

# Update of scientific information on upcoming management measures to be agreed at GFCM level in the Strait of Sicily and in the East Med.



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## GFCM Recommendations



Recommendation **GFCM/42/2018/3** on a multiannual management plan for **sustainable trawl fisheries targeting giant red shrimp and blue and red shrimp in the Levant Sea** (geographical subareas 24, 25, 26 and 27)

Recommendation **GFCM/42/2018/4** on a multiannual management plan for **sustainable trawl fisheries targeting giant red shrimp and blue and red shrimp in the Ionian Sea** (geographical subareas 19, 20 and 21)

Recommendation **GFCM/43/2019/6** on management measures for **sustainable trawl fisheries targeting giant red shrimp and blue and red shrimp in the Strait of Sicily** (geographical subareas 12, 13, 14, 15 and 16)

## ***Scientific monitoring***



- CPCs shall ensure annually an adequate **scientific monitoring of the status** of the key species in the Strait of Sicily
- The SAC shall **assess the biological, economic and social implications of implementing several management scenarios** with the objective of restoring and maintaining the species population above levels that can produce MSY

## ***Fleet management measures***

- **Vessels authorized to fish for the key species in the specific areas shall be listed** by the CPC whose flag they are flying → to GFCM Sec by **30 June each year**
- Authorized vessels shall provide national authorities a **detailed report of their fishing activities, including as minimum requirements: operating days, operating area and total catch of key species.** This information shall be transmitted to the GFCM Secretariat at least on a yearly basis
- CPCs may **designate additional spatio-temporal restrictions** to those already established where fishing activities may be banned or restricted in order to protect aggregation areas of juveniles of the key species

## ***Management of fishing effort***



- CPCs shall ensure that their **fleet capacity or fishing effort is maintained at the levels authorized and implemented during the recent years for the exploitation in the specific areas for the key species**
- Each CPC shall ensure the **set-up of adequate mechanisms for the recording of each fishing vessel in a national fleet register and for the recording of vessel catches and fishing effort via the logbook**

## ***Final provisions***



The SAC shall provide, on an annual basis as **from 2020**, advice on the status of the key species in the Strait of Sicily including specific objectives to maintain fishing mortality within agreed precautionary fishing mortality reference points and to maintain or restore the stocks of the key species at levels that can produce MSY

- **In 2022, the SAC shall provide scientific advice in order to enable the GFCM to establish a multiannual management plan for the key species**



**As a result of the 2018 Recommendations on DWRS a number of Data Preparation WGs took place jointly with FAO Regional Projects i.e. MEDSUDMED, EASTMED in 2018, 2019 and the SRC-EM.**

**Their aim was to bring together a critical mass of expert scientists and collate, analyse, standardize various data sources from biology, ecology, fleets, landings, surveys, stock assessments, VMS/AIS etc.**



# REVIEW OF BIOLOGY

- **Age cohorts**
- **Growth parameters**
- **Length weight relationships**
- **Reproduction**
- **Maturity (ARS)**
- **Mortality**



# REVIEW OF LANDINGS DATA



## Landings and LFDs:

- GSA 12 (ARS + ARA, 2013 – 2017)
- GSA 15 (ARS, 2009 – 2012, 2017)
- GSA 16 (ARS, 2008 - 2016)
  - **Summary LFDs from catches taken in GSAs 12, 16, 21, 23, 25 – various years**
- **GSA 18 (ARS [2009 – 2017] + ARA [2010-2015])**
- **GSA 19 (ARS [2009 – 2017] + ARA [2003 – 2017])**
- **GSA 20 (ARS + ARA, 1996 – 2017, not reliable)**
- GSA 22 (TUR) (Mixed, 2007 - 2017)
- GSA 24 (TUR) (Mixed, 2007 - 2017)
- **GSA 25 (Mixed, IW+NW, 1965 – 2004, 2008 - 2017)**
- **GSA 26 (ARS [2015 - ] 2017)**



