ICES Advice on fishing opportunities, catch, and effort
Celtic Seas and Greater North Sea ecoregions
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Sea bass (*Dicentrarchus labrax*) in divisions 4.b–c, 7.a, and 7.d–h (central and southern North Sea, Irish Sea, English Channel, Bristol Channel, and Celtic Sea)

ICES advice on fishing opportunities

ICES advises that when the EU multiannual plan (MAP) for Western Waters and adjacent waters is applied, total removals[†] in 2021 that correspond to the F ranges in the plan are between 1680 tonnes and 2000 tonnes.

Note: This advice sheet is abbreviated due to the COVID-19 disruption. The previous advice issued for 2020 is attached as Annex 1.

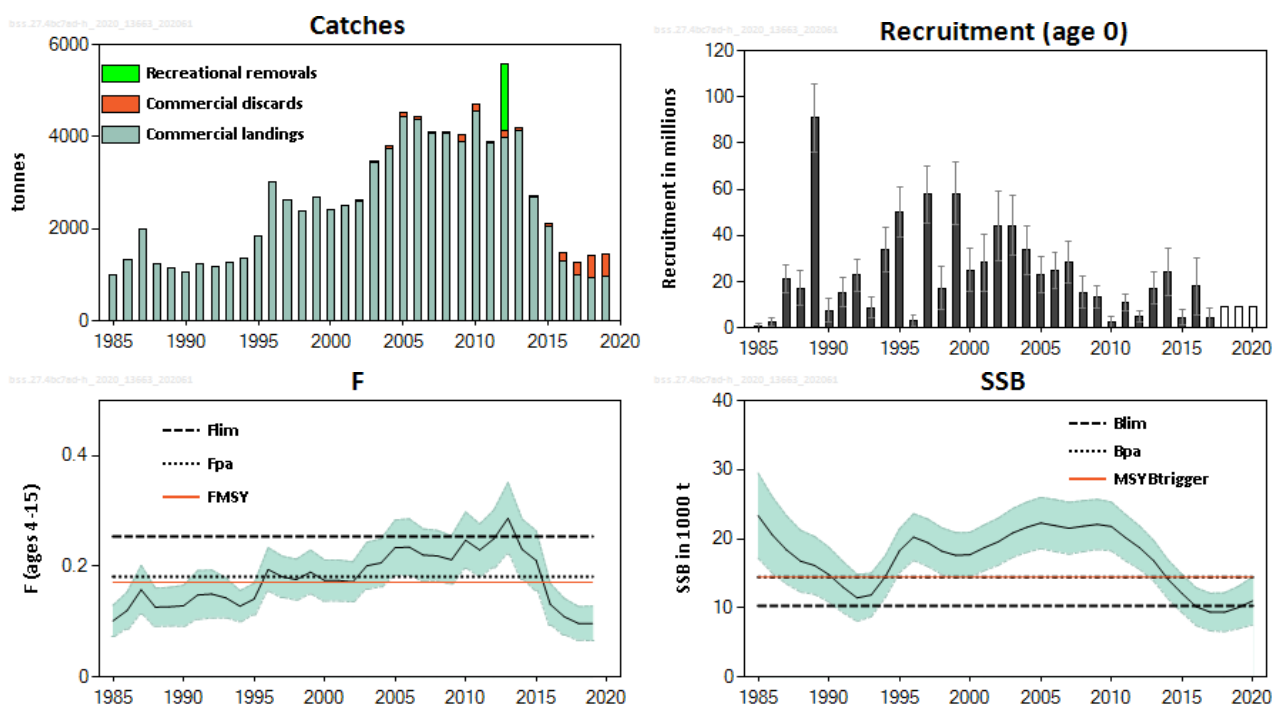### Stock development over time

Figure 1   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Summary of the stock assessment. Survey-estimated recreational removals are only presented for 2012 where the data are available. Discard estimates are available from 2002. Fishing mortality (F) is shown for the combined commercial and recreational fisheries. Assumed recruitment values are not shaded. Recruitment (R), F, and spawning-stock biomass (SSB) are shown with 95% confidence intervals.

Stock and exploitation status

Table 1   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. State of the stock and the fishery relative to reference points.

		Fishing pressure				Stock size			
		2017	2018	2019			2018	2019	2020
Maximum sustainable yield	F_{MSY}	✅	✅	✅ Below	MSY $B_{trigger}$		❌	❌	❌ Below trigger
Precautionary approach	F_{pa}, F_{lim}	✅	✅	✅ Harvested sustainably	B_{pa}, B_{lim}		❌	❌	🟠 Increased risk
Management plan	F_{MGT}	✅	✅	✅ Below the range	B_{MGT}		❌	❌	❌ Below trigger

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[†] The total removals include commercial catch and recreational removals taking mortality of released fish into account (estimated at approximately 5%).

Catch scenarios

Table 2   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Assumptions made for the interim year and 2020 forecast.

