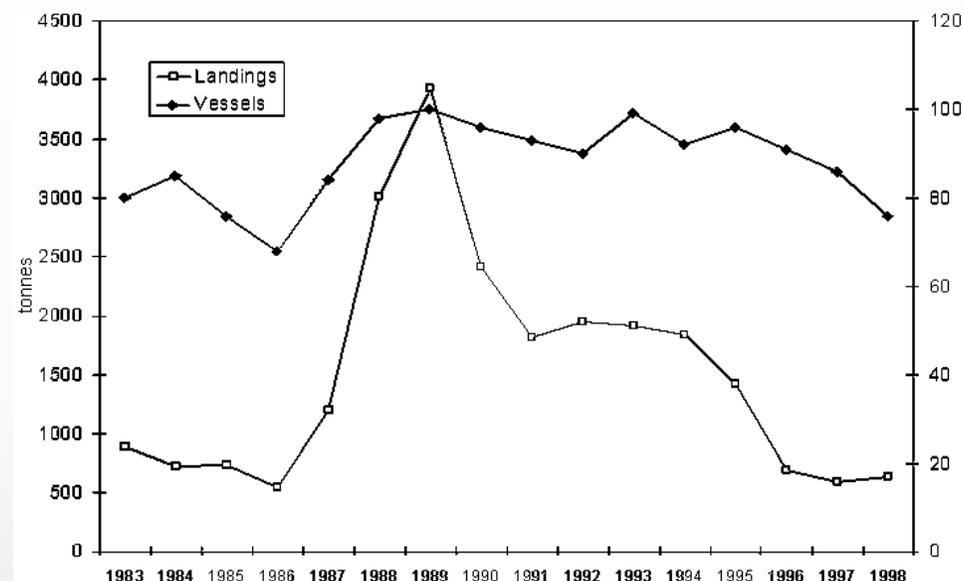


Common Indicator 10: Fishing effort

This indicator will be assessed according both to the Mediterranean and Black Sea sub-areas (GSA) and GFCM sub-regions in order to reflect spatial changes.

Indicator units (*under development*)

- Total effort (e.g. GT*fishing days)
- Effort by fleet segments and per area
- Trends of nominal effort



Available Methodologies for Monitoring and Monitoring Protocols

Several methods to calculate effort measurements have been applied within the GFCM-WGSAs (Working Groups on Stock Assessment) and are also available in literature. **These information, in the GFCM area, are collected through the Data Collection Reference Framework (GFCM-DCRF, 2016) and the stock assessment forms (SAF),** which also contain information on reference points and outcomes of the assessment (e.g. fishing mortality, exploitation rate, spawning stock biomass, recruitment etc.).

Related Ecological Objective (EO 3): *Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock*

Common Indicator 11: Catch per Unit Effort (CpUE)

Relevant GES definition	Related Operational Objective	Proposed Target(s) <i>(under development)</i>
<p>Catch per unit effort (CPUE) is an indirect measure of the abundance of target species. Changes in the catch per unit effort are inferred to signify changes to the target species' abundance.</p>	<p>Stable or positive trend in CPUE Declines in CPUE may mean that the fish population cannot support the level of harvesting. Increases in CPUE may mean that a fish stock is recovering and more fishing effort can be applied.</p>	