# REVIEW OF SURVEY DATA



## Indices and LFDs:

- GSA 12 (ARS + ARA, 2003, 2007, 2010, index only)
- GSA 15 (ARS, 2006 - 2019)
- GSA 16 (ARS + ARA, 1994 - 2019)
- **GSA 19 (ARS + ARA, 1995 - 2019)**
- **GSA 20 (ARS + ARA , 1996 - 2019)**
- **GSA 24 (ARS + ARA: Antalya Bay monthly, 2015 - 2019)**
- **GSA 25 (ARS, 2006- 2017 sporadic)**
- **GSA 27 (ARS + ARA: trammel nets, 2013/2017)**





# Summary of available data



## GSA 19, 20 & 21

### GSA 19

- Annual landings (2004-)
- Annual landings@length (2006-)
- MEDITS Surveys (1995-)
- Effort data
- AIS data (2012-)
- VMS data (2006-, NA)
- No. of vessels
- Socioeconomic data
- Biological parameters

### GSA 20

- Annual landings (2015-, priori only grouped)
- MEDITS Surveys (1996-)
- Effort data
- AIS data (2012-)
- VMS data (2009-, NA)
- No. of vessels
- Socioeconomic data
- Biological parameters

### GSA 21

No data



# Summary of available data



## GSA 24, 25, 26 & 27

### GSA 24

- Annual landings (2007-, grouped)
- Monthly surveys in restricted areas (2009-2011, 2015-2017)
- Effort data
- VMS data (2016-, NA)
- No. of vessels (2011)
- Biological parameters

### GSA 25

- Annual landings (2005-, prior grouped)
- MEDITS Surveys (2005-)
- Effort data
- VMS data (2013-, NA)
- GPS data (2017)
- No. of vessels
- Biological parameters

### GSA 26

- Annual landings (2015-)
- Annual landings@length (2017-)
- No. of vessels
- Biological parameters in progress

### GSA 27

- Experimental trammel net data



# Summary of available data



## GSA 22 & 23

### GSA 22

- Annual landings (2015-, priori only grouped)
- MEDITS Surveys (1996-)
- Effort data
- AIS data (2012-)
- VMS data (2009-, NA)
- No. of vessels
- Socioeconomic data
- Biological parameters

### GSA 23

- Annual landings (2015-, priori only grouped)
- MEDITS Surveys (1996-)
- Effort data
- AIS data (2012-)
- VMS data (2009-, NA)
- No. of vessels
- Socioeconomic data
- Biological parameters



# Summary of available data



## GSA 12, 13, 14, 15 & 16

### GSA 12 – 14

- Annual landings (1999-, grouped)
- VMS data (2017-, NA)
- No. of vessels
- GRUND survey data partially available

### GSA 15

- Annual landings (2009-)
- Annual landings@length (2009-2012, 2014-2017)
- MEDITS Surveys (2006-)
- Effort data
- VMS data (2006-, NA)
- No. of vessels
- Socioeconomic data
- Biological parameters

### GSA 16

- Annual landings (2004-)
- Annual landings@length (2006-)
- MEDITS Surveys (1994-)
- GRUND Surveys (1985-2008)
- Effort data
- AIS data (2012-)
- VMS data (2006-, NA)
- No. of vessels
- Socioeconomic data
- Biological parameters
- Landings and L@length by GSA of origin (var. yrs)



# Deepwater red shrimp in the eastern-central Mediterranean



## Update meetings in 2022

### WGSAD (2022)

- ➔ Assessment of ARS and ARA GSA 18-19 (reference year 2020)
- ➔ Assessment of ARS and ARA GSA 26 (reference year 2020)
- ➔ DWRS week 7-11 Feb organised by GFCM-SAC

