Summary of the outcomes of the STECF EWG 21-07 on Review of the Technical Measures Regulation

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Extraordinary meeting on the results of the STECF Plenary meeting (15-20 November) and the Agrifish meeting (13-14 December)

Video conference, 17th December 2021

EWG 21-07 was a follow-up to the EWG 20-02 (October 2020).

EWG 21-07 met online from the 11th to the 15th October 2021.

The meeting was attended by 18 experts, including four STECF members and three JRC experts. Three DG MARE representatives and one observer also attended the meeting.

Background

- In August 2019, the new EU Technical Measures Regulation (TMR) (REGULATION (EU) 2019/1241) came into force.
- Its objective is to “optimise exploitation patterns to provide protection for juveniles and spawning aggregations of marine biological resources” (Article 3.2.(a))
- Its target is that “catches of marine species below the minimum conservation reference size are reduced as far as possible” (Article 4.1.(a))

EWG 21-07 Terms of Reference (ToRs)

1. Calculate the respective selectivity-at-age that (a) predict the highest yield at current fishing mortality rates or harvest rates, and (b) provide the greatest protection of juveniles.
2. Compare the optimised selectivity-at-age predicted under (1) with current selectivity-at-age estimates for the stocks concerned in terms of both (a) yield gains and (b) protection of juveniles
3. Compare the optimised selectivity-at-age predicted under (1) with current selectivity-at-age estimates by fleet, gear and area, which should be analysed to the most disaggregated level that is feasible in terms of both yield gains and protection of juveniles.
4. For regional case studies, explore trade-offs between fishing pressure and selectivity with a view to minimising impacts and maximizing catches under different scenarios for catch, fishing mortality and in relation to fisheries reference points. STECF is further asked to comment on practical issues regarding the attainment of the biologically optimal selection pattern in the context of mixed fisheries and multi-gear fisheries.

33 stocks

20 ICES stocks

13 Med stocks

Region	Area	Stock	Species	Assessment	Fleet Data
MED	WM	HKE.01_05_06_07	*Merluccius merluccius*	STEFC, a4a, 2020 (Rep. year)	Yes
MED	WM	HKE.08_09_10_11	*Merluccius merluccius*	STEFC, a4a, 2020 (Rep. year)	Yes
MED	WM	MUR.05	*Mullus surmuletus*	STEFC, a4a, 2020 (Rep. year)	Yes
MED	WM	MUT.01	*Mullus barbatus*	STEFC, a4a, 2020 (Rep. year)	No
MED	WM	MUT.06	*Mullus barbatus*	STEFC, a4a, 2020 (Rep. year)	No
MED	WM	MUT.07	*Mullus barbatus*	STEFC, a4a, 2020 (Rep. year)	Yes
MED	WM	MUT.09	*Mullus barbatus*	STEFC, a4a, 2020 (Rep. year)	Yes
MED	WM	MUT.10	*Mullus barbatus*	STEFC, a4a, 2020 (Rep. year)	Yes
MED	CEM	HKE.17_18	*Merluccius merluccius*	STEFC, SS3, 2020 (Rep. year)	No
MED	CEM	HKE.19	*Merluccius merluccius*	STEFC, a4a, 2020 (Rep. year)	No
MED	CEM	HKE.20	*Merluccius merluccius*	STEFC, a4a, 2020 (Rep. year)	No
MED	CEM	MUT.17_18	*Mullus barbatus*	STEFC, a4a, 2020 (Rep. year)	No
MED	CEM	MUT.22	*Mullus barbatus*	STEFC, a4a, 2020 (Rep. year)	No

Main conclusions from the EWG 21-07

The EWG 21-07 concludes that improving selectivity appears an efficient way to reach the current objectives of the CFP.

1. The current selectivity patterns lead to large mortality rates on juveniles for most of the studied stocks (especially, hake stocks in the Mediterranean), while optimizing the selectivity results in a much higher protection of juveniles, as required by the current TMR.
2. Improved selectivity allows to reach sustainability (F_{MSY}) more easily, in particular for those stocks, such as the hake stocks in the Mediterranean, that are currently heavily overfished.