Variable	Value	Notes
$F_{ages\ 4–15}$ (2020)	0.11	Total F, F_{sq} = Average $F_{2017–2019}$ (0.08) for commercial fishery, plus F_{rec} = 0.029 *, assuming full compliance of recreational fisheries in 2020
SSB (2021)	11451	Short-term forecast; in tonnes.
$R_{age\ 0}$ (2018–2021)	9184	Geometric mean (2008–2017); in thousands.
Total removals (2020)	1626	Short-term forecast fishing at F = 0.11; in tonnes.
Total landings (2020)	1084 **	Short-term forecast; in tonnes.
Discards (2020)	115 **	Short-term forecast; in tonnes.
Recreational removals (2020)	426	Short-term forecast assuming an F = 0.029; in tonnes.

* Recreational F as estimated in 2012 (0.0635), reduced by 53.6% to account for the management measures in place in 2020.
** The split of total commercial F into commercial landings and commercial discards in the interim year is modelled.

Table 3   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Annual catch scenarios for 2021. All weights are in tonnes.

Basis	Total catch* (2021)	Commercial landings (2021)	Commercial discards (2021)	Recreational removals (2021)	F total (2021)	F commercial landings (2021)	F commercial discards (2021)	F recreational removals (2021)	SSB (2022)	% SSB change **	% advice change ***
ICES advice basis											
EU MAP #: F_{MSY} × SSB_{2021} / MSY $B_{trigger}$	2000	1353	121	526	0.136	0.095	0.0047	0.037	11209	−2.1	2.8
EU MAP #: $F_{MSY\ upper}$ × SSB_{2021} / MSY $B_{trigger}$	2000	1353	121	526	0.136	0.095	0.0047	0.037	11209	−2.1	2.8 ^
EU MAP #: $F_{MSY\ lower}$ × SSB_{2021} / MSY $B_{trigger}$	1680	1137	101	442	0.113	0.079	0.0039	0.030	11472	0.18	2.8 ^
Other scenarios											
MSY approach: F_{MSY} × SSB_{2021} / MSY $B_{trigger}$	2000	1353	121	526	0.136	0.095	0.0047	0.037	11209	−2.1	2.8
F = F_{MSY}	2478	1676	151	651	0.171	0.119	0.0059	0.046	10817	−5.5	27
F = 0	0	0	0	0	0	0	0	0	12864	12.3	−100
F_{pa}	2613	1767	159	687	0.182	0.127	0.0062	0.049	10706	−6.5	34
F_{lim}	3530	2384	217	928	0.254	0.177	0.0087	0.068	9957	−13.0	81
SSB_{2022} = B_{lim}	3093	2091	190	813	0.219	0.152	0.0075	0.059	10313	−9.9	59
SSB_{2022} = B_{pa} ^^											
SSB_{2022} = MSY $B_{trigger}$ ^^											
F = F_{2020}	1635	1107	99	430	0.110	0.077	0.0038	0.029	11510	0.52	−16.0

* Includes commercial catch and recreational removals (taking mortality of released fish into account, estimated at approximately 5%).
** SSB 2022 relative to SSB 2021.
*** Advice value for 2021 relative to the MSY value for 2020 (1946 tonnes).
^ Advice value this year relative to the advice value last year for the MSY lower (1634 tonnes) and MSY upper (1946 tonnes).
^^ The B_{pa} and MSY $B_{trigger}$ options were left blank because B_{pa} and MSY $B_{trigger}$ cannot be achieved in 2022, even with zero catch in 2021.
# MAP multiannual plan (EU, 2019).
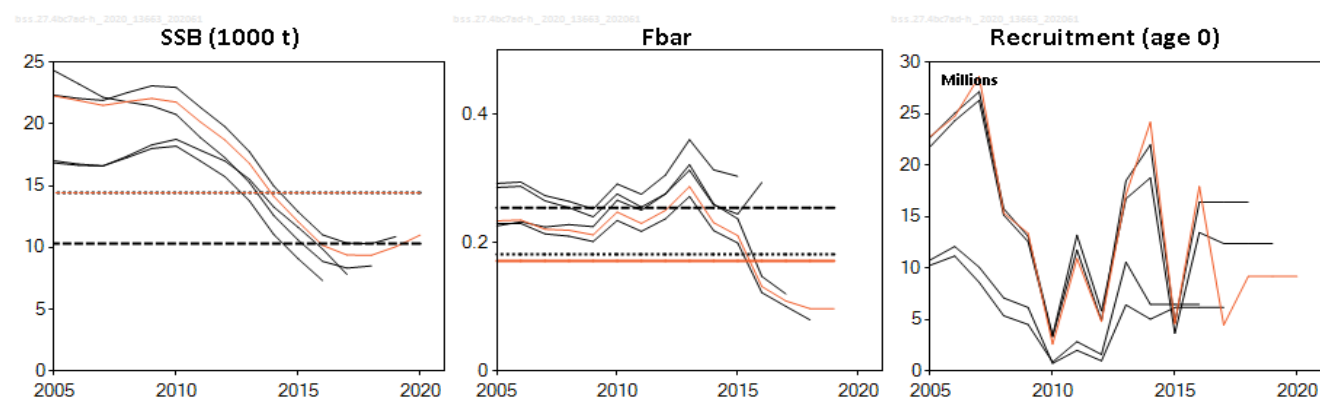
Quality of the assessment

Figure 2   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Historical assessment results. F in the current assessment (orange line) and in the 2019 assessment (longest black line) refers to ages 4–15; in all other assessments (three shortest black lines) it refers to ages 5–11. The stock was benchmarked in 2016, 2017, and 2018.

