

Striped red mullet (*Mullus surmuletus*) in Subarea 4 and divisions 7.d and 3.a (North Sea, eastern English Channel, Skagerrak and Kattegat)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches should be no more than 1 985 tonnes in each of the years 2024 and 2025. All catches are assumed to be landed.

ICES advice on conservation aspects

ICES has not identified any conservation aspects.

Stock development over time

Fishing pressure on the stock is above F_{MSY} proxy and the stock size indicator is above $I_{trigger}$.

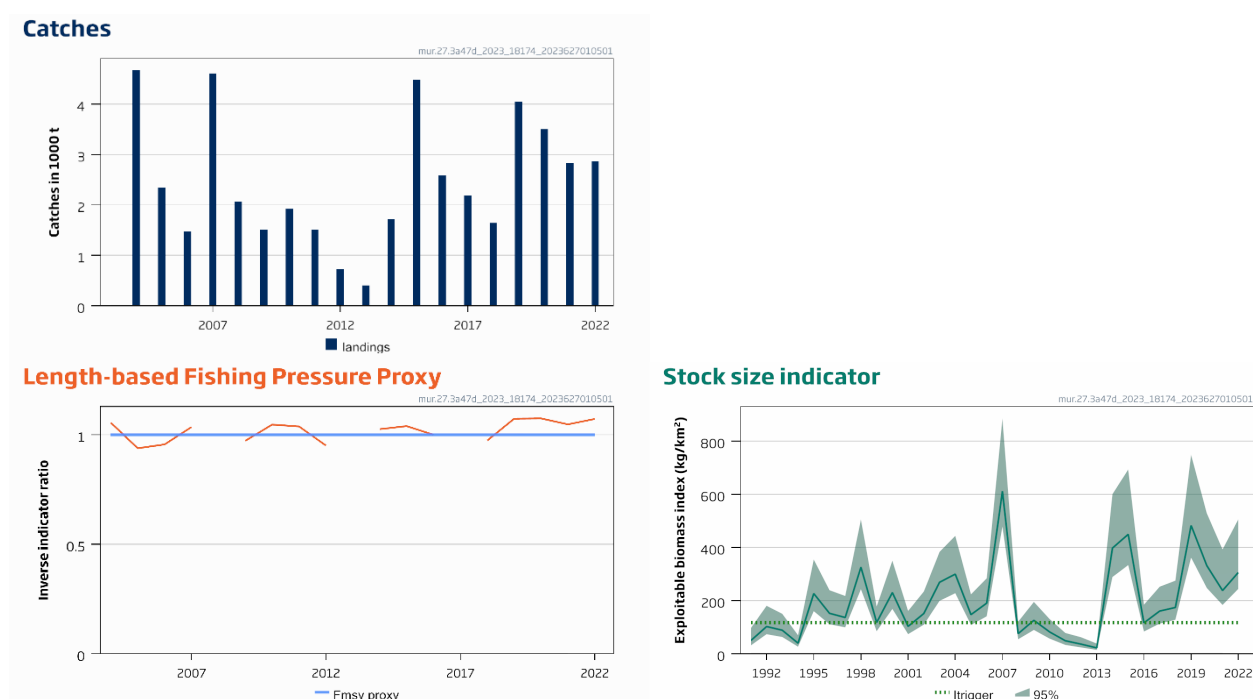


Figure 1 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. Summary of the stock assessment. ICES landings (estimates available since 2004), discards are assumed negligible. Indicator ratio $L_F = M/L_{mean}$ (inverse of the indicator ratio, f) from the length-based indicator (LBI) method is used for the evaluation of the exploitation status. The proxy fishing pressure is less than that corresponding to the F_{MSY} proxy ($L_F = M$) when the indicator ratio value is lower than 1 (shown by the horizontal blue line). Stock size indicator (exploitable biomass index) from the North Sea International Bottom Trawl Survey Q3 (NS-IBTS), Beam Trawl Survey Q3 (BTS), and the French Channel Ground Fish Survey Q4 (FR-GFS).

Conservation status

ICES is not aware of any information on stock/species-specific conservation status.

Catch scenarios

ICES framework for category 3 stocks was applied (*chr* rule, Method 2.2; ICES, 2022). The advice is based on the *chr* rule to provide MSY advice. A relative exploitable biomass index from the combined NS-IBTS Q3, BTS Q3, and FR-GFS Q4 surveys was used as an indicator of stock development. The advice is based on the stock indicator for 2022, multiplied by

a constant harvest rate, a biomass safeguard, and a precautionary multiplier. The stability clause was not applied, since the change from the previous advice was between +20% or –30%. Discarding is considered negligible.