## DWRS week 7-11 Feb organised by GFCM-SAC

- The **DWRS week** brought together experts as well as any other interested participants to advance on DWRS work plan, while also transferring knowledge regarding the work done to a wider audience with the aim of enhancing technical knowledge across the GFCM area of competence. The week was divided into three major sessions:
  - Session 1: Addressing **spatial aspects of the fishery** with **three workshops** foreseen to share the work done as well as the application of the methods employed
  - Session 2: A session of the Working Group for **Stock Assessment** of Demersal species (WGSAD) to advance towards the assessment of the two species of DWRS in the eastern-central Mediterranean Sea
  - Session 3: a session to discuss the advances of Part 1 of the **FAO technical paper** “Synthesis of the biology, ecology and fisheries of deepwater red shrimps *Aristaeomorpha foliacea* and *Aristeus antennatus* in the central-eastern Mediterranean (GSA 12 – 16, 18 – 27)”

**Draft agenda of the DWRS week**

| <b>Session</b>   | <b>Details</b>   | <b>Dates</b>  |
|--|--|---|
| <b>Session 1:</b> Addressing spatial aspects of the DWRS fishery<br>Capacity building workshops  | Workshop 1: The identification of DWRS fishing grounds in the eastern-central Mediterranean using quantitative methods for AIS data in R                         | 7 February 2022<br>(AM and PM)  |
|  | Workshop 2: Estimation of fishing grounds for DWRS using Multi-Criteria Decision Analysis (MCDA)   | 8 February 2022 (AM)  |
|  | Workshop 3: Species distribution modeling  | 9 February 2022 (AM)  |
| <b>Session2:</b> session of the WGSAD on the assessment of DWRS  | This session will entail advancing on the work done during the 2022 WGSAD towards finalising the assessment of DWRS in the eastern -central Mediterranean        | 8 February 2022 (PM);<br>9 February 2022 (PM);<br>10 February 2022 (PM);<br>11 February 2022 (PM) |
| <b>Session 3:</b> FAO technical paper “Synthesis of the biology, ecology and fisheries of deepwater red shrimps <i>Aristaeomorpha foliacea</i> and <i>Aristeus antennatus</i> in the central-eastern Mediterranean (GSA 12 – 16, 18 – 27)” | This session will be aimed at discussing the FAO technical paper on DWRS, in particular the first draft of Part 1; restricted to participants in the publication | 10 February 2022 (AM)   |