History of the advice, catch, and management

Table 4   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. History of ICES advice, the agreed TAC, and ICES estimates of landings, discards, and official landings. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice *	Agreed TAC	Official commercial landings	ICES commercial landings	ICES commercial discards ^	ICES recreational removals
2000	-	-	none	2100	2407		
2001	-	-	none	2200	2500		
2002	No increase in effort or F	-	none	2400	2622		
2003	No increase in effort or F	-	none	2900	3459		
2004	No increase in effort or F	-	none	3000	3731		
2005	-	-	none	3200	4430		
2006	-	-	none	3373	4377		
2007	-	-	none	3520	4064		
2008	-	-	none	3008	4107		
2009	-	-	none	4273	3889	151	
2010	-	-	none	4953	4562	148	
2011	-	-	none	4184	3858	22	
2012	No increase in catch	-	none	3983	3987	157	1440
2013	20% reduction in catches (average of the last 3 years)	< 6000 **	none	4242	4137	53	
2014	36% reduction in commercial landings (20% reduction, followed by 20% precautionary reduction)	< 2707 **	none	2817	2682	25	

Year	ICES advice	Catch corresponding to advice *	Agreed TAC	Official commercial landings	ICES commercial landings	ICES commercial discards ^	ICES recreational removals
2015	MSY approach	< 1155 ***	none	2081	2066	40	
2016	MSY approach	≤ 541 ***	none	1290	1295	199	
2017	Precautionary approach	0	none	949	984	271	
2018	MSY approach	≤ 880 ^^^	none	913 ^^	948	482	
2019	MSY approach	≤ 1806 ^^^	none	927 ^^	972	464	
2020	Management plan	1634–1946 ^^^	none				
2021	Management plan	2000 (range 1680–2000) ^^^					

* Advice prior to 2014 was provided for sea bass in the Northeast Atlantic.
** Commercial landings.
*** Total landings (commercial and recreational landings).
^ Incomplete for some fleets.
^^ Preliminary.
^^^ Includes commercial catch and recreational removals (taking mortality of released fish into account, estimated at approximately 5%).

Summary of the assessment

Table 5   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Assessment summary. Weights are in tonnes and recruitment in thousands. High and low refers to 95% confidence intervals.

Year	Recruitment age 0			SSB			Total F ages 4–15			F_{bar} commercial catch	F_{bar} recreational removals	Commercial landings	Commer-cial discards *	Recreational removals **
	Low	Value	High	Low	Value	High	Low	Value	High					
1985	73	850	1627	17183	23331	29478	0.073	0.101	0.130	0.038	0.063	994		1705
1986	428	2476	4524	15037	20549	26061	0.087	0.120	0.154	0.057	0.064	1318		1539
1987	14839	21106	27374	13467	18398	23329	0.114	0.158	0.20	0.094	0.063	1979		1404
1988	9734	17121	24508	12295	16759	21222	0.092	0.126	0.161	0.063	0.063	1239		1304
1989	76053	90828	105603	11957	16136	20315	0.092	0.127	0.162	0.063	0.063	1161		1209
1990	2234	7366	12499	10850	14813	18776	0.092	0.129	0.166	0.065	0.063	1064		1091
1991	9225	15364	21502	9309	13011	16713	0.104	0.148	0.192	0.085	0.063	1226		1003
1992	15544	22703	29861	8048	11448	14847	0.107	0.150	0.193	0.086	0.063	1186		1025
1993	4045	8645	13246	8715	11865	15015	0.107	0.143	0.179	0.079	0.063	1256		1191
1994	23902	33635	43368	11503	14531	17559	0.100	0.128	0.156	0.064	0.064	1370		1429
1995	38936	50041	61147	15098	18259	21420	0.113	0.141	0.169	0.077	0.063	1835		1604
1996	447	3118	5789	16869	20242	23615	0.155	0.194	0.23	0.131	0.063	3022		1619
1997	45376	57812	70248	16006	19430	22853	0.144	0.181	0.23	0.117	0.063	2620		1539
1998	7880	17154	26427	14833	18204	21575	0.139	0.176	0.21	0.113	0.063	2390		1488
1999	44525	58044	71564	14324	17600	20876	0.150	0.190	0.23	0.126	0.063	2670		1491
2000	15625	25055	34485	14477	17700	20923	0.137	0.174	0.21	0.111	0.064	2407		1544
2001	15815	28109	40402	15393	18699	22005	0.137	0.174	0.21	0.111	0.064	2500		1628
2002	28871	43855	58839	16169	19576	22982	0.136	0.172	0.22	0.109	0.063	2622	17	1723
2003	31411	44209	57006	17301	20829	24356	0.159	0.20	0.24	0.138	0.064	3459	16	1807
2004	22762	33530	44298	18028	21654	25280	0.163	0.21	0.25	0.143	0.063	3731	59	1857
2005	14889	22797	30706	18571	22279	25987	0.184	0.23	0.28	0.170	0.064	4430	96	1862
2006	17075	24737	32399	18147	21910	25673	0.184	0.23	0.29	0.171	0.064	4377	53	1839
2007	19593	28634	37674	17772	21519	25265	0.173	0.22	0.27	0.157	0.063	4064	50	1838
2008	8300	15340	22380	18132	21821	25510	0.173	0.22	0.26	0.155	0.063	4107	8	1845
2009	8357	13393	18429	18451	22076	25701	0.168	0.21	0.25	0.148	0.063	3889	151	1820
2010	319	2603	4887	18252	21780	25308	0.196	0.25	0.30	0.184	0.063	4562	148	1726
2011	7105	10921	14738	16815	20161	23507	0.183	0.23	0.28	0.166	0.063	3858	22	1591
2012	2298	4803	7308	15582	18707	21831	0.198	0.25	0.30	0.186	0.063	3987	157	1440
2013	10362	17148	23935	13877	16811	19746	0.22	0.29	0.35	0.22	0.063	4137	53	1239
2014	14084	24189	34293	11333	14147	16960	0.176	0.23	0.29	0.167	0.063	2682	25	1039

