



Food and Agriculture
Organization of the
United Nations

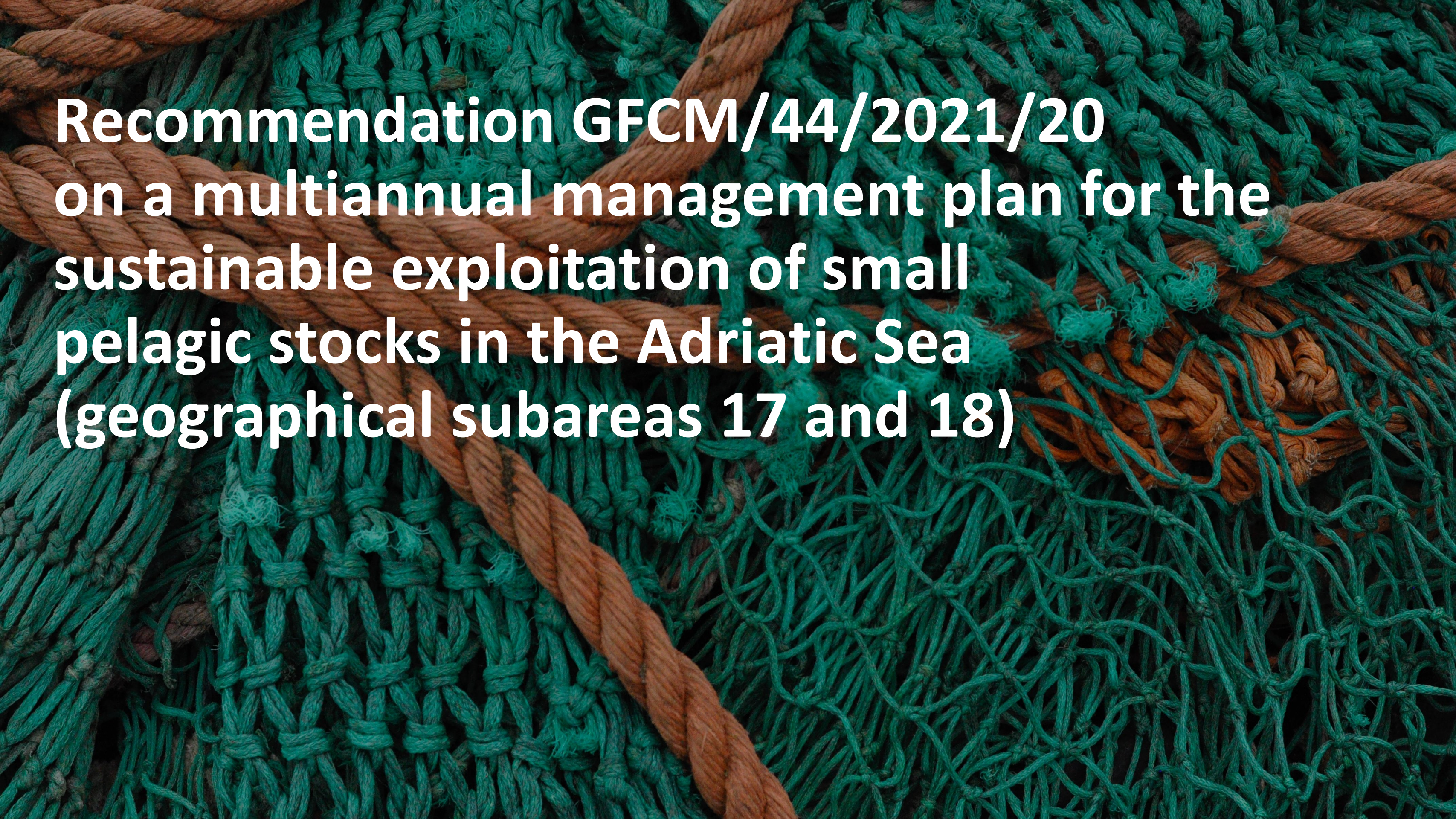


General Fisheries
Commission for
the Mediterranean

Stakeholders involvement in the Management Strategy Evaluation on small pelagic in the Adriatic Sea in the framework of the GFCM WGMSE

Rome

12 October 2023



**Recommendation GFCM/44/2021/20
on a multiannual management plan for the
sustainable exploitation of small
pelagic stocks in the Adriatic Sea
(geographical subareas 17 and 18)**

Recommendation GFCM/44/2021/20 on a multiannual management plan for the sustainable exploitation of small pelagics in the Adriatic Sea

General objectives



GFCM

- The **multiannual management plan** shall be consistent with the precautionary approach, provide high long-term yields consistent with the maximum sustainable yield (MSY) and guarantee a low risk of stocks collapse while maintaining sustainable and relatively stable fisheries including dependent industries.
- The plan should take account of the mixed nature of the fisheries and the nature of stock dynamics.

The plan shall, in particular:

- Apply the **precautionary approach** to fisheries management;
- Ensure that **exploitation levels of key stocks are at MSY ...** at the latest by 31st December 2028 taking into account possible interaction between the two species
- **Prevent increase of fishing capacity in relation to year 2014**
- **Protect nursery and spawning areas, and essential fish habitats** important for the key stocks
- Contribute to elimination of discards ...
- Provide for measures to adjust the fishing capacity and catches to levels of fishing mortalities consistent with the MSY...

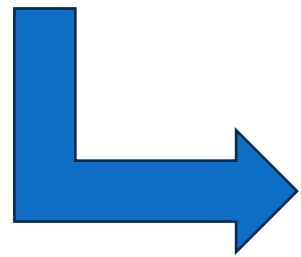


Recommendation GFCM/44/2021/20 on a multiannual management plan for the sustainable exploitation of small pelagics in the Adriatic Sea

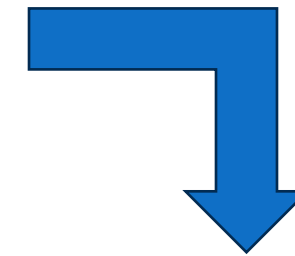


The management plan is based on a two-step approach where:

+ in the **first two years**, with the possibility of a third transitional year, **catch limits and spatio-temporal measures** will be applied.



2022-2023: finalization of sardine benchmark assessment and the MSE



+ from 2024 or 2025, on the basis of new scientific data, SAC will evaluate the state of the stocks and **on the basis of the Harvest Control Rule (HCR) propose further measures and advisable yearly catch limits per species**

Recommendation GFCM/44/2021/20 on a multiannual management plan for the sustainable exploitation of small pelagics in the Adriatic Sea



- In 2022 and 2023, the CPCs shall fully engage in supporting and **completing the sardine benchmark assessment and the management strategy evaluation (MSE)**...
- If, by the annual session of the **GFCM in 2023** the **sardine benchmark and MSE are incomplete**, the GFCM shall ensure that the **transitional period is extended** by one year so that both the benchmark and MSE for sardine are completed and agreed upon...

24th session of the SAC:



The Committee recommended **extending for one year the transitional period replicating the existing measures**, towards the implementation of long-term management in 2025.

The Committee agreed to **finalize the sardine benchmark and management strategy evaluation process in line with the roadmap**, underlining the crucial importance of timely data submission.