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MARINE



Food and Agriculture  
Organization of the  
United Nations



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



## **Workshop 1:**

# **Identification and mapping of bottom trawl fishing grounds for DWRS in the Eastern-Central Mediterranean Sea**

**7-11 February 2022**

**Deepwater red shrimp in the eastern-central Mediterranean Sea week  
(DWRS WEEK)**



# OUTLINE

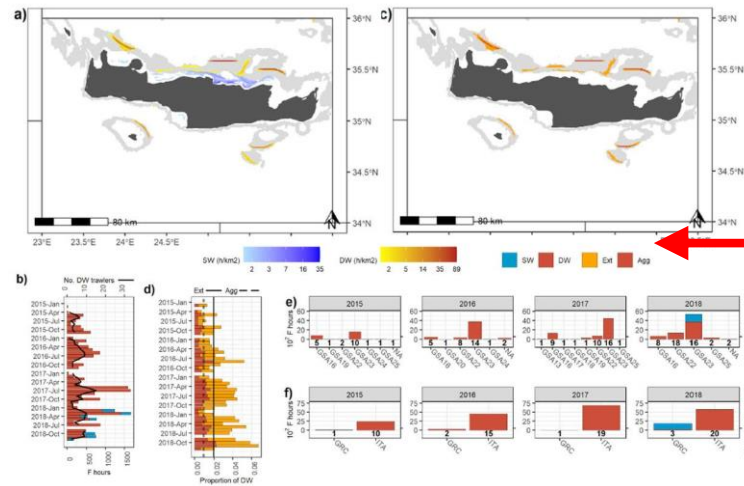
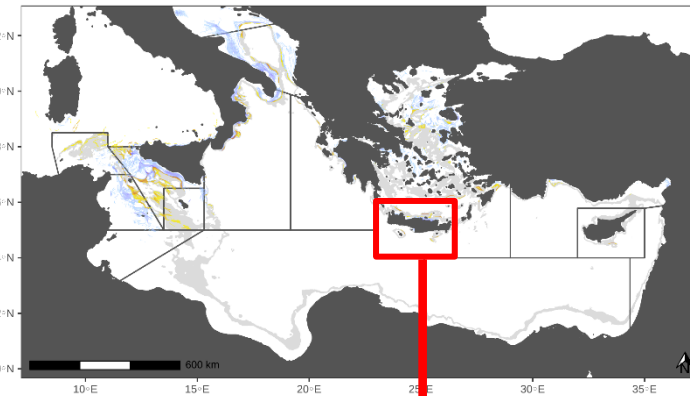
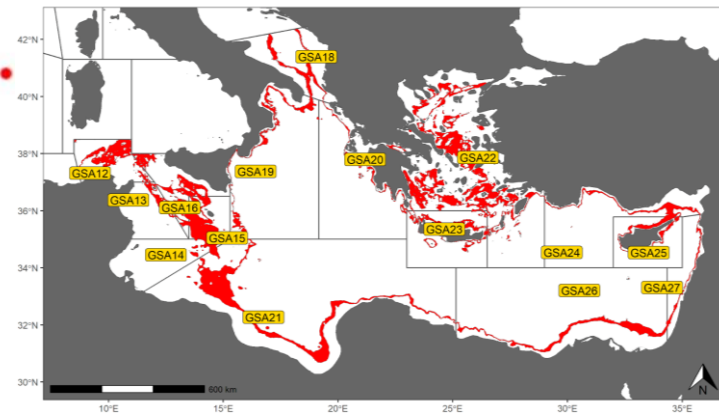
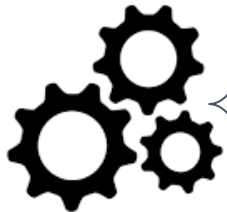
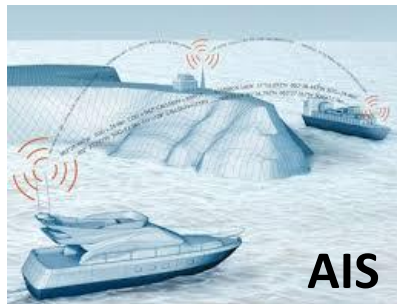
- **Scope**

Investigate the most important DW bottom trawl fishing grounds in the Eastern-Central Mediterranean Sea in terms of their spatial/temporal evolution and national contribution, with associated main origin of the operating fleet