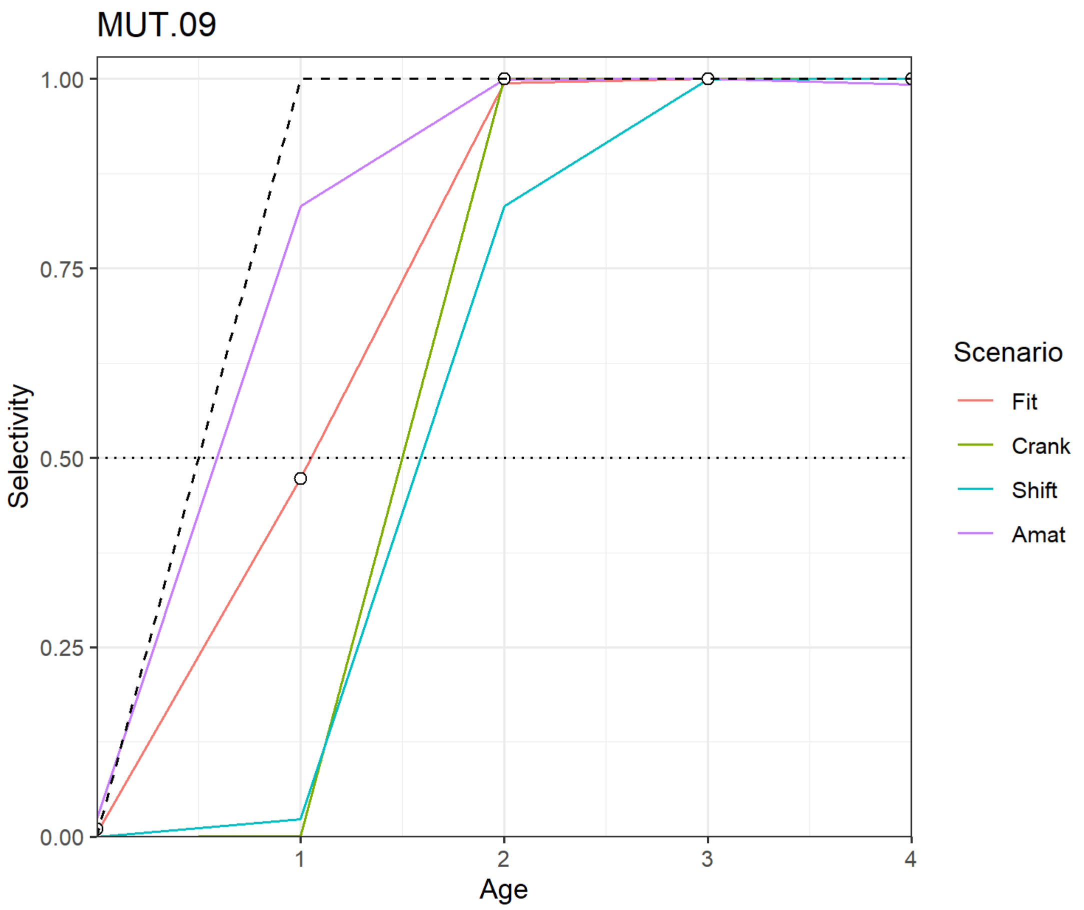
How the EWG 21-07 reached the previous conclusions……