Indicator Definition

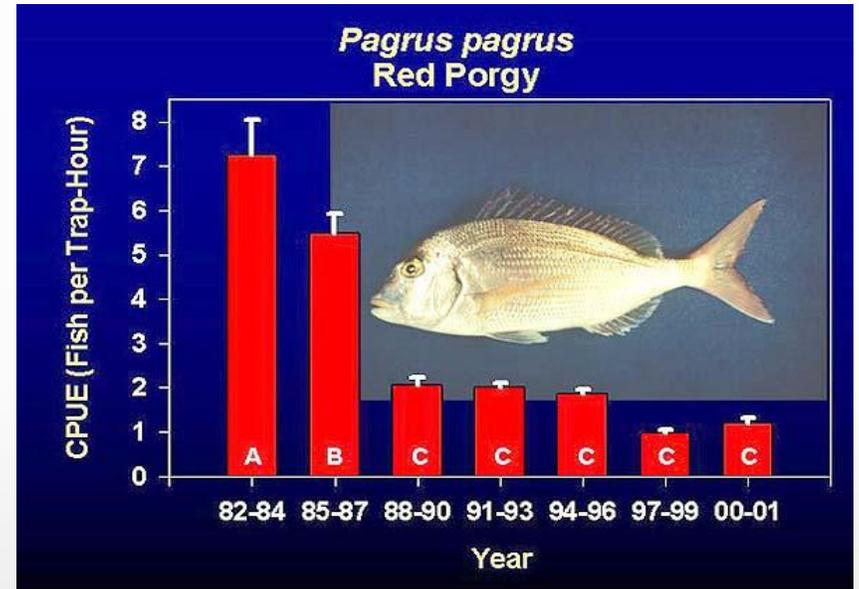
The catch per unit of fishing effort (CPUE) is a relative measure of fish stock abundance and can be used to estimate relative abundance indices; it could be an indicator of fishing efficiency, both in terms of abundance and economic value. In its basic form, the CPUE could be expressed as the captured biomass for each unit of effort applied to species/stock (e.g. total catch of a species divided by the total fishing effort: kg/number of fish per longline hook days). Declining trends of this estimator could indicate overexploitation, while unchanging value could indicate sustainable fishing.

Common Indicator 11: Catch per Unit Effort (CpUE)

CPUE should be reported, first, for the list of priority commercial species by subregion for which an advice should be produced (GFCM, 2016), then, the CPUE should be reported for the priority species belonging to Group 1 and Group 2. Further, this indicator will be assessed according both to the Mediterranean and Black Sea sub-areas (GSA) and GFCM sub-regions in order to reflect spatial changes.

Indicator units (under development)

- CPUE by fishing gear and species
- Trends of CPUE



Available Methodologies for Monitoring and Monitoring Protocols

Several methods to calculate CPUE and different effort measurements have been applied within the GFCM-WGSAs (Working Groups on Stock Assessment) and are also available in literature. These information, in the GFCM area, are collected through the Data Collection Reference Framework (GFCM-DCRF, 2016) and the stock assessment forms (SAF), which also contain information on reference points and outcomes of the assessment (e.g. fishing mortality, exploitation rate, spawning stock biomass, recruitment etc.).

Related Ecological Objectives: EO 3 and EO 1 – Biodiversity Biological diversity is maintained or enhanced. The quality and occurrence of coastal and marine habitats and the distribution and abundance of coastal and marine species are in line with prevailing physiographic, hydrographic, geographic and climatic conditions.

Common Indicator 12: Bycatch

Relevant GES definition	Related Operational Objective	Proposed Target(s)
<p>The abundance/trends of populations of seabirds, marine mammals, sea turtles and sharks key species (selected according to their actual and total dependence on the marine environment, and to their ecological representativeness) is stable or not reducing in a statistically significant way taking into account the natural variability compared to the current situation.</p>	<p>Incidental catch of vulnerable species (i.e. sharks, marine mammals, seabirds and turtles) are minimized</p>	<p><i>(under development)</i></p>



Indicator Definition

The abundance/trends of populations of seabirds, marine mammals, sea turtles and sharks key species (selected according to their actual and total dependence on the marine environment, and to their ecological representativeness) is stable or not reducing in a statistically significant way taking into account the natural variability compared to the current situation.

Common Indicator 12: Bycatch

Vulnerable species, as reported in Appendix E of the GFCM-DCRF, will be the ones considered for the evaluation of this indicator. Further, other biodiversity components such as abundance of exploited populations, fish communities and other components of the ecosystem will be investigated.

