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Rome, 22 July 2019

MEDAC CONTRIBUTION TO THE SOCIOECONOMIC INDICATORS RELATED TO THE FORTHCOMING DRAFT MAP ON DEMERSAL IN ADRIATIC SEA

The MEDAC, during the WG1 meeting held in Thessaloniki in June, acknowledging the importance given to the socioeconomic indicators by STECF and GFCM WKMSE, decided to investigate and anlayse this topic related to the future Adriatic MAP on demersal species. This work will be done in collaboration and coordination with WG5, starting from the most updated information on the status of the demersal stocks in the Adriatic Sea. Nevertheless, the MEDAC decided to open the debate on the most appropriate socioeconomic indicators to be estimated before the definition of management measures in the MAP and/or after the regulation enforcement in order to evaluate the effects in each Mediterranean sub-area.

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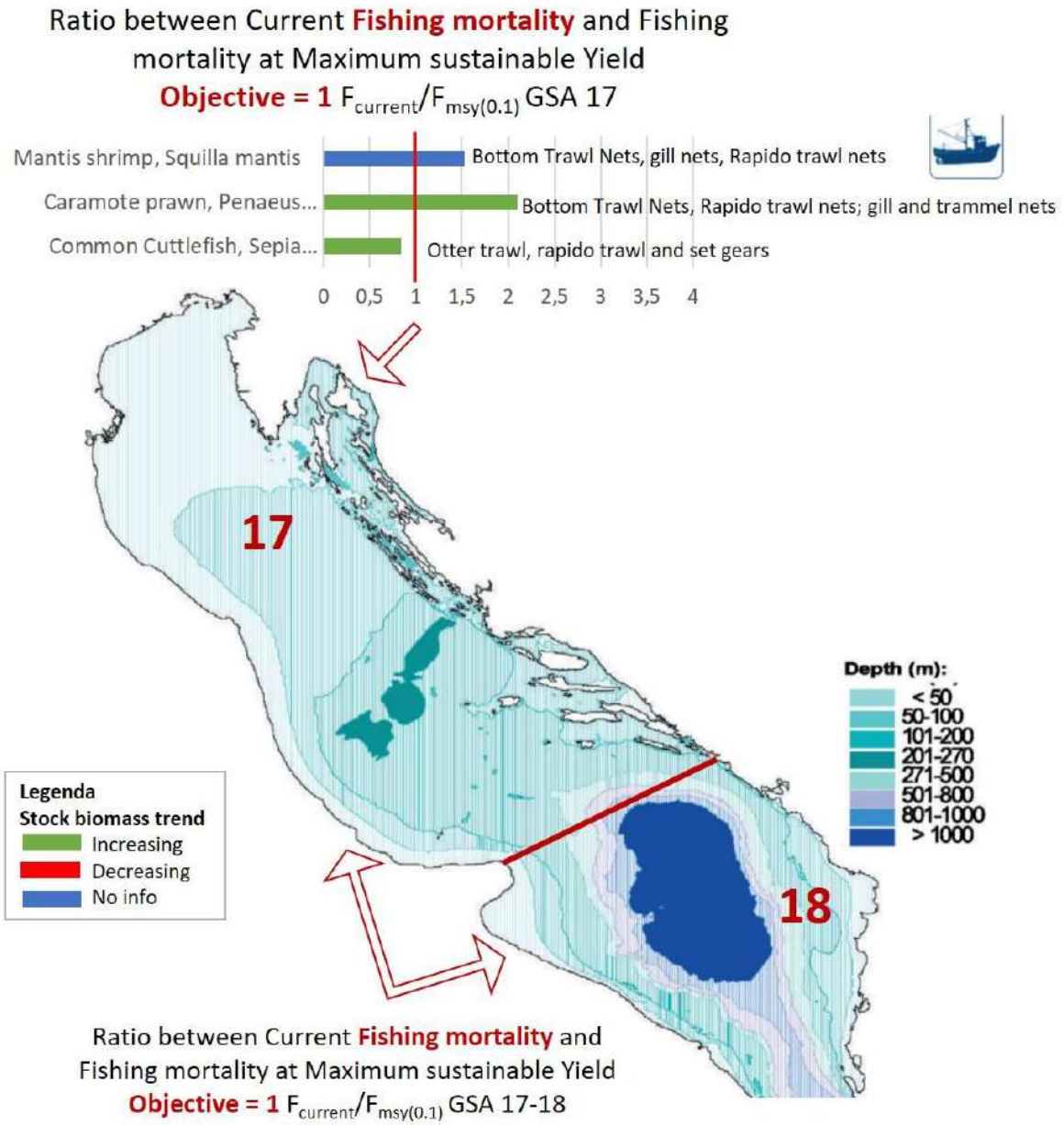
Stock status indicators: - F fishing mortality