Recommendation GFCM/44/2021/20 on a multiannual management plan for the sustainable exploitation of small pelagics in the Adriatic Sea

In 2022 and 2023 a transitional fishing regime shall be established. CPCs shall ensure that national or joint catch limits are established for small pelagics, aligned with annual reductions of:

- 5% for anchovy and 8% for sardine in 2022
- 5% for anchovy and 9 % for sardine in 2023



Such reduction should be in respect to catch limits of 2021

For the CPCs with declared catches under 2500 tonnes in 2014, a joint catch limit is established where the same reductions ... shall apply and for the period 2022-2023 catch limits are established in Annex I. These CPCs shall not exceed 70% of the total joint limit at any time.

Species	EU 2022	EU 2023	[EU 2024]	Joint catch limit 2022	Joint catch limit 2023	[Joint catch limit 2024]
Anchovy and Sardine Combined	91998	84976	[]	4650	4301	[]

The catch limits by CPC established in paragraphs 11 to 13 for the period 2022–2023 or 2024, shall be set without prejudice to the discussions to take place in the context of the working group referred to under paragraph 15.



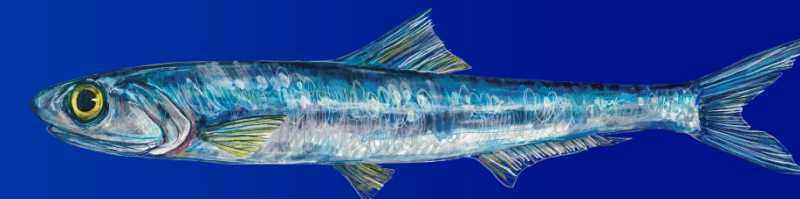
2023 stock assessment



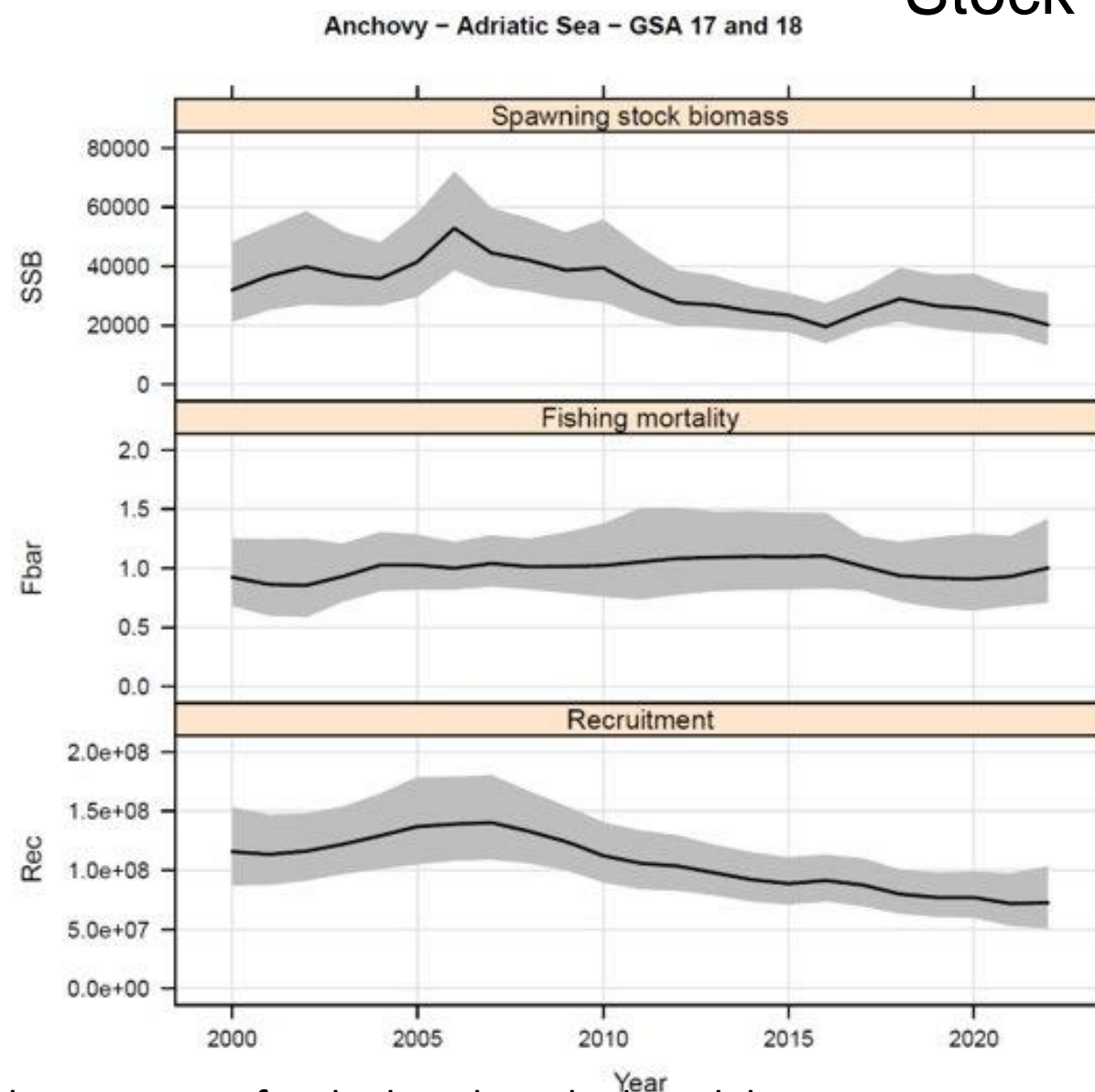
Status of small pelagic stocks in AS

GSA	Species	Method used	F/F_{MSY} *(E)	B/B_{MSY} * B/B_{pa} ** B/B_{lim}	Stock status	Management advice	WG comments
17-18	Anchovy	FLSAM	$F/F_{msy} = 1.24 \uparrow$	$SSB/SSB_{lim} = 1.25 \downarrow$ $SSB/SSB_{pa} = 0.94 \downarrow$	Overexploited and in overexploitation	Reduce fishing mortality immediately	Validated quantitative advice based on a statistical catch-at-age model a4a. F_{msy} is based on the fishing mortality that corresponds to $E=0.4$. B_{lim} correspond to $B_{loss}(year=1987)$ and B_{pa} corresponds to $B_{lim} * \exp(1.645 * \sigma_{SSB})$.
17-18	Sardine	SPiCT	$F/F_{msy} = 1.44$	$B/B_{msy} = 0.68$ $B/B_{pa} = 1.35$ $B/B_{lim} = 2.25$	Increased risk of being overexploited and in overexploitation	Reduce fishing mortality	Benchmark not finalized. Validated quantitative advice based on a surplus production model SPiCT from catches and combined biomass index. Reference points are specified based on B_{msy} . The threshold (B_{pa}) and limit (B_{lim}) reference points were set with to B_{msy} at $B_{pa} = 0.5B_{msy}$ and $B_{lim} = 0.3B_{msy}$.