Year	Recruitment age 0			SSB			Total F ages 4–15			F_{bar} commercial catch	F_{bar} recreational removals	Commercial landings	Commer-cial discards *	Recreational removals **
	Low	Value	High	Low	Value	High	Low	Value	High					
2015	1211	4581	7951	9324	12085	14846	0.157	0.21	0.26	0.159	0.052	2066	40	723
2016	5473	17928	30383	7450	10173	12897	0.094	0.131	0.169	0.113	0.0179	1295	199	222
2017	357	4465	8573	6674	9395	12116	0.076	0.109	0.142	0.091	0.0179	984	271	218
2018		9184 ^		6562	9372	12182	0.066	0.097	0.127	0.085	0.0121	948	482	155
2019		9184 ^		6999	10061	13123	0.066	0.097	0.128	0.077	0.0198	972	464	273
2020		9184 ^		7530	11007	14484								

 * Discards from 2000–2008 are incomplete for some fleets.

** All values were derived from the 2012 survey estimate (1440 tonnes).

^ Geometric mean recruitment (2008–2017).

Sources and references

EU. 2019. Regulation (EU) 2019/472 of the European Parliament and of the Council of 19 March 2019 establishing a multiannual plan for stocks fished in the Western Waters and adjacent waters, and for fisheries exploiting those stocks, amending Regulations (EU) 2016/1139 and (EU) 2018/973, and repealing Council Regulations (EC) No 811/2004, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007 and (EC) No 1300/2008. Official Journal of the European Union, L 83: 1–17. http://data.europa.eu/eli/reg/2019/472/oj.

ICES. 2020. Working Group for the Celtic Seas Ecoregion (WGCSE). Draft report. ICES Scientific Reports. 2:40. Xx pp. http://doi.org/10.17895/ices.pub.5978. Publication of the full report is expected end of 2020.

Annex 1

ICES Advice on fishing opportunities, catch, and effort
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Sea bass (*Dicentrarchus labrax*) in divisions 4.b–c, 7.a, and 7.d–h (central and southern North Sea, Irish Sea, English Channel, Bristol Channel, and Celtic Sea)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, total removals[†] in 2019 should be no more than 1806 tonnes. This advice for 2019 replaces the advice provided in July 2018[‡].

ICES advises that when the EU multiannual plan (MAP) for Western Waters and adjacent waters is applied, total removals in 2020 that correspond to the F ranges in the MAP are between 1634 tonnes and 1946 tonnes.