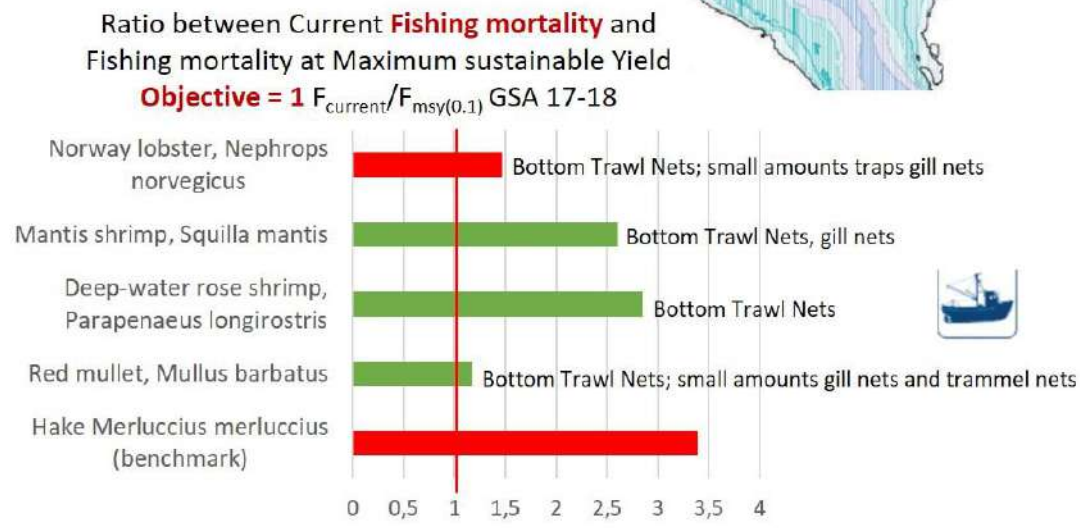
- F_{msy} fishing mortality related to the maximum sustainable yield
- $F_{0.1}$ is considered a conservative proxy for F_{MSY}, and is widely used in the context of the GFCM, especially for demersal stocks.
- $F_{current}$ = Current Fishing mortality - **Objective of management measures**: **$F_{current} = F_{msy}$ (or $F_{0.1}$) *AND SO* $F_{current} / F_{msy}$ (or $F_{0.1}$) = 1**

Species	GSA	Fishery	Spawning Stock Biomass	F (Fishing mortality)	Diagnosis	Advice and recommendation
Red mullet, *Mullus barbatus*	17-18	Bottom Trawl Nets; small amounts gill nets and trammel nets	Increasing from 2011	Decreasing, now slightly higher than reference point	**In overexploitation** with relatively high biomass	Reduce $F_{current}$ towards $F_{0.1}$ **2017 - $F_{current}/F_{0.1}$ = 1,17**
Deep-water rose shrimp, *Parapenaeus longirostris*	17-18-19	Bottom Trawl Nets	Increasing (max value in 2017)	Decreasing	**Unstable results in the last years - Possibly in overexploitation, with relatively high biomass**	Precautionary advice – Reduce fishing mortality **2017 - $F_{current}/F_{0.1}$ = 2,85**
Caramote prawn, *Penaeus kerathurus*	17	Bottom Trawl Nets, Rapido trawl nets; gill and trammel nets	Stock biomass increasing above MSY	**Increasing**	**In overexploitation, with relatively low biomass**	Progressive reduction of fishing effort **2017 - $F_{current}/F_{msy}$ = 2,1**
Mantis shrimp, *Squilla mantis*	17	Bottom Trawl Nets, gill nets, Rapido trawl nets			**Intermediate overfishing, relative low biomass**	Reduce $F_{current}$ towards $F_{0.1}$ **2017 - $F_{current}/F_{0.1}$ = 1,53**
Mantis shrimp, *Squilla mantis*	17-18	Bottom Trawl Nets, gill nets	Increasing	Decreasing	**In overexploitation with relatively high biomass**	Reduce fishing mortality **2017 - $F_{current}/F_{0.1}$ = 2,60**
Norway lobster, *Nephrops norvegicus*	17-18	Bottom Trawl Nets; small amounts traps gill nets	**Decreasing**	Decreasing	**In overexploitation**	Reduce fishing mortality **2017 - $F_{current}/F_{msy}$ = 1,47**
Common Cuttlefish, *Sepia officinalis*	17	Otter trawl, rapido trawl and set gears	Biomass in the last 4 years increased but is still below the B_{msy}	Decreasing	**Sustainably exploited, with relatively low biomass**	Do not increase Fishing mortality - Avoid any increase of catches to improve the of biomass **2017 - $F_{current}/F_{msy}$ = 0,84**
Hake (benchmark)	17-18		**Biomass around 70% the precautionary biomass**		**In overexploitation and overexploited**	**$F_{current}/F_{msy}$ =3,4**