Indicator units (*under development*)

- Incidental catch (weight and number) of vulnerable species by main fleet segments and areas
- Trends in abundance
- Trends in spatial distribution
- Trends in temporal occurrence
- Identification of risky areas
- Record strandings of vulnerable species due to incidental catch



Available Methodologies for Monitoring and Monitoring Protocols

Bycatch data (discards and incidental catch of vulnerable species) can be obtained from different sources and are usually derived from a combination of catch reports, logbooks, observers on board, observed at landing and/or market, dedicated surveys, questionnaires, self-sampling by fishers, market and/or landing survey

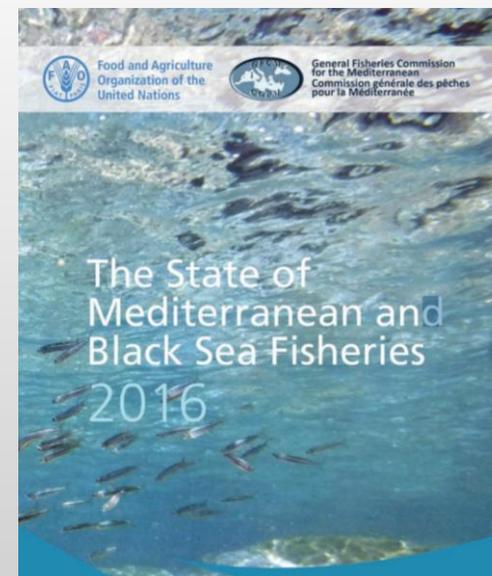
Next steps:

The description of indicators CI10, CI11 and C12 should be validated by the next session of the SAC (May, 2017).

The SAC should also reflect, for all the proposed indicators, on the following aspects in order to have an assessment by 2018:

- ✓ Operational Objectives and Target(s) at regional level
- ✓ How to aggregate them at sub-regional and regional scale (Regionalization) and assess their performance

All the mentioned indicators will be presented in the SoMFI 2018



Identification of GFCM priority species

Group 1 species. *Species for which assessment is regularly carried out.*

Group 2 species. *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 3 species. *Species within international/ national management plans and recovery and/or conservation action plans as well as non-indigenous species with the greatest potential impact.*

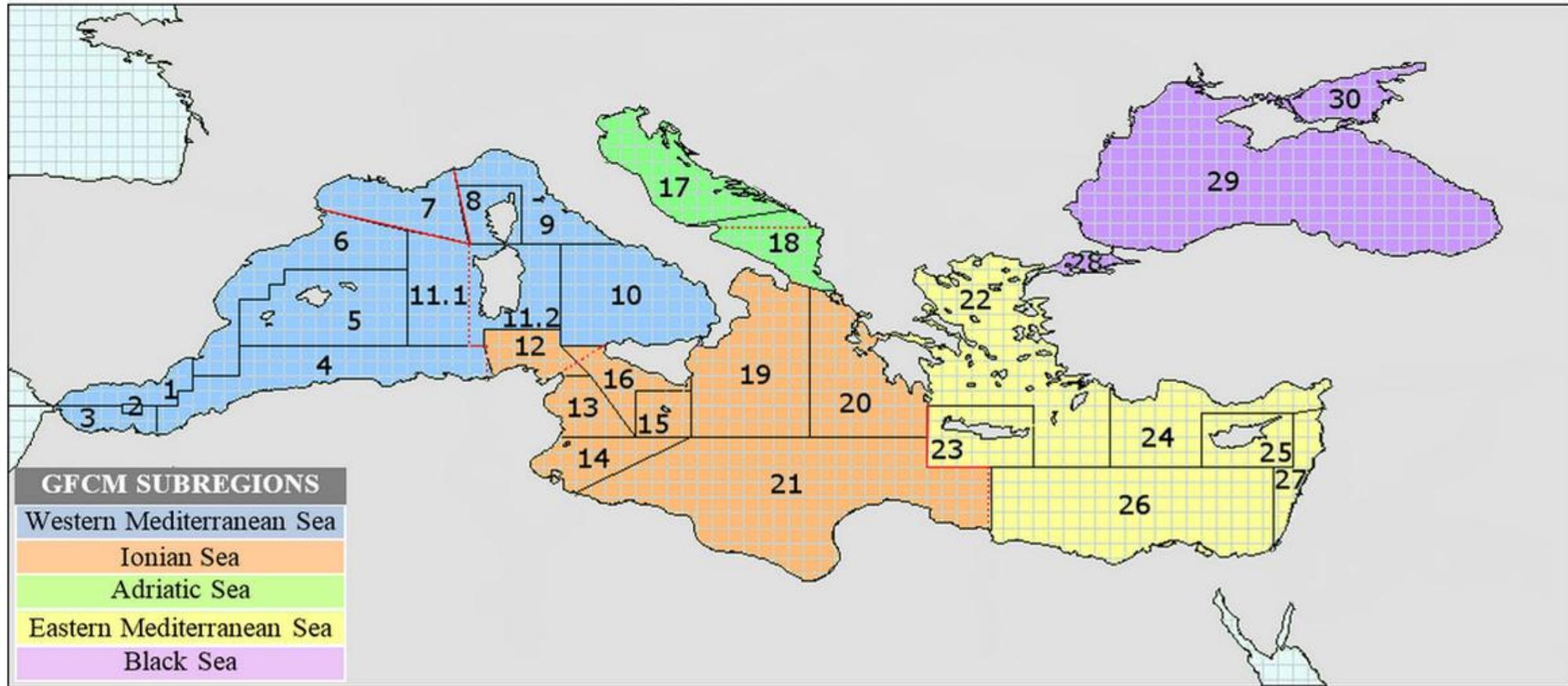
List of priority commercial species by subregion for which an advice should be produced (GFCM, 2016):