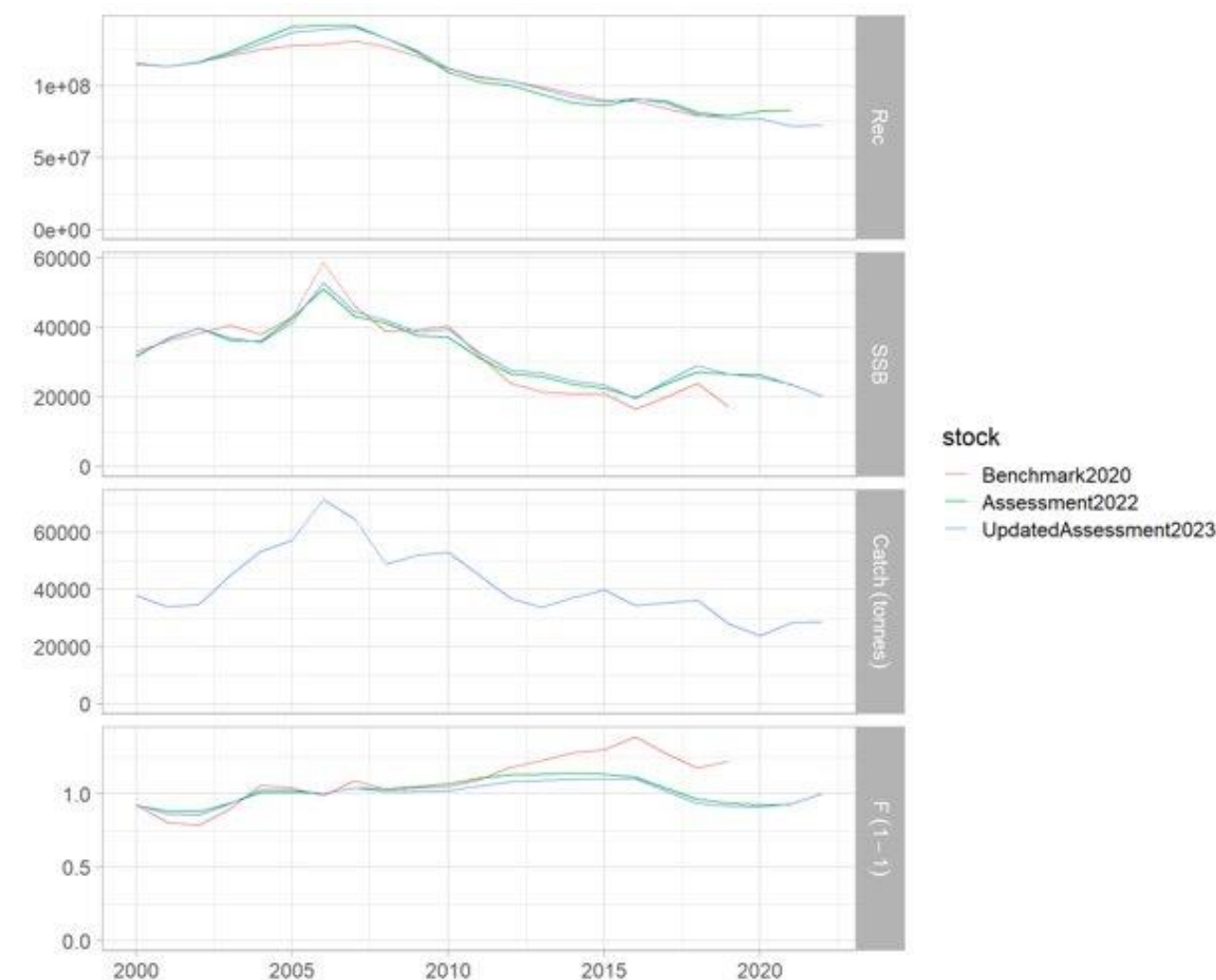
European anchovy GSAs 17-18



Stock assessment results



Stock assessment for the benchmarked model.

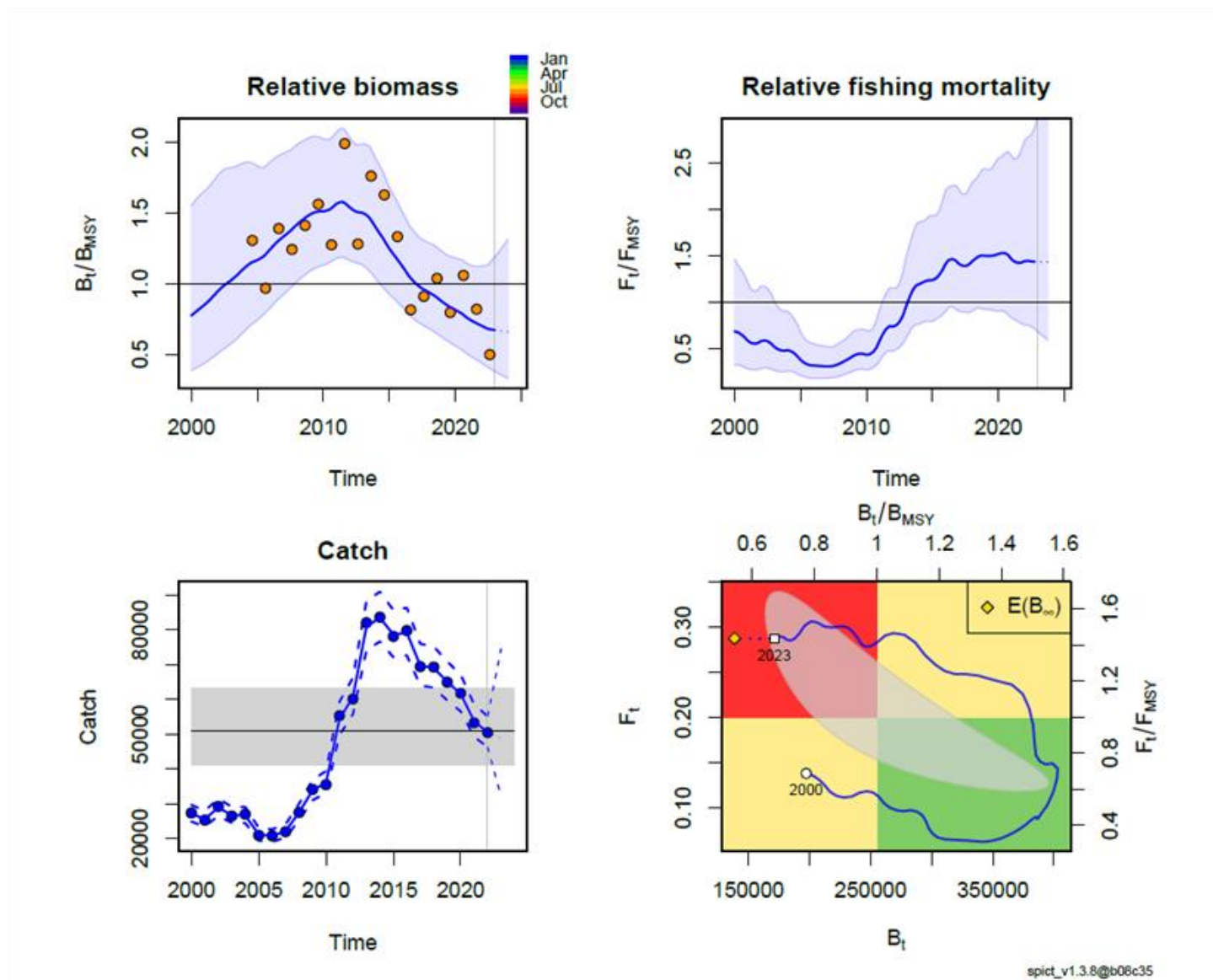


Comparison Benchmarked model (red) with updates in 2022 (green) and 2023 (blue)