- **Workflow**

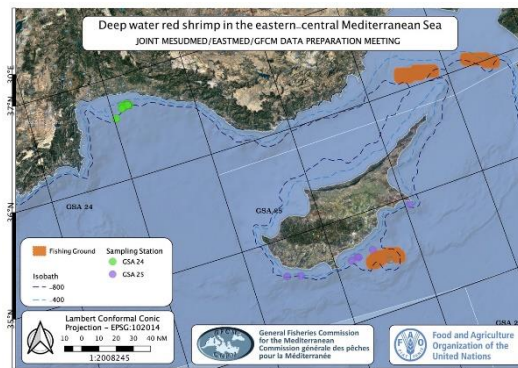
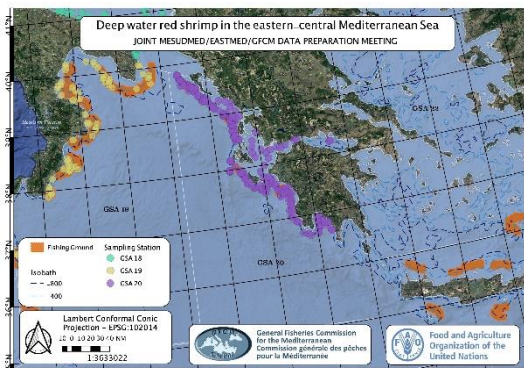
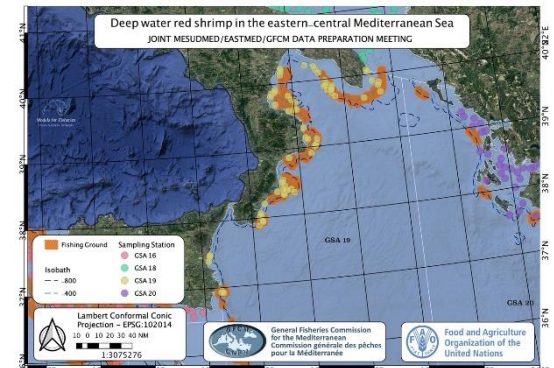
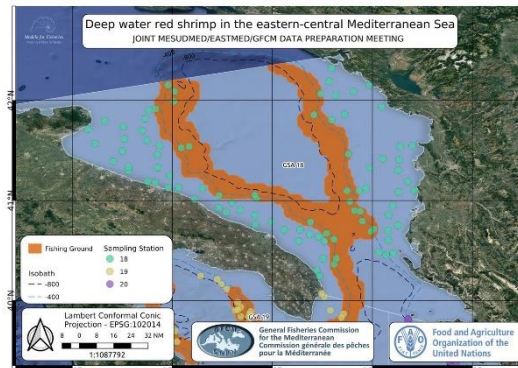
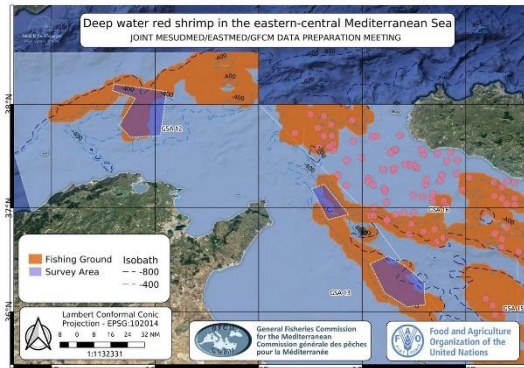
- **Spatial outcomes**

- **Close up views at GSA level**



# Survey and catch data

- New data were presented for **GSA 12-13** and **GSA 26**
- **GSA 15, 16, 18, 19, 18+19, 20** and **25**: results of the use of the **BioIndex** and **BioStand** routines presented; **GSA 24**: still working on the analysis of their data;
- **GSA 12-13**: new survey data being processed and will be available later in the year
- **Database of BioIndex outcomes was compiled: available on sharepoint with code**
- Overlaid survey haul positions on the identified fishing grounds to determine if standardized trawl survey indices could be used as a measure of the productivity of different areas



| GSA | Tot. No. Hauls | No. hauls on FGs | % overlap |
|-----|----------------|------------------|-----------|
| 16  | 120            | 58               | 48        |
| 18  | 91             | 24               | 26        |
| 19  | 69             | 49               | 71        |
| 20  | 223            | 63               | 28        |
| 24  | 30             | 0                | 0         |
| 25  | 7              | 0                | 0         |