Stock development over time

Spawning-stock biomass (SSB) has been declining since 2009 and is currently below MSY $B_{trigger}$ and just above B_{lim}. Fishing mortality (F) has increased over the time-series, peaking in 2013 before a rapid decline to below F_{MSY}. After a period of above average recruitment (R), recruitment is low, fluctuating without trend since 2008.
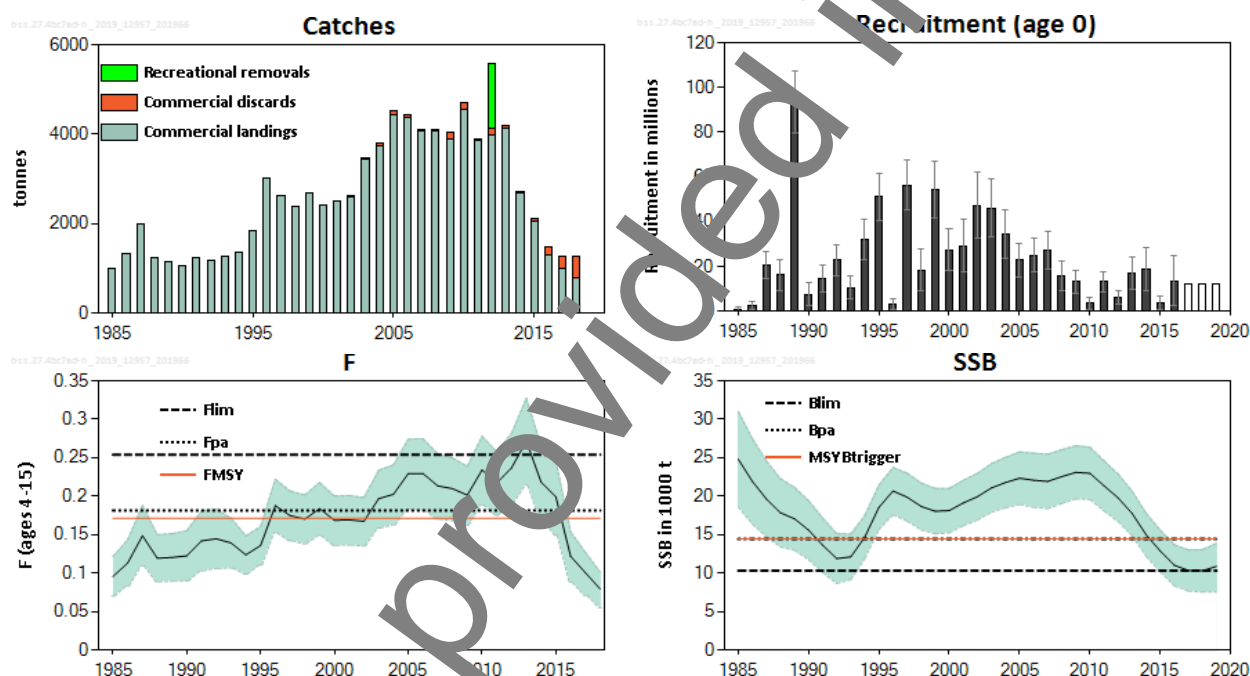

Figure 1 Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Summary of the stock assessment. Total landings (commercial landings and estimated recreational removals, available for 2012 only [green bar], taking mortality of released fish into account). Fishing mortality is shown for the combined commercial and recreational fisheries. Discard estimates are available from 2009. Assumed recruitment values are not shaded. Recruitment, F, and SSB are shown with 95% confidence intervals.

Stock and exploitation status

ICES assesses that fishing pressure on the stock is below F_{MSY}, F_{lim}, and F_{pa}; spawning stock size is below MSY $B_{trigger}$ and between B_{pa} and B_{lim}.

[†] Includes commercial catch and recreational removals (taking mortality of released fish into account, estimated at approximately 5%).
[‡] This advice is provided because of an error that was discovered in the advice for 2019 provided in July 2018. The advice for total catches is practically unchanged. See the Quality of the assessment for details.

Table 1 Sea bass in divisions 4.b–c, 7.a, and 7.d–h. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2016	2017	2018			2017	2018	2019
Maximum sustainable yield	F_{MSY}	✅	✅	✅	Below	MSY $B_{trigger}$	❌	❌	Below trigger
Precautionary approach	F_{pa}, F_{lim}	✅	✅	✅	Harvested sustainably	B_{pa}, B_{lim}	🟠	🟠	Increased risk
Management plan	F_{MGT}	✅	✅	✅	Below	B_{MGT}	❌	❌	Below trigger

Catch scenarios for 2019

Table 2 Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Assumptions made for the interim year and 2019 forecast.

Variable	Value	Notes
$F_{ages\ 4–15}$ (2018)	0.078	Model output (2019 assessment using data up to 2018).
SSB (2019)	10884	Model output; in tonnes.
$R_{age\ 0}$ (2017–2019)	12383	Geometric mean (2005–2016); in thousands.
Total catch (2018)	1467	Total landings + discards + recreational removals; in tonnes.
Total landings (2018)	801	ICES landings; in tonnes.
Discards (2018)	482	ICES discards; in tonnes.
Recreational removals (2018)	156	Model output; in tonnes.

Table 3 Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Annual catch scenarios for 2019. All weights are in tonnes.

Basis	Total catch* (2019)	Commercial landings (2019)	Commercial discards (2019)	Recreational removals (2019)	Total F (2019)	F Commercial landings (2019)	F Commercial discards (2019)	F Recreational removals (2019)	SSB (2020)	% SSB change **	% Advice change ***
ICES advice basis											
MSY approach = F_{MSY} × SSB_{2019} / MSY $B_{trigger}$	1806	1480	118	207	0.129	0.110	0.0041	0.015	10960	0.70	105
Other scenarios											
F = F_{MSY}	2341	1918	154	269	0.171	0.145	0.0054	0.020	10527	−3.3	166
F = 0	0	0	0	0	0	0	0	0	12432	14.2	−100
F_{pa}	2488	2038	164	286	0.182	0.155	0.0057	0.022	10408	−4.4	183
F_{lim}	3350	2741	224	385	0.25	0.216	0.0080	0.030	9717	−10.7	281
SSB_{2020} = B_{lim}	2606	2135	172	299	0.192	0.163	0.0060	0.023	10313	−5.2	196
SSB_{2020} = B_{pa}^											
SSB_{2020} = MSY $B_{trigger}$^											
F = F_{2018}	1121	932	73	129	0.078	0.067	0.0025	0.0093	11516	5.8	27

* Includes commercial catch and recreational removals (taking mortality of released fish into account, estimated at approximately 5%).
** SSB 2020 relative to SSB 2019.
***Advice value for 2019 relative to the advice value for 2018 (880 tonnes).
^ The B_{pa} and MSY $B_{trigger}$ options were left blank because B_{pa} and MSY $B_{trigger}$ cannot be achieved in 2020, even with zero catch in 2019.