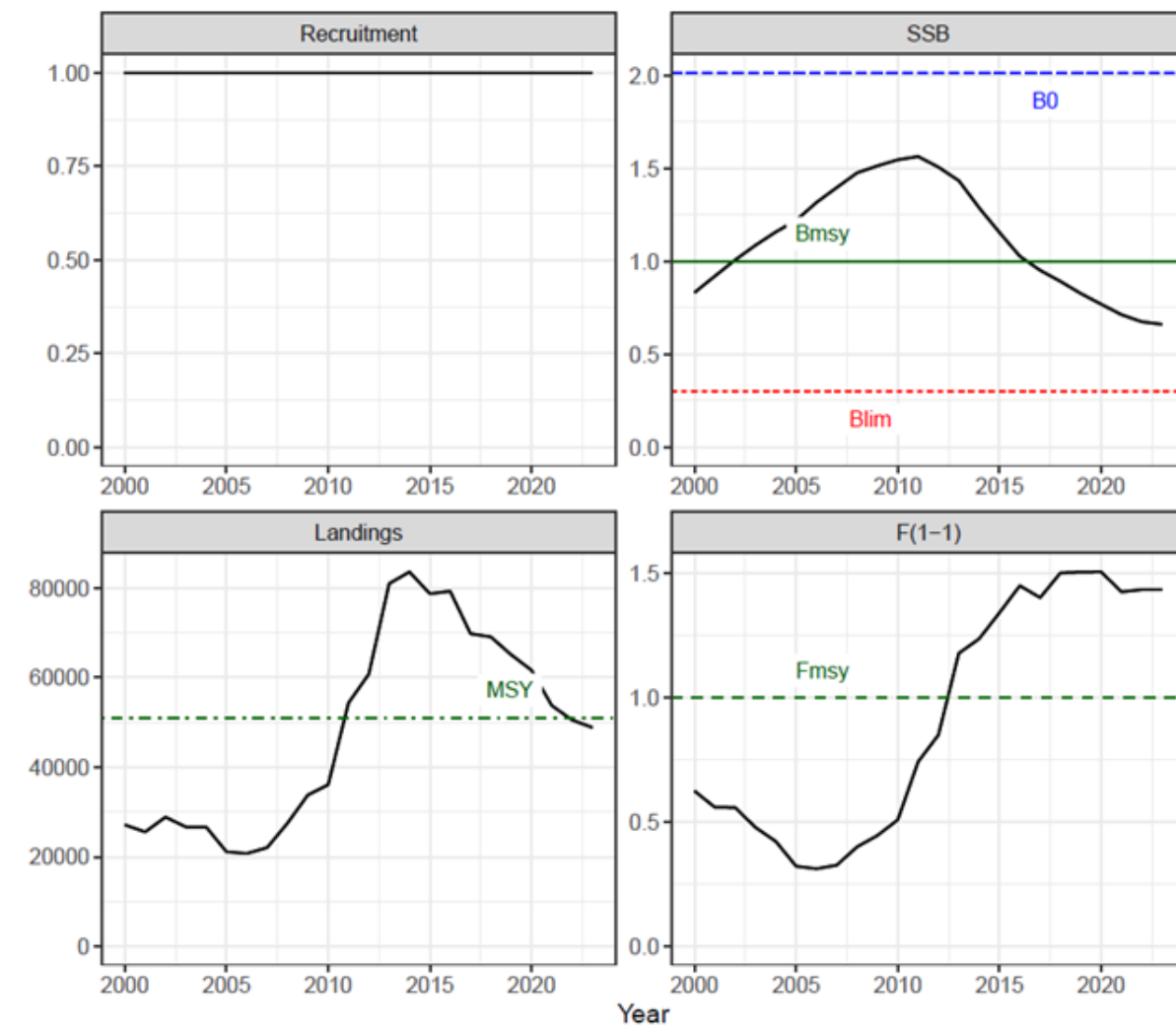
Sardine GSAs 17-18




Stock assessment results



Stock assessment for the reference case. Catches since 2000 and combined JARA survey



Stock assessment for the reference case.



**Roadmap towards the finalization of the
sardine benchmark and a quantitative MSE
for small pelagic fisheries in
the Adriatic Sea**

Finalization of the benchmark for sardine

- GFCM data call at the end of June 2023 for data needed in Data preparation session 1. ✓
- Data preparation session 1 ✓
- Workplan for the period between data preparation meetings - **ONGOING**
- **Data preparation session – 13-17 November 2023**; dedicated to the selection of the final models to be considered for the finalization of the benchmark assessment as well as fitting the data within the different models.
- **Finalization of the benchmark – 27 November – 1 December**; a benchmark assessment using the model decided at the second session of the data preparation meeting



A quantitative MSE for small pelagic fisheries in the Adriatic Sea

The scope of the MSE work in the framework of Recommendation GFCM/44/2021/20 is to provide outputs on the implementation of different management options and decision-making loops that will allow the Group to propose an HCR to the SAC in 2024



Advance on MSE work during the intersession (July 2023 – January/February 2024)



Stakeholder consultations (July-October 2023 for first consultations and iterative presentation November 2023 - February 2024)



MSE work (following the finalization of the benchmark of sardine, and before May 2024)



Presentation of results (SRC-AS 2024; SAC 2024)



Capacity-building



**Stakeholder consultations in the MSE on
small pelagics in the Adriatic Sea**

Stakeholder consultations



Building upon the work already carried out by WKMSE on Adriatic small pelagics, organise in-country / subregional stakeholder consultation meetings including all involved countries to gain an understanding of stakeholder views