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In the following figure you can find the information provided in the previous table





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Furthermore, considering the STECF - GFCM WKMSE (Workshop Management Strategy Evaluation) comments:

European hake	The fact that hake is **heavily overexploited** leads to the stock being very reactive to changes in F leading to large increases in SSB. This brings the stock dynamics to areas not observed in the past data, **increasing uncertainty in the outcomes and suggesting results should be taken cautiously**. Nevertheless, the outcomes of the MSE for this stock are very similar to those obtained for other hake stocks around the world, some of them validated by an observed **quick recovery after a reduction of fishing pressure.**
Deepwater rose shrimp	The assessment highlights a peak in recruitment in the most recent part of the time series. This makes it difficult to project into the future and therefore the **results of an MSE based on this assessment should be taken with caution**.
Common sole	The average of F in the last three years, used as F status quo, is smaller than the terminal F in the assessment, instantly triggering an increase in SSB, due to an artificial decrease of fishing mortality in the first year of the projection. ii. For this particular MSE, **the harvest control rules were not robust to the stock recruitment relationship assumed in the assessment. GSA 17 Fcurrent/Fmsy = 2,71**

And the management scenarios assessed during the STECF 19-02 are listed in the table below:

	F status quo	**Fmsy2024**	**Fmsy2024 Fix Reduction**	**F status quo Catch lim**	**Fmsy2024 Fix Reduction Catch limit**	**F status quo FRA (Fishery Restricted Area)**	**Fmsy2024 Fix Reduction FRA**	**F status quo 6 Nautical miles closure**	**Fmsy2024 Fix Reduction 6 Nautical miles closure**
Solea solea	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Hake	**X**	**X**	**X**						
Deep-water rose shrimp	**X**	**X**	**X**						
Red mullet	**X**	**X**	**X**						
Mantis shrimp	**X**	**X**	**X**						

Acknowledging the steps forward on the knowledge of the assessed stocks, additional information and more robust results on the effects related to management measures and scenarios could improve the compliance of the fishery sector.

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Moreover, considering the results of the SAC21 meeting (24-27 June 2019), that endorsed the outcomes of the WKMSE and the SRC-AS:

"The overexploitation status of all priority demersal species, with the exception of common cuttlefish, was also highlighted. In view of improving the overall management of priority species in this subregion, ***technical elements towards a management plan****, including potential fisheries management measures, were presented. In acknowledging the poor status of Adriatic demersal stocks, it advised management measures to be implemented, in line with the following technical elements:*

- *The* ***linear reduction scenario tested had the best performance*** *in terms of both recovery and reaching the target of MSY. This is particularly true for stocks that are highly overexploited and for which a significant and continued reduction (as highlighted by the results of the stock assessment) may be needed to reach agreed targets.*
- *Regarding* ***common sole****, the most effective* ***spatial measures*** *to reduce F among the ones tested is the* ***combination of the 6nm closure with the effort reduction****.*
- ***Two-year management lag in the cyclic response observed in the simulations reduces the uncertainty in the projections for catch and SSB****. This effect is exacerbated by the fact that the fishery for most of these species concentrates on individuals between 1 and 3 years of age, so by the time adopted measures become effective, the stock used as the basis of management would have already left the fishery. "*

During the SRC-AS meeting, the following Potential fisheries management measures were proposed. **The existing (*in italics*) and potential fisheries management measures applicable to demersal fisheries in the Adriatic Sea** include:

- Fishing effort regime
- FRA to protect EFH (*Jabuka/Pomo pit (Rec. GFCM 41/2017/3)*
- *Depth restrictions*
- Other spatial restrictions *(Distance from the coast)*
- Temporal closures (Authorized number of fishing days or Temporal closures)
- Gear restrictions *(Authorized/prohibited gear types-* Gear characteristics including mesh size)
- Management of the fleet capacity (Fleet registry/Number of vessels/fleet capacity)
- *Minimum conservation reference size*
- Control measures (VMS and electronic logbook/ pilot project for joint inspection schemes)

Furthermore, considering that the **WKMSE in the intersessional period 2019-2020 will provide support to the SAC towards advice on the impacts of alternative measures for selected fisheries**, including the **expansion of the analysis of economic** dependency of different fleets on the different demersal species in the Adriatic Sea, initiated by the STECF-19-02 (Appendix 10 – SAC21).

Taking into consideration the **comments and conclusions of the STECF Plenary to the EWG 19-02** *"EWG 19-02 was asked to assess the potential biological and socio-economic benefits of implementing several management options of a planned Multi-Annual Plan for the fisheries exploiting demersal stocks in the Adriatic Sea" […] "STECF notes however that the bio-economic analyses carried out by the working group are limited and still preliminary. STECF considers that further work based on mixed fishery bioeconomic modelling and* ***consultation with stakeholders would be needed to better understand the socio-economic implications of the proposed Multiannual Plan****".*

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MEDAC suggests the following socio-economic indicators.

Socioeconomic indicators – *Demersal Stocks*

Indicators	Brief description
Economic dependency on the stocks	$Sum_{species\ of\ MAP}$ (weight * price) / Total revenues
Fleets' contributions to total landings	$Weight_{stock}$ / Total weight of stock (taking into consideration the seasonal fluctuations)
Social impact related to fishing communities	Social impact on small coastal communities (i.e. percentage of impacted people on total community population – Islands)
Price/Landed Quantities (Kg)	Economic indicator
Current coefficient of elasticity of the demand for the species involved	Socio-economic indicator (estimate of the effect of reducing quantities landed - due to the management measures in place - on the average price for the sale)
Working days/Employed	Socio-economic indicator
Working hours/day/Employed	Social indicator
Full-Time equivalent (FTE)	Social indicator
Full-Time equivalent (FTE)/Catches (tons)/year	Social impact
Fuel consumption (l)/Catches(ton)/year	Economic indicator (taking into consideration the distance needed to reach the fishing area)

Unwanted catches (kg)/Tot catches (ton)/year	Economic indicator
Average age of new workers in the fishing sector	Socio-economic indicator
Average of exit age from the fishing sector	Socio-economic indicator
Population pyramid of the different localities (distribution of various age groups in a population)	Socio-economic indicator
Employment level in the fishing sector in the affected localities	Socio-economic indicator
Possibility of alternative or complementary economic activities	Socio-economic indicator
Number of vessels with permanent cessation of fishing activity	Medium term Socio-economic indicator
Current Revenue (CR) / Break-even Revenue (BER)	Indicator of the economic sustainability
Labour cost / Number of employees	Social Indicators - Average salary per employee
Effects of bringing stocks to MSY through the implementation of the MAP	Environmental indicator - The recovery of stocks repairs the disequilibrium of the ecosystem and makes it more resilient to external factors (climate changes, pollution).

	Socio-economic indicator (Operating on depleted stocks is a net loss for fisheries. The Jabuka example shows that marine ecosystems have a surprisingly strong and fast capacity of recover in terms of biomass. Fishing on thriving stocks means better catches on middle term (quantity and quality) which means a better value at first sale which implies more visibility for coastal communities that depend (directly or indirectly) on fish and fishing activities.)
Use of EMFF by the concerned fisheries (How many ships? How much? What for?)	Socio economic indicator
Difference between present catches and catches at MSY	Socio economic indicator
Difference between present number of Full-time jobs and employment at MSY	Socio economic indicator
Difference between present value at first sale and at MSY	Socio economic indicator
Difference between present financial net results and at MSY	Socio economic indicator
Difference between present situation of the processing sub-sector and effects at MSY	Socio economic indicator
Current CPUE and CPUE at MSY (maintaining capacity)	