Table 1 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. The basis for the catch scenarios. Catches are in tonnes.*

Previous catch advice A_y (advised catch for 2022 and 2023)	1950 tonnes
Biomass index	
I: most recent biomass index (I_{2022})	306.13
MSY proxy harvest rate	
$HR_{MSY\ proxy}$: MSY proxy harvest rate (average of the ratio of catch to biomass index for the years for which $f > 1$, where $f = L_{mean}/L_F = M$)	12.97
Biomass safeguard	
Index trigger value ($I_{trigger}$)	117.38
b: index relative to trigger value, $\min\{I_{2022}/I_{trigger}, 1\}$	1
Precautionary multiplier to maintain biomass above B_{lim} with 95% probability	
m: multiplier (generic multiplier based on life history)	0.5
CHR calculation**	1985 tonnes
Stability clause (+20%/–30% compared to A_y , only considered if $b=1$)	Not applied
Discard rate	0%
Catch advice A_{y+1} for 2024 and 2025**	1985 tonnes
Landings corresponding to the advice for 2024 and 2025 ***	1985 tonnes
% advice change	1.80%

* The figures in the table are rounded. Calculations were done with unrounded inputs, and computed values may not match exactly when calculated using the rounded figures in the table.

** Formula: $A_{y+1} = I \times HR_{MSY\ proxy} \times b \times m$, limited by stability clause if applicable.

*** $A_{y+1} \times (1 - \text{Discard rate})$.

Basis of the advice

Table 2 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. The basis of the advice.

Advice basis	MSY approach.
Management plan	The EU multiannual plan (MAP) for stocks in the North Sea (EU, 2018) and adjacent waters applies to bycatches of this stock. UK and Norway have not requested ICES to provide advice based on the EU MAP. The MAP stipulates that when the F_{MSY} ranges are not available, fishing opportunities should be based on the best available scientific advice.

Quality of the assessment

During the 2022 FR-GFS survey, five stations within six nautical miles of the UK coast were not sampled. This area is an important habitat for striped red mullet. There was no UK-BTS survey in the eastern English Channel in 2022. The effect of these issues has been investigated and only shows a small rescaling of the stock size indicator (–7.9% over 1991–2021), estimated by a statistical model. The same model has been used to calculate the stock size indicator and associated reference point ($I_{trigger}$) accounting for the reduced survey coverage in 2022. Although one year of missing stations did not have a substantial impact on the current assessment outputs, it may become a problem if the issue persists in the future.

Issues relevant for the advice

Landings are assumed to be catches, as there is no minimum landing size and there is a market for small fish. The composition of the fleet has changed over the past two decades. Before 2012, the French bottom trawl fleet was the main fishery targeting striped red mullet. Since 2012, the majority of the fishery has been taken by vessels from the Netherlands deploying Danish seine nets. Changes in exploitation pattern of the stock are likely to have occurred during that period.

Recent catches of this stock mainly consist of fish ages 0 and 1. Striped red mullet start maturing at age 1 but are not fully matured before age 3. The stock status would therefore benefit from improved technical measures, such as sorting grids, increased mesh size, and spatial and temporal closures. These measures could reduce the catches of small fish and contribute to more stable yields.

Reference points

Table 3 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	$I_{trigger}$	117.38	$1.4 \times I_{loss}$; I_{loss} : 20th percentile of the stock size indicator from 1991–2022	ICES (2023a)
	$HR_{MSY\ proxy}$	12.97	Average of the ratio of catch to stock size indicator for the years 2005, 2006, 2009, 2012 and 2018 for which the fishing pressure proxy relative to MSY proxy (f) > 1, where $f = L_{mean}/L_{F=M}$ (Table 8)	ICES (2023a)
	$F_{MSY\ proxy}$	$\frac{L_{mean}}{L_{F=M}} = 1^*$	Relative value from LBI analysis, assuming $M/K = 1.5$. $L_{F=M}$ is based on L_c (length at 50% of modal abundance), which is assumed constant.	ICES (2023a)
Management plan	SSB_{mgt}	Not defined		
	F_{mgt}	Not defined		

* No reference points are defined for this stock in terms of absolute values. The LBI-estimated values of the ratio $L_{mean}/L_{F=M}$ are used to estimate exploitation status relative to the proxy MSY reference point.

Basis of the assessment

Table 4 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. Basis of the assessment and advice.

ICES stock data category	3 (ICES, 2023b)
Assessment type	Stock size indicator and applying the <i>chr</i> rule (ICES, 2022)
Input data	Catch statistics, catch length distributions, one survey index (tweedie GAM combining NS-IBTS Q3 [B2453], BTS Q3 [B2453], and FR-GFS Q4 [G3425])
Discards and bycatch	Not included; are considered negligible
Additional indicators	Length-based indicator (LBI) based on lengths from commercial catch data (2004 – 2022). Growth parameters were estimated as $L_{\infty} = 34.1$ cm and $K = 0.36$. $L_c = 17.9$ cm is assumed constant.
Other information	Benchmarked in 2023 (ICES, 2023c)
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