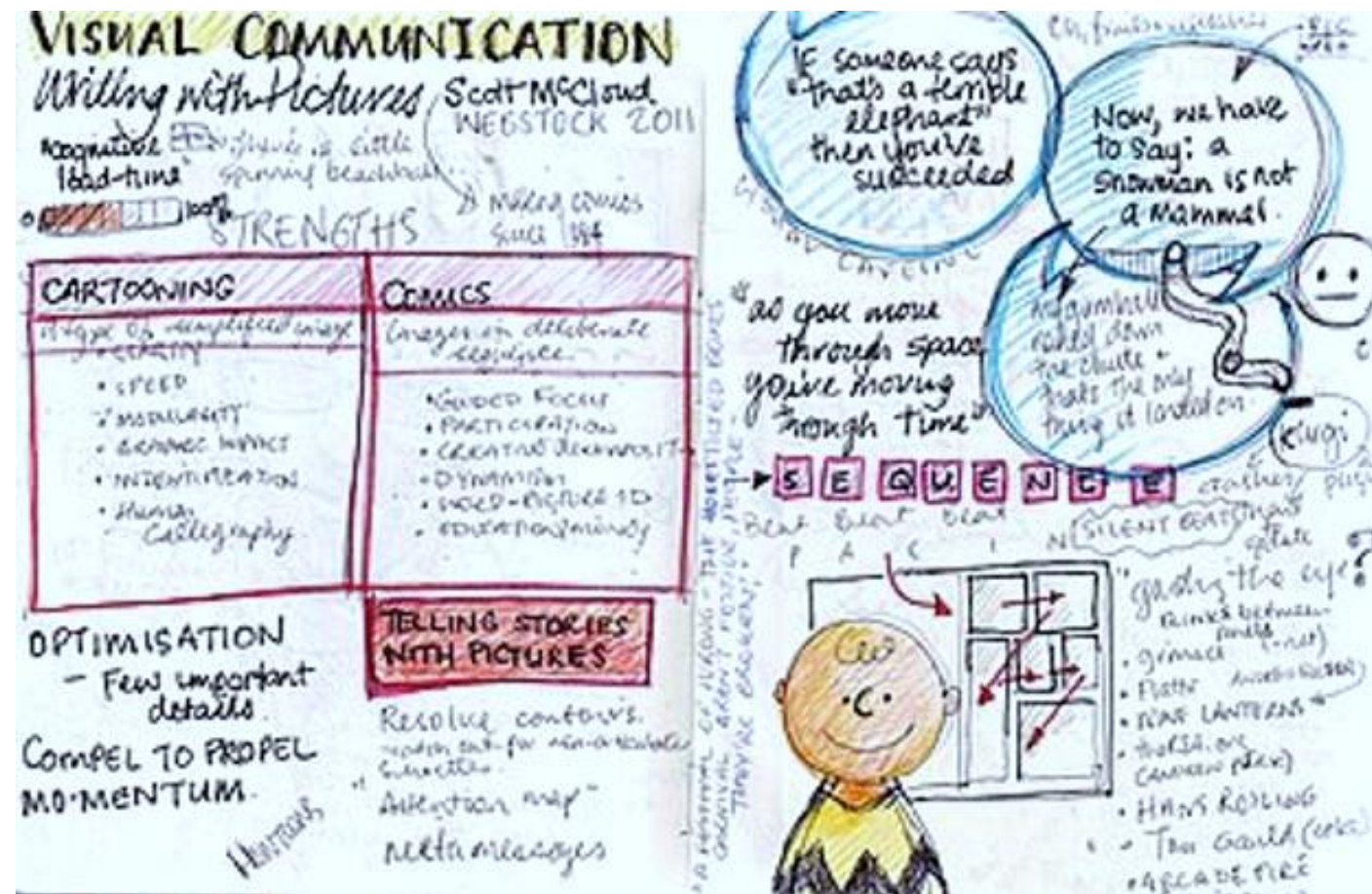
- + provide a simplified synopsis of the MSE process to stakeholders
- + simplify and standardise the inputs from the stakeholders by adapting them to those pieces of information that could be used by MSE analysts, thus reducing the gap between doable and expectation



Stakeholder consultations

A **template** will be developed and circulated with stakeholders by the GFCM Secretariat allowing stakeholders to address the **information required by the analysts** while also ensuring their views were being collected.

A compilation of the information received through these templates will **inform the technical work** to be performed.



MSE introduction

The Management Strategy Evaluation (MSE) in fisheries management provides a structured and scientific approach to decision-making that helps ensure the sustainable and effective management of fishery resources. The practical value of MSE lies in its ability to guide fisheries management toward more sustainable, adaptable, and effective practices. It provides a systematic way to navigate the complexities of fisheries ecosystems and to make well-informed decisions that benefit both the environment and the people dependent on these resources.

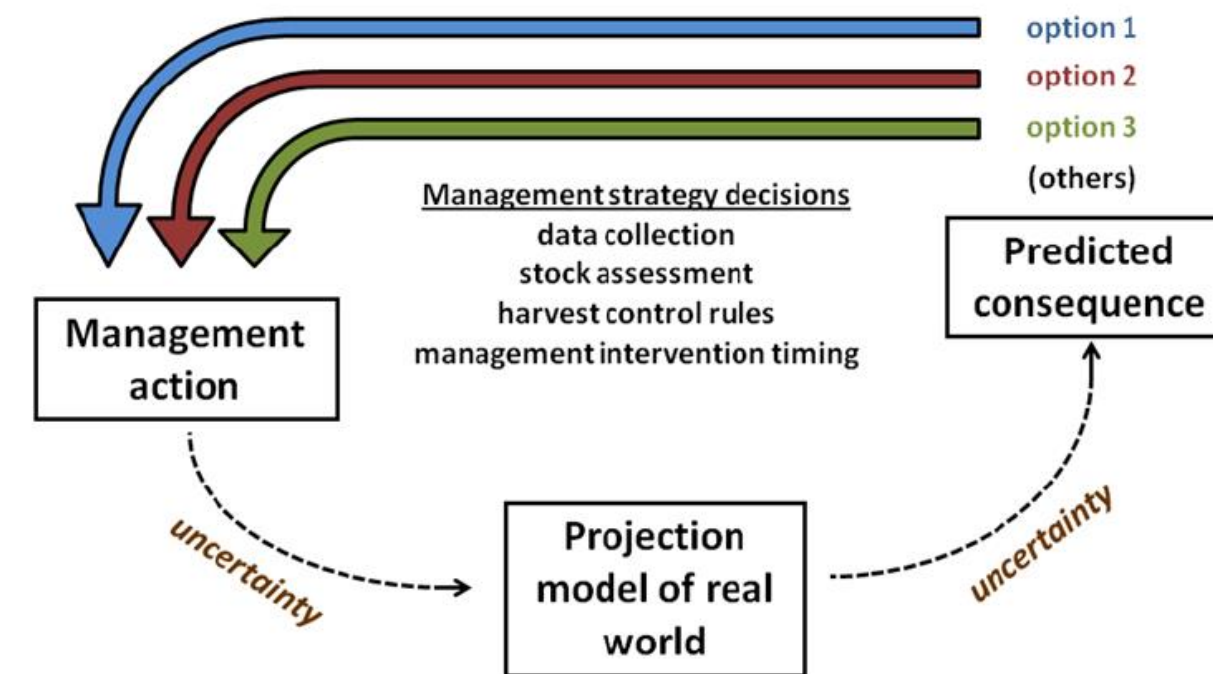
Simple and clear?

MSE is a closed-loop simulation with feedback control of the fishery where the population dynamic is driven by the management process that feeds back and impacts the simulated fish population.

More simple...

In simple words, MSE is trying to mimic the status of the stock following the management rules over the time period.