ToRs 1 and 2: PROJECTION SCENARIOS

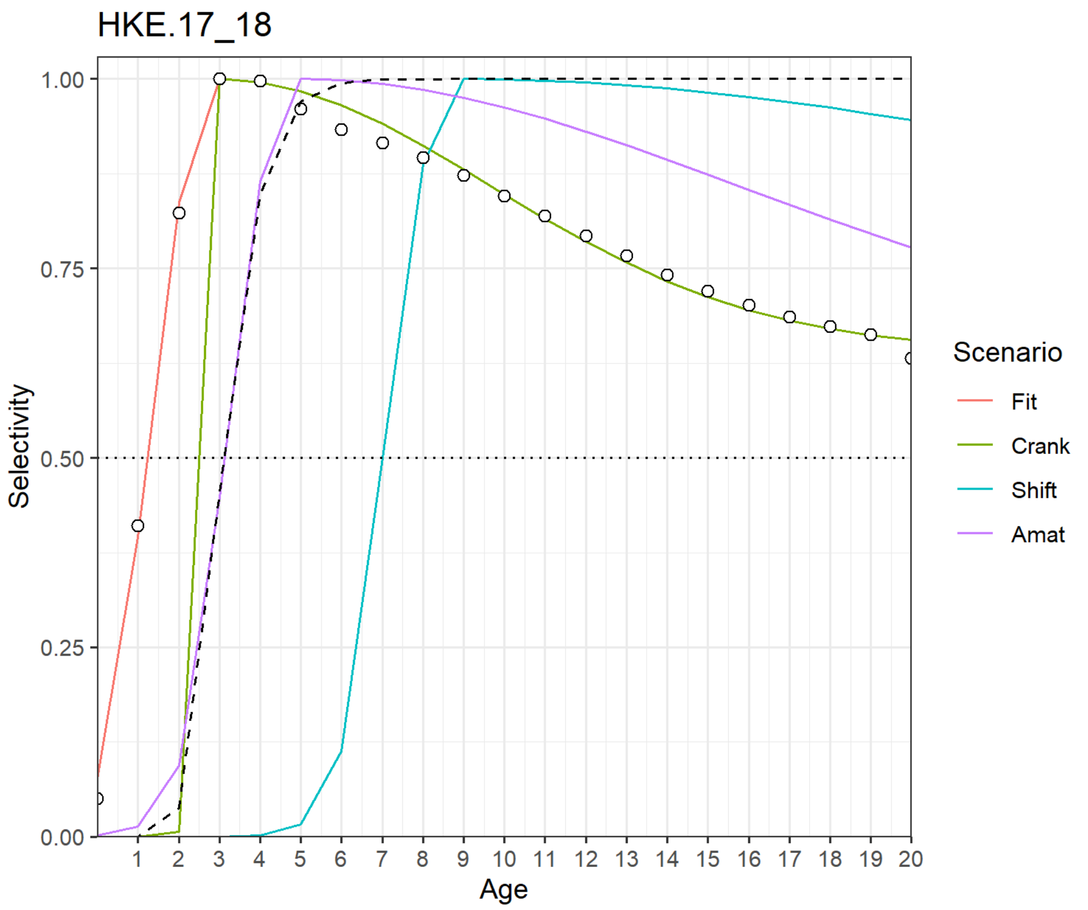
For each stock, a total of five scenarios were projected deterministically over a horizon of 50 years to attain equilibrium quantities for (a) yield and (b) the proportion of juveniles in the catches

No	Scenario	Specification
1	Cur (Reference)	Projections are made using the current selectivity-at-age at current F (F_{cur}), which serves the reference case of the status quo situation against which the four following alternative scenarios are evaluated
2	Crank	Projections are made at F_{cur} using “cranked” selectivity curve that resulted in the maximum yield. **Crank is mimicking nursery areas closure or use of exclusion devices**
3	Shift	Projections are made at F_{cur} using “shifted” selectivity curve resulted in the maximum yield. **Shift is mimicking an increase of mesh size**
4	Amat	Projections are made under F_{cur} using “shifted” selectivity curve for which the age-at-50%-selectivity (S_{50}) corresponds to age-at-50%-maturity (A_{mat50})
5	F_{adv}	Projections are made using the current selectivity, but at F levels that correspond to the scientific advice for F_{MSY} (F_{adv})

The analyses were performed with the R/FLR package FLSelex, which was developed for EWG 21-07 and is available at https://github.com/Henning-Winker/FLSelex.



Red mullet in GSA09: Selectivity scenarios. Dots represent the observed selectivity-at-age and dashed line represents maturity-at-age from the assessment model



Hake in GSAs 17-18: Selectivity scenarios. Dots represent the observed selectivity-at-age and dashed line represents maturity-at-age from the assessment model

Predictions for Mediterranean stocks summarizing the yield change (%) relative to the current selectivity under current F (blue: positive; red: negative; colour intensity indicates magnitude of effect) and the associated percentage of juvenile fish in the catch (%) (from red, via orange and yellow to green: high to low values).