History of the advice, catch, and management

Table 5 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. ICES advice, official landings, and ICES catch estimates. Weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Official landings	ICES catch estimates
2012	No increase in catch	-	698	726
2013	No increase in catches (average 2009–2010)	< 1700	364	408
2014	Reduce catches by 36% compared to 2012	< 460	1739	1718
2015	No new advice, same as for 2014	< 460	4527	4487
2016	Precautionary approach (increase catches by no more than 20%)	< 552	2614	2579
2017	Precautionary approach (same advised catch value as given for 2016)	< 552	2204	2195
2018	Precautionary approach	≤ 465	1652	1640
2019	Precautionary approach	≤ 465	4096	4048
2020	No catch advice requested		3530	3503
2021	No catch advice requested		2594*	2833
2022	Precautionary approach	≤ 1950	2842*	2866
2023	Precautionary approach	≤ 1950		
2024	MSY approach	≤ 1985		
2025	MSY approach	≤ 1985		

* Preliminary.

History of the catch and landings

Table 6 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. Catch distribution by fleet in 2022 as estimated by ICES.

Catch	Landings			Discards
2866 tonnes	Danish seine 71%	Otter trawl 19.7%	Others 9.3%	Negligible
	2866 tonnes			

Table 7 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. History of commercial landings; both the official and ICES estimated values are presented for each country participating in the fishery. Weights are in tonnes.

Year	Belgium	Denmark	France	Germany	Netherlands	UK	Total official landings	ICES estimated catch
2004	22		3618	26	804	91	4561	4669
2005	19		1595	26	600	81	2321	2347
2006	12		1030		293	69	1404	1476
2007	14		3475		906	161	4556	4604
2008	16		3249		873	313	4451	2064
2009	13		736		562	260	1571	1513
2010	62		879		567	310	1818	1919
2011	83		649		540	238	1510	1511
2012	38		155		367	138	698	726
2013	33		112		180	39	364	408
2014	71		726		700	242	1739	1718
2015	211		1615		2038	663	4527	4487
2016	151		556		1421	486	2614	2579
2017	93		784		978	349	2204	2195
2018	77		593		826	156	1652	1640
2019	232		1408		1867	589	4096	4048
2020	220		723		1752	835	3530	3503
2021	55*	< 1*	593*		1188*	757*	2594*	2833
2022	77*	4*	793*		1130*	838*	2842*	2866

* Preliminary.

Summary of the assessment

Table 8 Striped red mullet in Subarea 4 and divisions 7.d and 3.a. Assessment summary. Weights are in tonnes. Catch, exploitable biomass index (stock size indicator), harvest rate (catch/stock size indicator) and length-based fishing pressure proxy (inverse $f = L_F = M/L_{\text{mean}}$) are given for the years used in the application of the *chr* rule. L_{mean} refers to the mean length above length at first capture (L_c), and $L_F = M$ refers to the target reference length.

Year	Catch*	Stock size indicator			Harvest rate	Length-based fishing pressure proxy*** ($L_F = M/L_{\text{mean}}$)
		Low	Value	High		
1991		31.59	50.04	97.08		
1992		73.96	102.76	181.03		
1993		63.17	88.81	150.61		
1994		26.78	40.15	70.47		
1995		160.44	226.88	355.07		
1996		111.09	152.43	239.56		
1997		99.74	136.69	217.93		
1998		242.79	326.05	505.79		
1999		85.02	117.96	178.35		
2000		168.8	230.57	350.64		
2001		74.1	103.29	161.60		
2002		109.53	151.74	234.67		
2003		199.12	269.30	383.69		
2004	4669	228.03	299.86	444.02	15.57	1.055
2005	2347	108.40	147.44	224.14	15.92	0.939
2006	1476	141.16	190.78	284.52	7.74	0.956
2007	4604	478.36	611.94	885.39	7.52	1.035
2008	2064	54.71	76.13	121.27	27.11	**
2009	1513	89.92	126.18	195.60	11.99	0.972
2010	1919	57.1	82.60	131.02	23.24	1.047
2011	1511	33.57	49.29	78.81	30.66	1.038
2012	726	24.14	36.64	62.41	19.80	0.951
2013	408	14.48	22.63	38.95	18.02	**
2014	1718	288.83	398.12	601.07	4.31	1.026
2015	4487	333.69	449.65	693.55	9.98	1.040
2016	2579	83.87	116.68	185.21	22.10	1.000
2017	2195	113.46	160.89	252.63	13.64	**
2018	1640	128.31	174.55	275.56	9.39	0.974
2019	4048	361.77	482.90	748.70	8.38	1.073
2020	3503	247.42	331.55	528.79	10.57	1.074
2021	2833	183.76	238.12	392.94	11.90	1.048
2022	2866	244.09	306.13	506.01	9.36	1.072

* Discards are considered negligible.

** Length data have been treated as missing due to limited sampling coverage.

*** Only harvest rates in years where the inverse f ratio ($L_F = M/L_{\text{mean}}$) is below 1 are included in the calculation of $HR_{\text{MSY proxy}}$.

Sources and references

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