Management Strategy Evaluation (MSE)



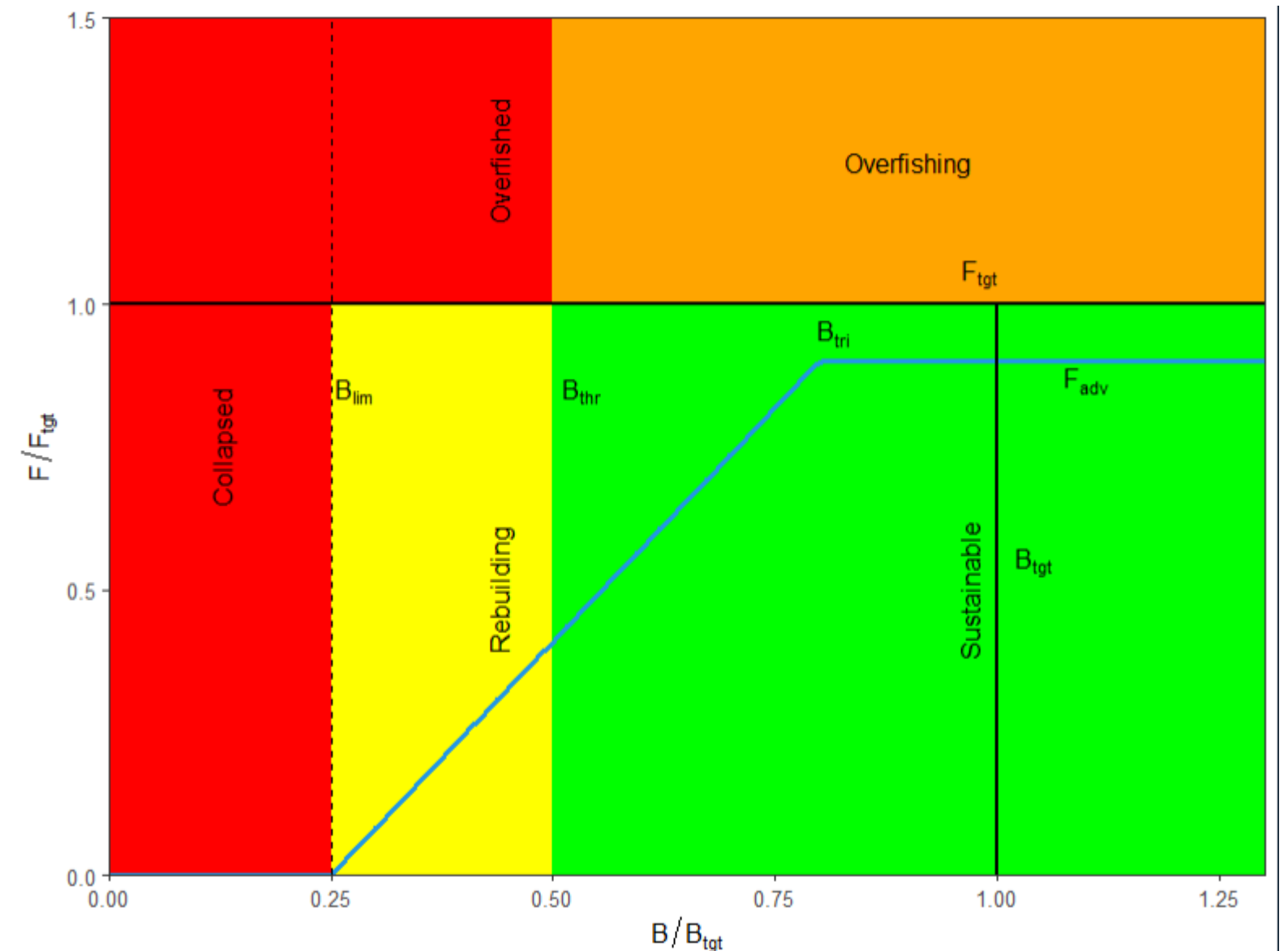
The objective of the Adriatic small pelagics MSE in the context of Rec. GFCM/44/2021/20



To implement the second step of the multiannual management plan GFCM Working group for MSE needs to carry out an MSE in order to define the most appropriate HCR to be implemented for anchovy and sardine.

A Harvest Control Rule (HCR) is a set of rules that dictate how **catch limits should be tuned to achieve the management objective** for a specific stock.

It helps ensure the sustainability of the fishery by providing a framework for **making management decisions in response to changes in the fish population's status.**



The objective of the Adriatic small pelagics MSE in the context of Rec. GFCM/44/2021/20

Stakeholders' inputs

The full MSE process allows the incorporation of many tuning variables, such as fleet characteristics and behaviour, spatio-temporal measures, adaptive management or more complex assessment dynamics. **However, this particular MSE has its defined goal in the Recommendation, which is a selection of the best-performing HCR based on a set pre-agreed performance criteria.**



The Recommendation also sets number of input informations...



Input information defined by the Recommendation



HCR to be tested

- + Fixed Fmsy
- + Biomass Escapement (Besc)
- + Bay of Biscay (BoB)
- + Hockey-Stick?
- + ?

Safety

- + Safety has been defined to be less than a risk of 5% probability of stocks falling below Blim.

Yield variation, in terms of stability

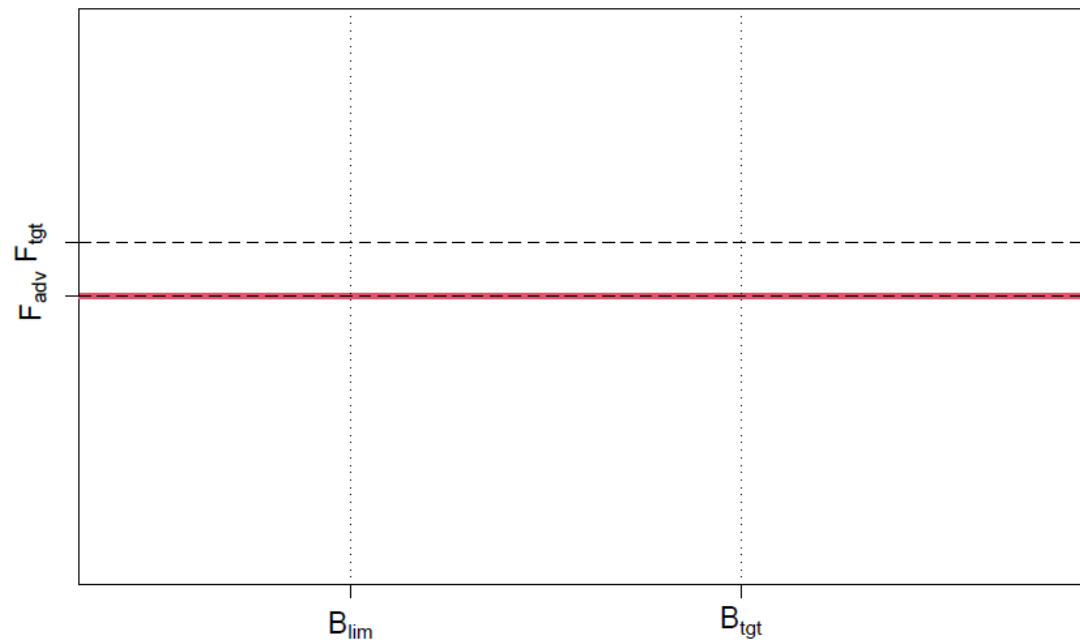
- + The Recommendation sets this variation to a maximum of 10% for the first three years (starting from 2024), and to a maximum of 20% for the remaining years.