Area	Stock	F_{2019}/F_{adv}	Yield Change (%)				Juveniles in catch (%)				
			F_{adv}	Crank	Shift	A_{mat}	Cur	F_{adv}	Crank	Shift	A_{mat}
WM	HKE.01_05_06_07	4.1	25.5	88.3	294	67.8	86.3	65.1	18.5	0.2	44.8
WM	HKE.08_09_10_11	3.4	11.7	6.1	129.7	37.1	78.6	63.8	58.7	0	16.1
WM	MUR.05	0.5	-1	0.6	1	1	0	0.6	0.2	0	0
WM	MUT.01	1.5	8.4	35.3	43.9	-23.9	0	0	0	0	0
WM	MUT.06	4.6	19	24.8	67.8	-51	0	0	0	0	0.5
WM	MUT.07	1.6	5.1	28.8	27.3	-5.7	13.2	10.1	0	0.2	24.6
WM	MUT.09	1.7	-5.8	6.2	5	-12.3	2.9	4.7	0	0.1	11.9
WM	MUT.10	1.2	8.8	25.1	47.5	-31.5	1.3	11.4	0	0	5.1
CEM	HKE.17_18	2.3	10.4	16.7	34.9	18.1	89.9	73.3	40.3	0.3	42
CEM	HKE.19	2.4	20.8	17.9	166.6	54	78.7	67.3	55.2	1.1	46.2
CEM	HKE.20	2.7	28.3	49.4	99.3	31.1	63.3	47.4	11	2.2	38
CEM	MUT.17_18	2.0	-2.2	17.3	21.6	-11.8	2.3	7.5	0	0	7.2
CEM	MUT.22	0.3	22.3	0.4	0.6	0.4	15.9	17.9	16.1	14	16.4

All the tested scenarios result in a reduction of catches of juveniles; this is particular evident in hake stocks where the current percentage of juveniles in catches is extremely high (>80%).

ToR 3

Percentage of juvenile fish in the catch, by fleet (by stock)

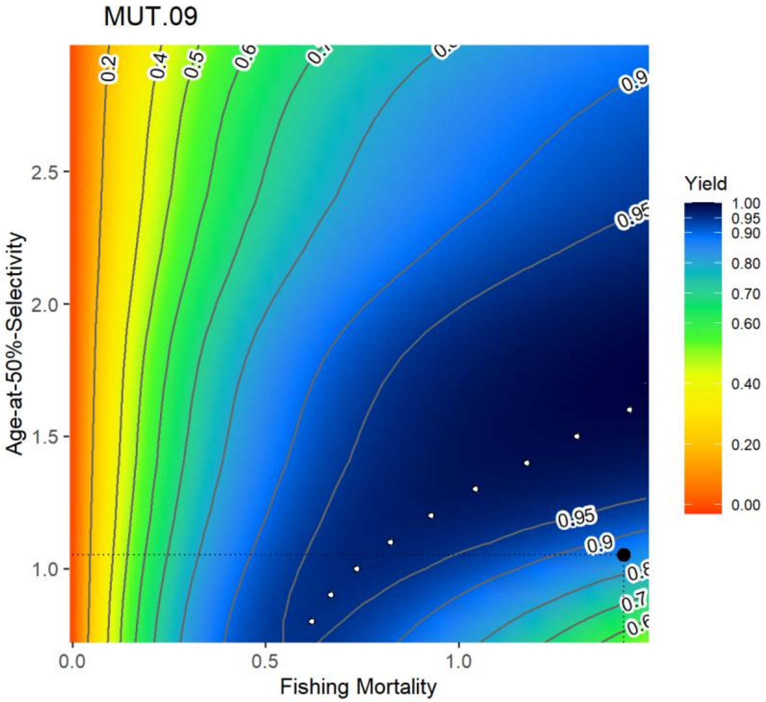
Area	Stock	Cur	Crank	Shift	A_{mat}	GNS	GTR	LLS	OTB
WM	HKE.01_05_06_07	86.3	18.5	0.2	44.8	48.1		3.1	91.6
WM	HKE.08_09_10_11	78.6	58.7	0	16.1	16.9	51.8		82.5
WM	MUT.01	0	0	0	0				
WM	MUT.07	13.2	0	0.2	24.6				13.3
WM	MUT.09	2.9	0	0.1	11.9				3.5
WM	MUT.10	1.3	0	0	5.1	30.5	0.1		25.7