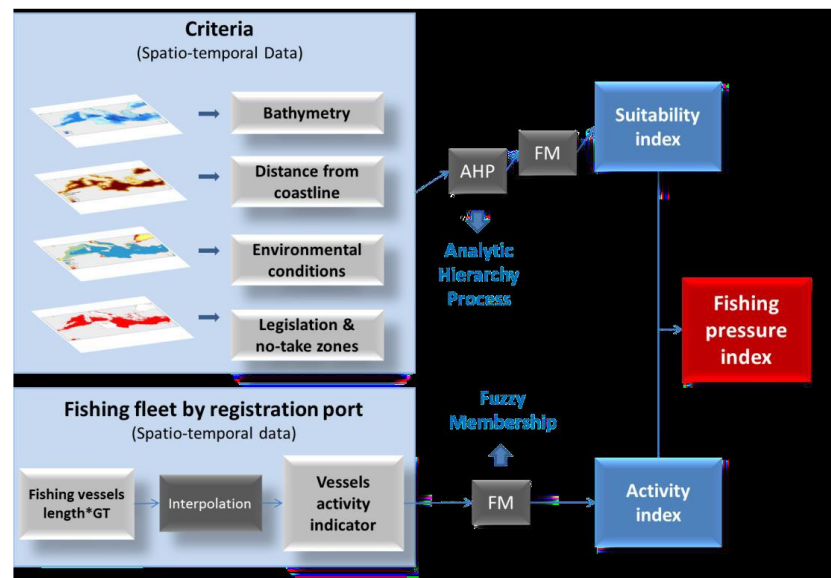
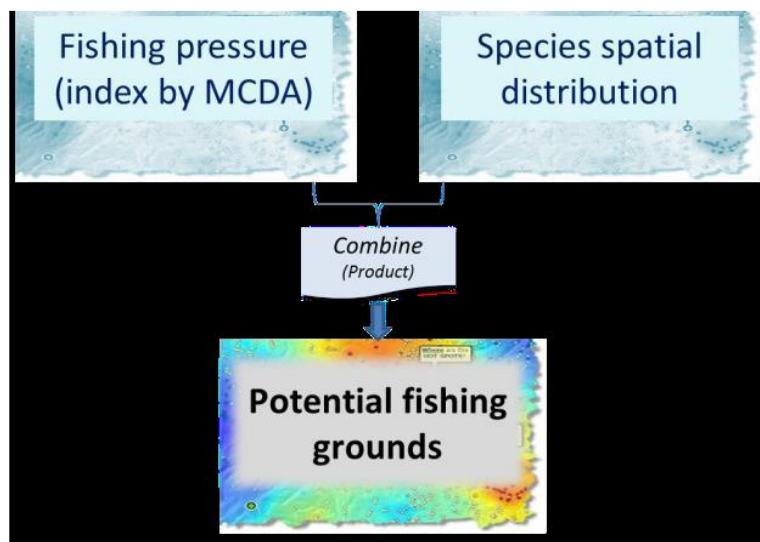
## Assessment units

- Agreed to work towards assessing stocks step-by-step, **starting from the GSA-level** (i.e. from the basic unit of data availability) and maintain the prerogative to unify them whenever and if needed, also by performing sensitivity analyses. Overarching this, the concept of **keeping all GSAs in the eastern-central Mediterranean together** should be maintained as the **null hypothesis to be challenged**
- The group discussed that, at present, **the origin of catches cannot be accurately represented** and expressed the **hope that existing GFCM recommendations would help GFCM countries to report catches by the GSA of origin of the catch**



## Workshop 2 Estimate a Fishing Pressure Index using Multi-Criteria Decision Analysis (MCDA)

- Exploring DWRS fishing grounds was based on a general framework that mainly considers information about: i) the spatial distribution of fishing pressure and ii) the potential habitat use of *Aristaeomorpha foliacea* and *Aristeus antennatus* (Fig. 1).





## DWRS week SESSION 2: OF THE WGSAD ON THE ASSESSMENT OF DWRS **Draft Conclusions and Recommendations**

1. **Two assessments were validated**, providing qualitative, precautionary, advice– ARS in GSA 12-16 and 21, and ARA in GSAs 19-20 (Table 1; details below), significantly increasing the spatial coverage of assessments in the eastern-central Mediterranean.
2. The issue of better understanding the **spatial dynamics of all fleets and incorporating into the assessments information on catches**, and their length structure, from fleets fishing outside their GSA of origin was raised numerous times and identified as **the most important next step** towards truly informative and representative assessments. In this context, the group compiled a table of information that would make assessments by GSA more informative (Table 2).
3. The Group agreed that a **benchmark session on DWRS** in the eastern-central Mediterranean was needed (**2022-2023** intersession) to finalise the work.