Excess of catch limit

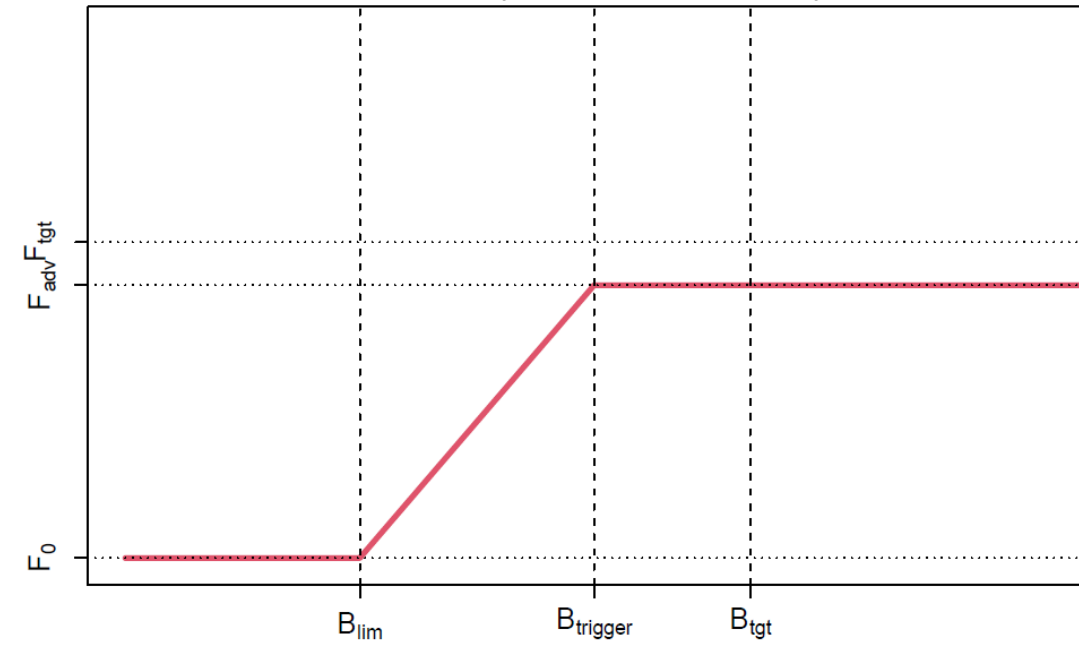
- + Recommendation foresees the possibility of overshooting the annual catch limit in the case when one species (sardine or anchovy) is caught as a bycatch while targeting other species up to 9%. This provision shall only apply where the stocks of non-target species are within safe biological limits.

Candidate HCR types

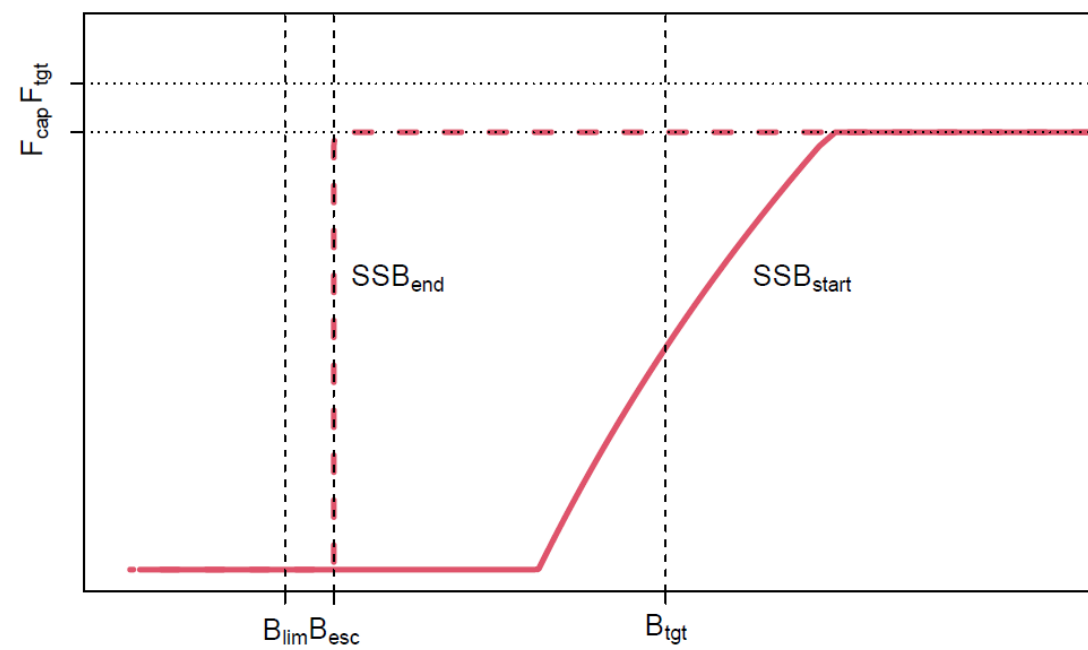
Fixed F



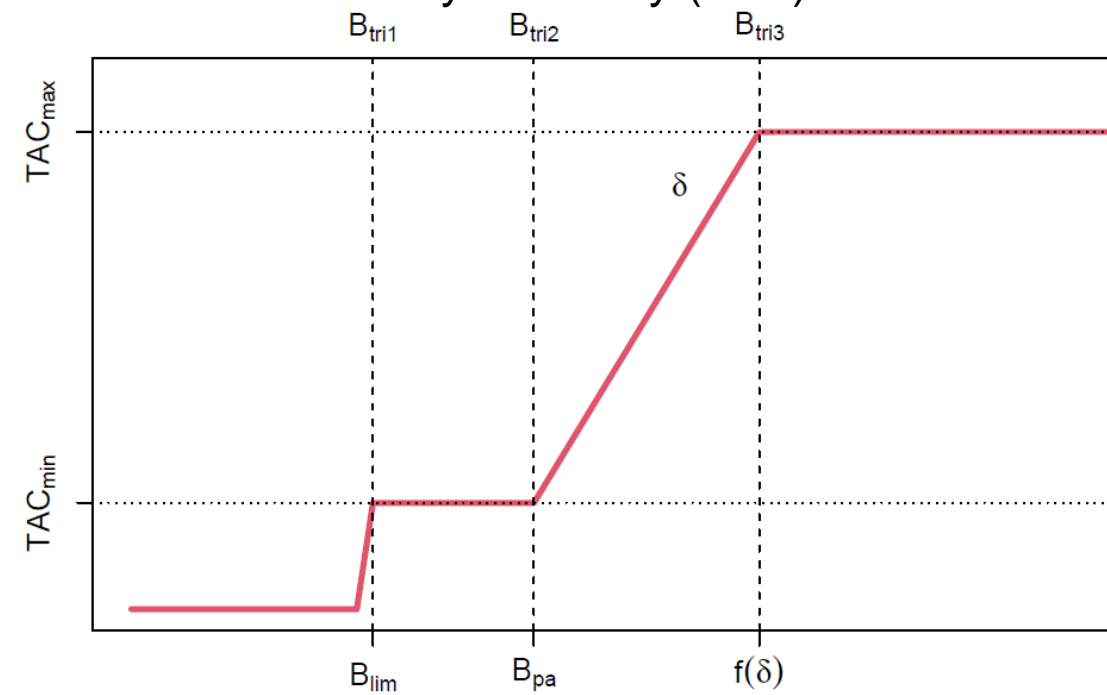
Hockey-Stick (ICES type)