	Western Mediterranean	Central Mediterranean	Adriatic Sea	Eastern Mediterranean	Black Sea	
Pelagic species	<i>Engraulis encrasicolus</i>	<i>Engraulis encrasicolus</i>	<i>Engraulis encrasicolus</i>	<i>Engraulis encrasicolus</i>	<i>Engraulis encrasicolus</i>	<i>Trachurus mediterraneus</i>
	<i>Sardina pilchardus</i>	<i>Sardina pilchardus</i>	<i>Sardina pilchardus</i>	<i>Sardinella aurita</i>	<i>Sprattus sprattus</i>	<i>Sarda sarda</i>
Demersal species	<i>Parapenaeus longirostris</i>	<i>Parapenaeus longirostris</i>	<i>Mullus barbatus</i>	<i>Mullus barbatus</i>	<i>Merlangius merlangus</i>	<i>Psetta maxima</i>
	<i>Merluccius merluccius</i>	<i>Merluccius merluccius</i>	<i>Merluccius merluccius</i>	<i>Saurida lessepsianus</i>		<i>Mullus barbatus</i>
	<i>Pagellus bogaraveo</i>					

Priority species (Appendix A - DCRF, 2016)

Priority species Group 1	GFCM subregions	Western Mediterranean Sea	Ionian Sea	Adriatic Sea	Eastern Mediterranean Sea	Black Sea
	GSAs	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	12, 13, 14, 15, 16, 19, 20, 21	17, 18	22, 23, 24, 25, 26, 27	28, 29, 30
Scientific name	Countries	Algeria, France, Italy, Monaco, Morocco, Spain	Italy, Greece, Libya, Malta, Tunisia	Albania, Croatia, Italy, Montenegro, Slovenia	Cyprus, Egypt, Greece, Israel, Lebanon, Syrian Arab Republic, Turkey	Bulgaria, Romania, Turkey, (Georgia, Russian Federation, Ukraine)**
	FAO 3-alpha code					
<i>Engraulis encrasicolus</i>	ANE	X	X	X	X	X
<i>Merluccius merluccius</i>	HKE	X	X	X	X	
<i>Mullus barbatus</i>	MUT	X	X	X	X	
<i>Mullus surmuletus</i>	MUR	X	X		X	
<i>Nephrops norvegicus</i>	NEP	X	X	X		
<i>Parapenaeus longirostris</i>	DPS	X	X	X	X	
<i>Psetta maxima</i>	TUR					X
<i>Sardina pilchardus</i>	PIL	X	X	X	X	
<i>Sprattus sprattus</i>	SPR					X
<i>Squalus acanthias</i> *	DGS					X
<i>Trachurus mediterraneus</i>	HMM					X

GFCM Subregion and GSA (Appendix L - DCRF, 2016)