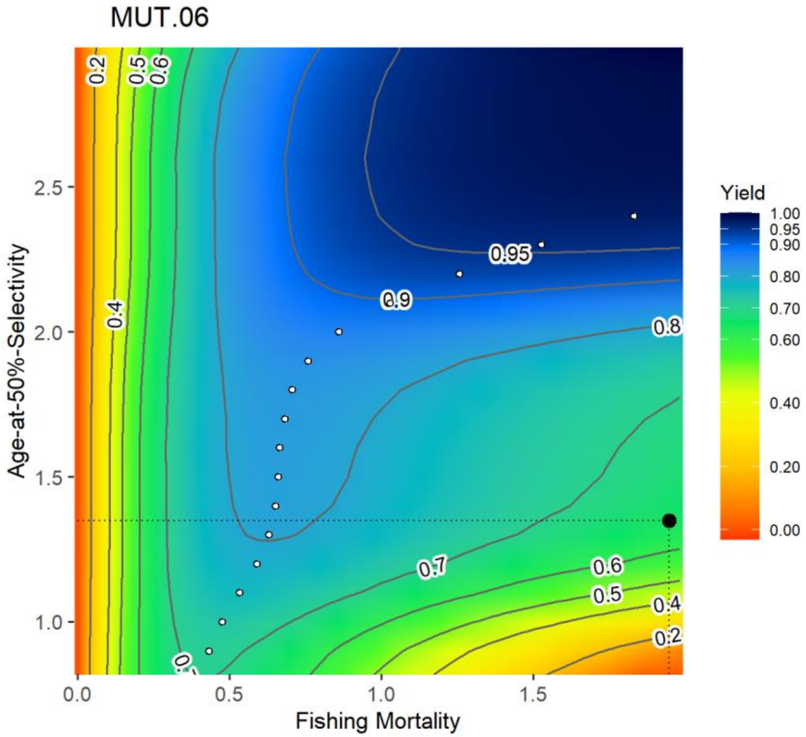
Yield changes relative to current situation, by fleet (by stock)

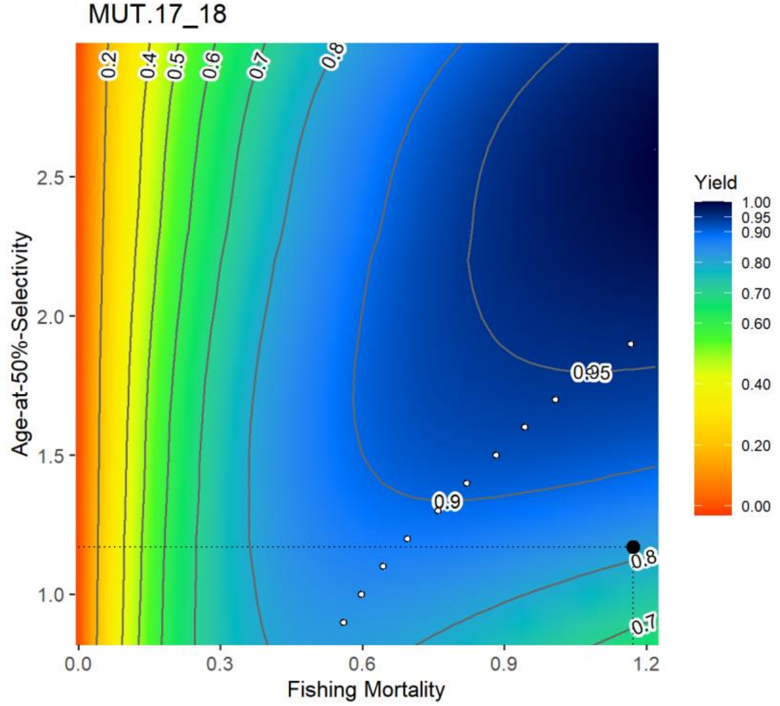
Area	Stock	Crank	Shift	A_{mat}	GNS	GTR	LLS	OTB
WM	HKE.01_05_06_07	88.3	294	67.8	35.2		197	-11.5
WM	HKE.08_09_10_11	6.1	129.7	37.1	56.3	-28.8		-13.5
WM	MUT.01	35.3	43.9	-23.9		11.5		-5.8
WM	MUT.07	28.8	27.3	-5.7				-0.2
WM	MUT.09	6.2	5	-12.3		-17.3		-0.5
WM	MUT.10	25.1	47.5	-31.5	29.2	5.9		-9.1