Biomass escapement



Bay of Biscay (BoB)



Input information defined by the stakeholders

Set Performance Criteria from Recommendations

- Risk of biomass falling below B_{lim}
- Probability(%) that $B > B_{MSY}$ by 2028

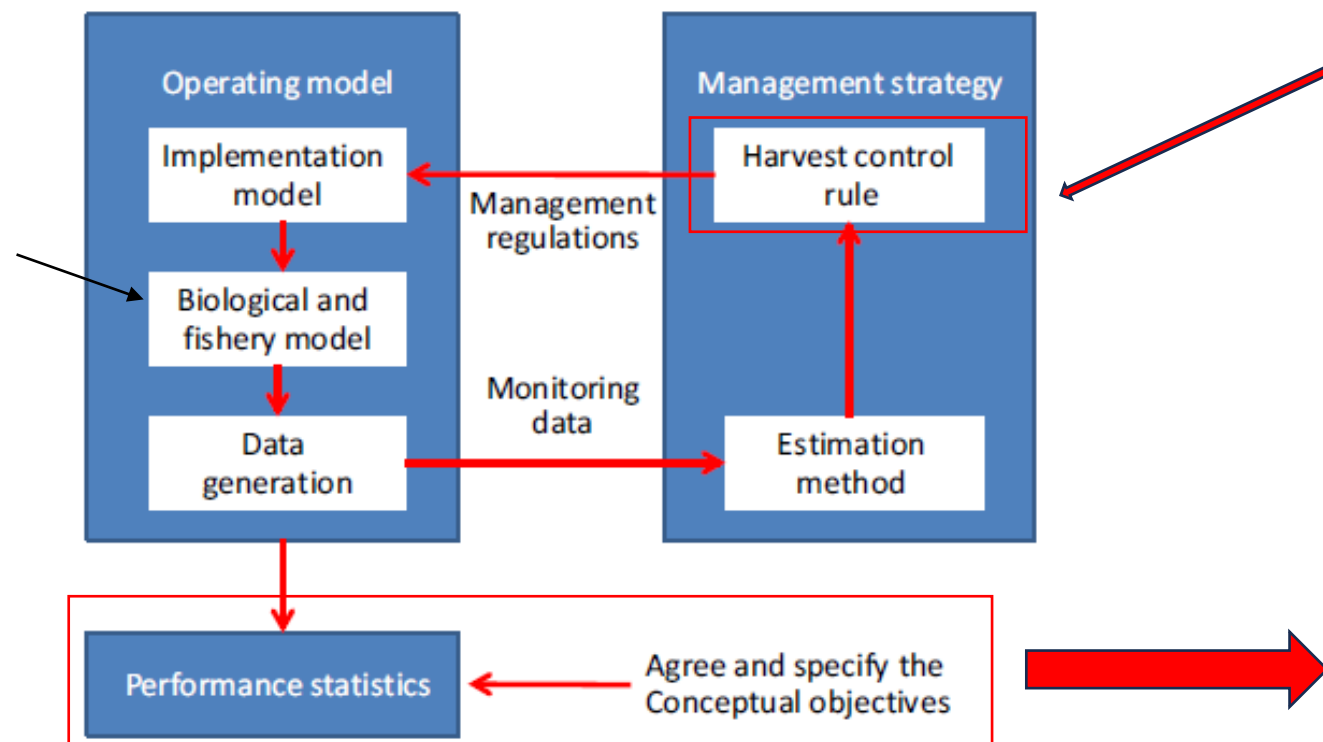
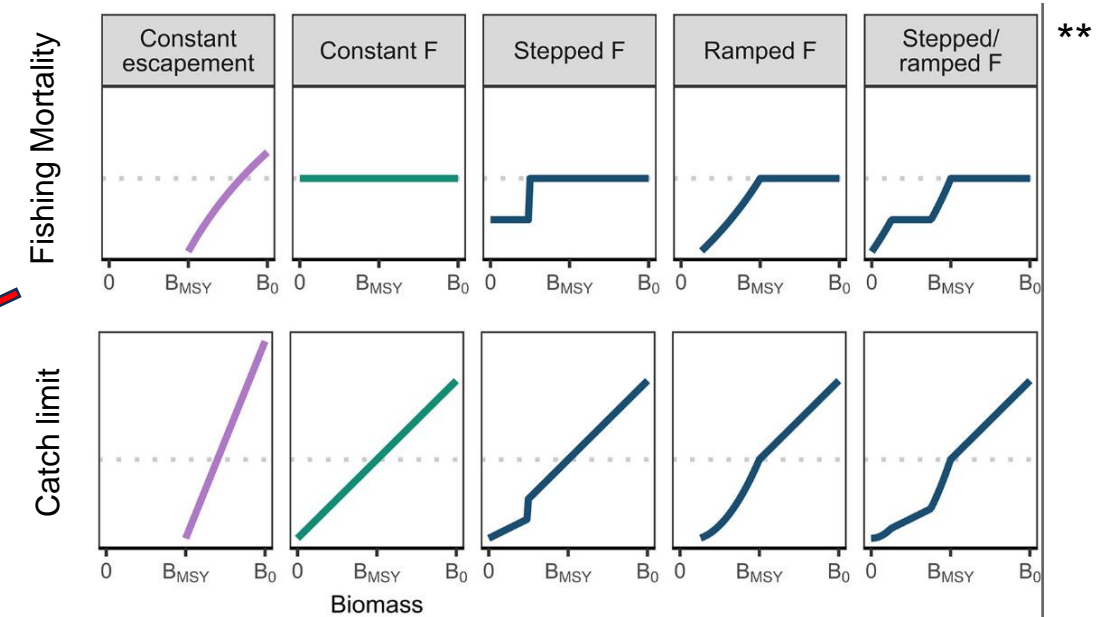


Figure 1 Conceptual overview of the management strategy evaluation modelling process.*

Additional type of harvest control rules?



Optional Performance criteria to select the HCR?

- Average long-term yield
- Average short- and medium-term yields (time horizons?)
- Interannual catch variability (stability)
- Catch per unit effort
- Minimum viable economic catch levels
- Maximum upper catch level

* Punt et al. (2016). Management strategy evaluation: best practices. Fish and fisheries, 17(2), 303-334.

**Free et al. (2023). Harvest control rules used in US federal fisheries management and implications for climate resilience. Fish and Fisheries, 24(2), 248-262.



In the view of the MEDAC members...

- what would be the priorities in observing the performance statistics of HCR?
- aside from the management objectives from the recommendation, what would be other goals regarding the management (yield stability, minimum, maximum)?
- are there any other important aspects of the fishery that could be included in the MSE?

Thank you for your attention

GFCM Secretariat

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