# Performed assessments



Table 1. Scientific advice on the status of the stocks assessed, including WGSAD comments

| No | GSA       | Species                 | Method           | Current levels             | Reference points | Quantitative status   | Stock status  | Scientific advice               | WG comments   |
|----|-----------|-------------------------|------------------|----------------------------|------------------|-----------------------|---|---------------------------------|---|
| 1  | 18,19     | Aristaeomorpha foliacea | a4a              | $F_c = 0.62$ , $B_c = 285$ | $F_{0.1} = 0.45$ | $F/F_{target} = 1.38$ | In overexploitation, with relatively intermediate biomass | <b>Reduce fishing mortality</b> | Revised assessment previously validate by the WGSAD in January 2022   |
| 2  | 18,19     | Aristeus antennatus     | XSA*, a4a, SPICT |                            |                  |                       | In overexploitation                                       | <b>Reduce fishing mortality</b> | New assessment<br>Validated providing qualitative advice based on XSA (sexes combined)<br>Benchmark session suggested to further explore input data and modeling approaches   |
| 3  | 12-16, 21 | Aristaeomorpha foliacea | AMSY, BSM, JABBA |                            |                  |                       | In overexploitation and overexploited                     | <b>Reduce fishing mortality</b> | New assessment<br>Validated providing qualitative advice based on all three methods<br><br>Improvement of catch reconstruction for the Italian fleet<br>Benchmark session suggested to further explore input data and modeling approaches |



# Performed assessments



Table 2. Summary of additional information useful for making assessments more informative, by GSA

| GSA | Additional information  |
|-----|---|
| 18  | Georeferenced catches<br>Logbook information                                  |
| 19  |   |
| 20  |   |
| 12  |   |
| 13  |   |
| 14  |   |
| 15  |   |
| 16  | Catches by GSA of origin – to check DCRF submissions<br>Georeferenced catches |
| 18  |   |
| 19  |   |
| 20  |   |
| 21  |   |
| 24  |   |
| 25  | Increase opportunistic sampling effort<br>Surveys at sea                      |
| 26  | Surveys at sea;<br>Complementary indicators of productivity/CPUE from LEK     |

# 2021 Twenty-second session of the Scientific Advisory Committee (SAC)\* regarding the Management of eastern-central Mediterranean fisheries proposes to:

**Assess the status of all relevant stocks of DWRS in the area by the end of 2021 including benchmarks:**

*NOT possible for all stocks within the timeframe*

SAC proposed implementing existing measures and requirements but also endorse **additional precautionary measures**.

## **Existing...**

- Authorized landing ports
- Bycatch reporting obligation
- Catch and effort record
- Register of fishing authorizations
- Effort restrictions
- International inspection plan
- Logbook/VMS requirements
- Transshipment prohibition





# Deepwater red shrimp in the eastern-central Mediterranean



Can they request and implement additional management measures?

Recommendation GFCM/42/2018/3 on a multiannual management plan for sustainable trawl fisheries targeting giant red shrimp and blue and red shrimp in the Levant Sea (geographical subareas 24, 25, 26 and 27)

22. Where, for any reason (e.g. lack of appropriate data), the SAC is not in a position to provide an accurate advice on the stock status of the key species listed in Annex 1 and on their exploitation levels, the GFCM shall decide on the most appropriate management measures to ensure the sustainability of the fisheries. Such measures shall be based on SAC advice, **in accordance with the precautionary approach** and taking into consideration environmental and socio-economic elements in a way that guarantees the sustainability of the fisheries.



## Deepwater red shrimp in the eastern-central Mediterranean



**Upcoming management measures to be agreed at GFCM level in the Strait of Sicily and in the East Med.**

### Potential...

- Report **catches by GSA of origin**
- Establish a **catch certification scheme + research programme**
- **Minimum landing size** (based on size at first maturity), at least for *A. antennatus*
- **Minimum mesh size and twine material** for the trawl cod-end (pending possible advice from WGFiT)
- Spatial **protection of nursery grounds** for *A. foliacea*
- Establishment of a **fishing season**

**At present (Feb 2022) there is no information on exact management measures upcoming at GFCM level for 2022.**

**Thank you for your attention**



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