ToR4

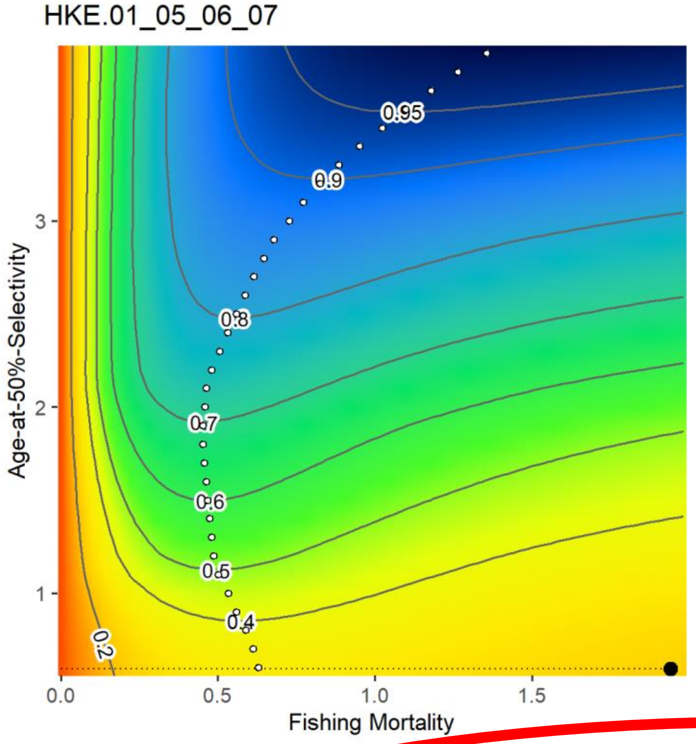
Isopleths show the trade-offs between improved selectivity and F with respect to relative yield and stock biomass