While the assessment has been revised and reference points have been updated, the increase of 105% in catch advice for 2019 compared with the advice for 2018 is mainly due to the above-average recruitment in 2013 and 2014, low fishing mortality, and increase in stock size.

Catch scenarios for 2020

Table 4   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Assumptions made for the interim year and 2019 forecast.

Variable	Value	Notes
$F_{ages\ 4–15}$ (2019)	0.088	Total F, F_{sq} = (average F 2016–2018) for commercial fishery plus assuming full compliance of recreational fisheries in 2019.
SSB (2020)	11413	Short-term forecast; in tonnes.
$R_{age\ 0}$ (2017–2020)	12383	Geometric mean (2005–2016); in thousands.
Total catch (2019)	1248	Short-term forecast; in tonnes.
Total landings (2019)	915*	Short-term forecast (average landings pattern over the last 3 years [2016–2018]); in tonnes.
Discards (2019)	73*	Short-term forecast (average discards pattern over the last 3 years [2016–2018]); in tonnes.
Recreational removals (2019)	260	Short-term forecast assuming an F = 0.019** (average recreational removals pattern over the last 3 years [2016–2018], assuming full compliance); in tonnes.

* The split of total commercial F into commercial landings and commercial discards in the interim year is modelled.
** Recreational F as estimated in 2012 (0.06), reduced by 69% to account for the management measures in place in 2019.

Table 5   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Annual catch scenarios for 2020. All weights are in tonnes.

Basis	Total catch* (2020)	Commercial landings (2020)	Commercial discards (2020)	Recreational removals (2020)	Total F (2020)	F Commercial landings (2020)	F Commercial discards (2020)	F Recreational removals (2020)	SSB (2021)	% SSB change **	% Advice change ***
ICES advice basis											
EU MAP#: F_{MSY} × SSB_{2020} / MSY $B_{trigger}$	1946	1445	89	412	0.135	0.102	0.0038	0.029	10861	-4.8	7.8
F = MAP F_{MSY} lower × SSB_{2020} / MSY $B_{trigger}$	1634	1213	74	346	0.113	0.085	0.0031	0.024	11114	-2.6	-9.5
Other scenarios											
MSY approach = F_{MSY} × SSB_{2020} / MSY $B_{trigger}$	1946	1445	89	412	0.135	0.102	0.0038	0.029	10861	-4.8	7.8
F = F_{MSY}	2428	1802	111	514	0.171	0.130	0.0048	0.037	10473	-8.2	34
F = 0	0	0	0	0	0	0	0	0	12444	9.0	-100
F_{pa}	2560	1900	118	543	0.182	0.138	0.0051	0.039	10367	-9.2	42
F_{lim}	3462	2567	161	734	0.254	0.192	0.0071	0.054	9644	-15.5	92
SSB_{2021} = B_{lim}	2627	1949	121	557	0.187	0.141	0.0052	0.040	10313	-9.6	45
SSB_{2021} = B_{pa}^											
SSB_{2021} = MSY $B_{trigger}$ ^											
F = F_{2019}	1296	963	59	275	0.088	0.067	0.0025	0.019	11388	-0.22	-28

* Includes commercial catch and recreational removals (taking mortality of released fish into account, estimated at approximately 5%).
** SSB 2021 relative to SSB 2020.
***Advice value for 2020 relative to the advice value for 2019 (1806 tonnes).
^ The B_{pa} and MSY $B_{trigger}$ options were left blank because B_{pa} and MSY $B_{trigger}$ cannot be achieved in 2021, even with zero catch in 2020.
# MAP multiannual plan (EU, 2019).

The increase in advice for 2020 of 7.8% is mainly due to above-average recruitment in 2013 and 2014.

Basis of the advice

Table 6   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. The basis of the advice.

Advice basis for 2020	Management plan
Management plan	The EU multiannual plan (MAP) for stocks in in the Western Waters and adjacent waters applies to this stock. The plan specifies conditions for setting fishing opportunities, depending on stock status and making use of the F_{MSY} range for the stock. In accordance with the MAP, catches higher than those corresponding to F_{MSY} can only be taken providing SSB is greater than MSY $B_{trigger}$, and one of the following conditions is met: a) if it is necessary for the achievement of objectives of mixed fisheries; b) if is necessary to avoid serious harm to a stock caused by intra- or inter-species stock dynamics; c) in order to limit variations in fishing opportunities between consecutive years to not more than 20%. ICES considers that the F_{MSY} range used in the MAP for this stock is precautionary. Full details of the plan are described in EU (2019).