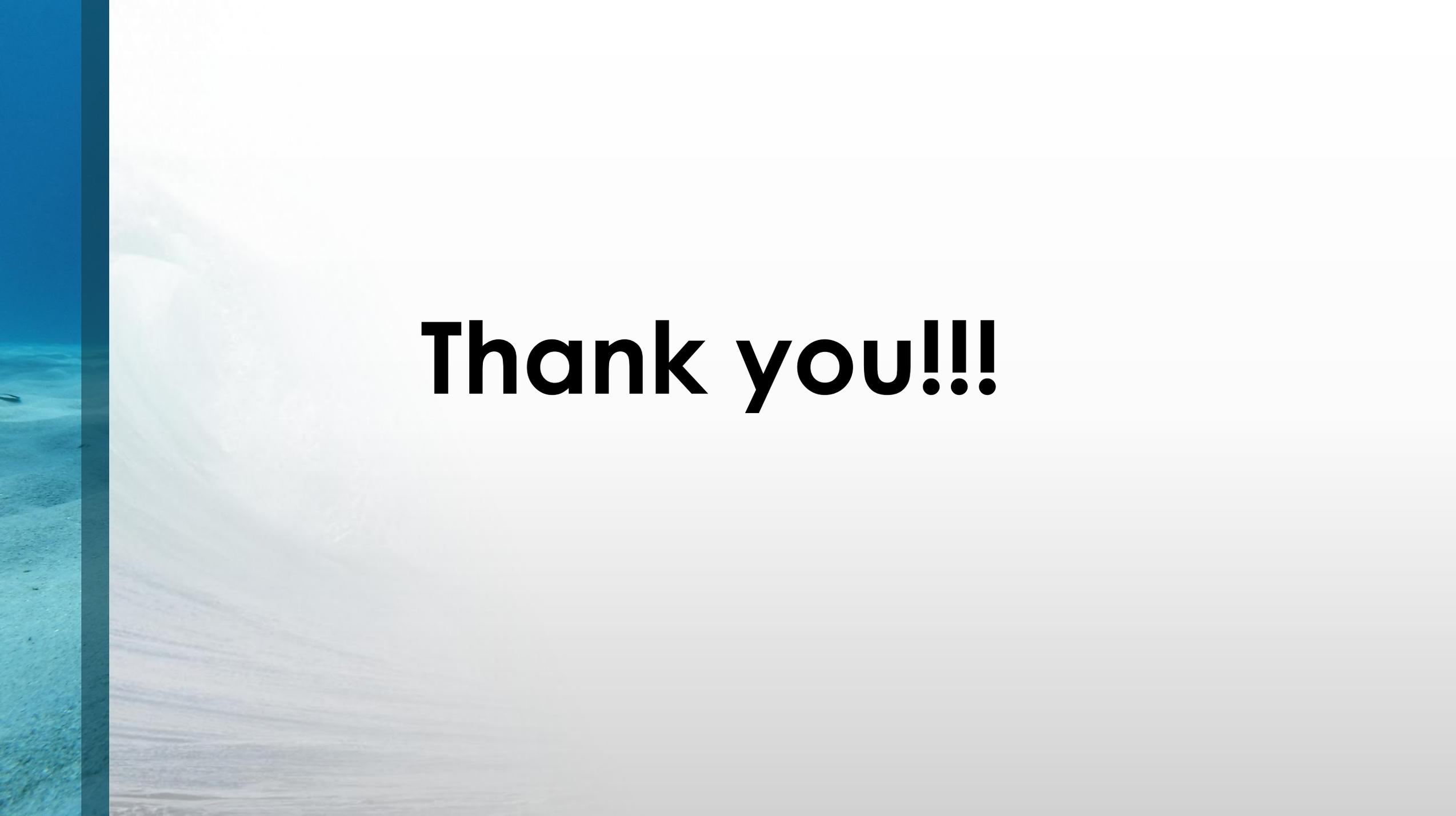


--- FAO Statistical Divisions

---- GFCM Geographical Subareas (GSAs)

GFCM GSAs

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



Thank you!!!