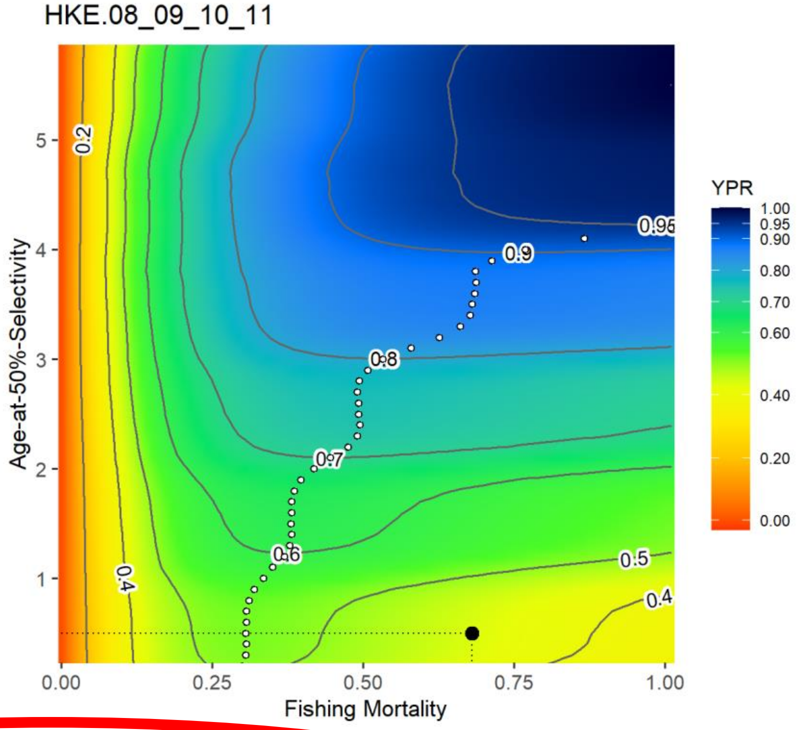




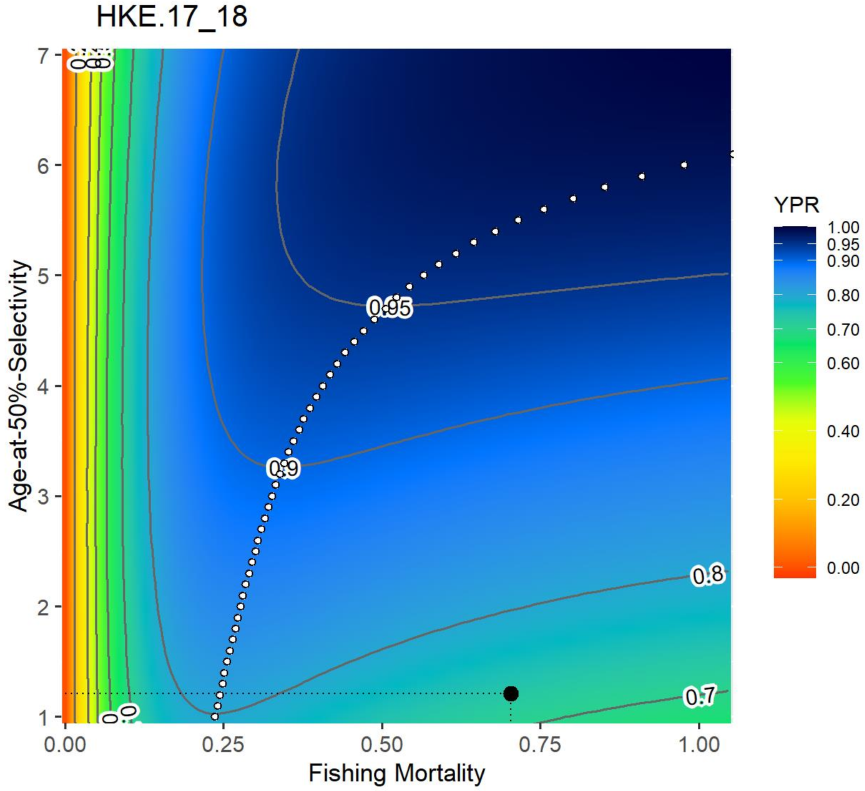


White dots represent MSY: reaching MSY by both increasing selectivity and reducing F implies a lower reduction of F compared to a scenario where management actions work to only reduce F towards F_{MSY}





2. Improved selectivity allows to reach sustainability (FMSY) more easily, in particular for those stocks, such as the hake stocks in the Mediterranean, that are currently heavily overfished.



STECF PLEN 21-03 Conclusions

STECF concludes that increasing selectivity contributes to reaching some of the current objectives of the CFP, especially if applied together with reductions in fishing mortality. Advantages of such an approach include:

- **reaching the current F_{MSY}** (i.e. maximum sustainable yield exploitation rate, defined as the target of fisheries management in Article 2.2 of the 2013 CFP basic regulation) **with less overall reduction in fishing pressure, in particular for stocks that are currently heavily overfished (e.g., hake)**;

- **ensuring a higher protection of juveniles** by improved exploitation patterns, as required in Article 3.2a of the current TMR;

- **improved compliance with the landing obligation** (Article 15 of 2013 CFP basic regulation);

- **discard reduction due to lower catches of individuals below** MCRS (Article 2.5a and Article 4.1a of the TMR regulation);

- **reducing the impact of fishing on exploited fish stocks**, according to Article 2.3 of the 2013 CFP Basic Regulation which stipulate that "*The CFP shall implement the ecosystem-based approach to fisheries management so as to ensure that negative impacts of fishing activities on the marine ecosystem are minimized*". In particular, improving selectivity together with reducing fishing pressure towards F_{MSY} would lead to higher biomass than by reducing fishing pressure alone. This means that a given level of catches would be achieved with comparatively less effort, implying thus fewer greenhouse gas emissions, habitats impacts and bycatches of sensitive species.