Quality of the assessment

An error was found in the computation of the early part of the LPUE series, used in the advice provided in July 2018 regarding fishing opportunities for 2019. The correction of this error implied a a revision in the estimation of recreational catches for the entire time-series. These are based on the fishing mortality for recreational fisheries in 2012 when the estimate of recreational catch was available. These changes are mostly the cause of the downward revision in SSB at the beginning of the series, as well as the upward revision of SSB and the downward revision in F in recent years. Reference points have been updated accordingly.

Poor catch data quality, owing to limited sampling of the discards and recreational removals, leads to additional uncertainty in the assessment. The discard values are estimated from sampling programmes, and more recently from a mix of sampling programmes and logbooks, where sampling is variable across fleets and years. Despite an increase in the reported discard values in the logbooks since 2016 for some countries, total discards are still considered to be considerably underestimated. For the forecast, the discard ratio assumed is the estimate provided by the assessment model. This assumed discard rate is lower than the discard rates recently observed. This has little impact on the values of the advised total catch.

The estimates of 1440 tonnes for the recreational removals (including post-release mortality, estimated to be 5%) in 2012, are based on multiple surveys covering a range of years. As in previous years, the mortality rate from recreational removals for 1985–2014 (excluding 2012) was assumed to be the same as estimated for 2012. In the assessment, the mortality rate from recreational removals for 2015 to 2018 was derived by scaling down the 2012 F to account for the management measures in these years, assuming full compliance.

Fishery sampling rates over time have been variable for all countries. For France, no data on commercial numbers-at-length and age are available prior to 2009, increasing the uncertainty in this time period. Additional information on recreational removals from all countries is needed in order to improve these estimates and the stock assessment model.
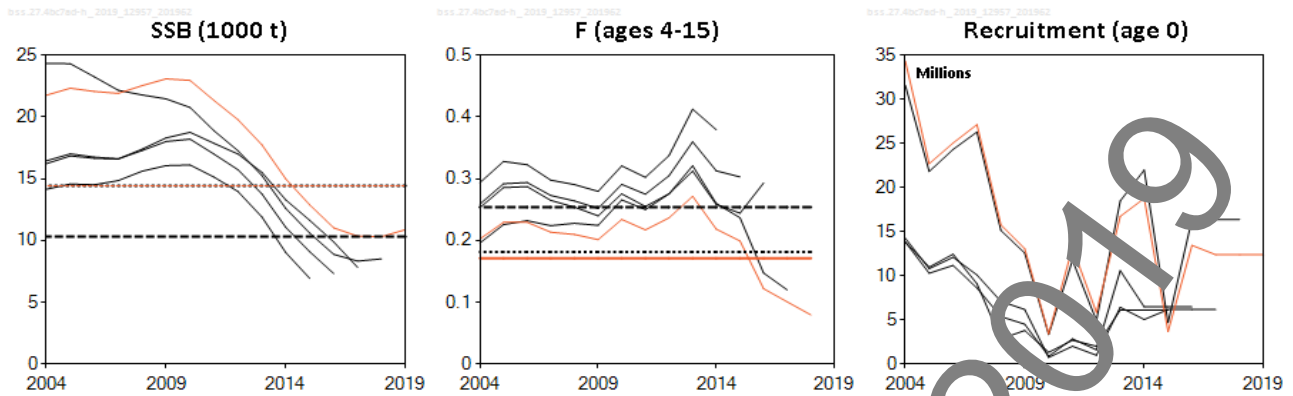
Figure 2   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Historical assessment results. F in the current assessment (red line) refers to ages 4–15; in all other assessments (black lines) it refers to ages 5–11. The stock was benchmarked in 2016, 2017, and 2018.

Issues relevant for the advice

Following a correction of the error in the calculation of the LPUE series used in the previous assessment, ICES is now providing revised advice for 2019 based on the current assessment. The result of this correction is that the advice for total catches for 2019 is increased slightly compared to that provided in 2018 and there is a difference in the predicted proportions of commercial and recreational catches. For example, the predicted recreational catches for 2019 are estimated to be 207 t in the corrected advice compared to 113 t in the initial advice provided in 2018 for 2019.

In the absence of information on future management measures, the forecast assumes the same relative fishing mortality ratios as those indicated in the interim year of the forecast for the commercial and recreational fleet components. Using different ratios for the fleet components can give different resulting catches.

The emergency measures introduced in 2015 reduced not only pelagic trawl catches of sea bass, but also bycatch of sea bass in other fisheries. However, observed discards have increased.

Stock identity remains poorly understood.

Reference points

Table 7   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	14439	B_{pa}; in tonnes.	ICES (2019)
	F_{MSY}	0.1713	Stochastic simulations (EqSim).	ICES (2019)
Precautionary approach	B_{lim}	10313	B_{loss} (lowest value in the time-series, SSB in 2018 as estimated by the WGCSE 2019 assessment); in tonnes.	ICES (2019)
	B_{pa}	14439	B_{lim} × 1.4; in tonnes.	ICES (2019)
	F_{lim}	0.254	Stochastic simulations (EqSim).	ICES (2019)
	F_{pa}	0.1815	F_{lim} / 1.4	ICES (2019)
Management plan*	MAP MSY $B_{trigger}$	14439	MSY $B_{trigger}$; in tonnes.	EU (2019)
	MAP B_{lim}	10313	B_{lim}; in tonnes.	EU (2019)
	MAP F_{MSY}	0.1713	F_{MSY}	EU (2019)
	MAP range F_{lower}	0.142	Consistent with ranges provided by ICES (2019), resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2019) and EU (2019)
	MAP range F_{upper}	0.1713	Consistent with ranges provided by ICES (2019), resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2019) and EU (2019)

* EU multiannual plan (MAP) for the Western Waters and adjacent waters (EU, 2019).

Basis of the assessment

Table 8   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2018a).
Assessment type	Age- and length-based analytical assessment (Stock Synthesis 3; NOAA Toolbox).
Input data	Commercial landings (international landings, ages and length frequencies from catch sampling); commercial discards (UK bottom otter trawl and nets and combined French fleet, length frequencies from catch sampling); one recruit survey (UK Solent autumn survey, 1986 to present, excluding 2010 and 2012); one bottom trawl survey (Channel Groundfish Survey, 1988–2014); one commercial tuning fleet (2001 to present); growth and maturity data from sampling of commercial catches and surveys; natural mortality (inferred from life history parameters and maximum observed ages).
Discards and bycatch	Discarding included in the model and forecast for some of the fleets.
Recreational	Used in the model and in the forecast.
Indicators	None.
Other information	Benchmarked in 2018 (ICES, 2018b).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

Information from stakeholders

There is no additional available information.

History of the advice, catch, and management

Table 9   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. History of ICES advice, the agreed TAC and ICES estimates of landings, discards, and official landings. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice*	Agreed TAC	Official commercial landings	ICES commercial landings	ICES commercial discards^	ICES recreational removals
2000	-	-	none	2100	2407		
2001	-		none	2200	2500		
2002	No increase in effort or F	-	none	2400	2622		
2003	No increase in effort or F		none	2900	3459		
2004	No increase in effort or F	-	none	3000	3731		
2005	-	-	none	3200	4430		
2006	-	-	none	3373	4377		
2007	-	-	none	3520	4064		
2008	-	-	none	3008	4107		
2009	-	-	none	4273	3889	151	
2010	-	-	none	4953	4562	148	
2011	-	-	none	4184	3858	22	
2012	No increase in catch	-	none	3983	3987	157	1440
2013	20% reduction in catch (last 3 years' average)	< 6000**	none	4242	4137	53	
2014	36% reduction in commercial landings (20% reduction, followed by 20% precautionary reduction)	< 2707**	none	2817	2682	25	

Year	ICES advice	Catch corresponding to advice*	Agreed TAC	Official commercial landings	ICES commercial landings	ICES commercial discards^	ICES recreational removals
2015	MSY approach	< 1155***	none	2081	2066	40	
2016	MSY approach	≤ 541***	none	1290	1295	19##	
2017	Precautionary approach	0	none	949^^	984	2?##	
2018	MSY approach	≤ 880^^^	none	912^^	801^^	482^^	
2019	MSY approach	≤ 1806^^^	none				
2020	Management plan#	1634–1946^^^					

* Advice prior to 2014 was given for sea bass in the Northeast Atlantic.

** Commercial landings.

*** Total landings (commercial and recreational landings).

^ Incomplete for some fleets.

^^ Preliminary.

^^^ Includes commercial catch and recreational removals (taking mortality of released fish into account, estimated at approximately 5%).

\# EU multiannual plan (MAP) for the Western Waters and adjacent waters (EU, 2019).

\#\# Updated in 2019.

History of the catch and landings

Table 10   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Catch distribution by fleet in 2018 as estimated by ICES.

Total catch	Commercial landings						Commercial discards	Recreational removals
1439 tonnes	Lines 52%	Bottom trawlers 14%	Other gears 4%	Fixed/drift nets 26%	Danish seine 3%	Pelagic trawlers 1%	482 tonnes	156 tonnes
	801 tonnes							

Table 11   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. History of commercial landings by country. All weights are in tonnes.

Year	Belgium	Denmark	Germany	France	UK	Netherlands	Channel Is.	Total	Total ICES
1985	0	0	0	62?	105	0	18	743	994
1986	0	0	0	841?	124	0	15	980	1319
1987	0	0	0	1226	123	0	14	1363	1980
1988	0	18	0	?14	173	8	12	925	1239
1989	0	2	0	?75	192	2	48	919	1161
1990	0	0	0	609	189	0	25	824	1063
1991	0	0	0	726	239	0	16	982	1227
1992	0	0	0	721	148	0	36	906	1186
1993	0	1	0	718	230	0	45	994	1255
1994	0	1	0	593	535	0	49	1178	1371
1995	0	1	0	801	708	0	69	1579	1835
1996	0	1	0	1703	563	8	56	2331	3022
1997	0	?	0	1429	561	1	74	2066	2620
1998	0	2	0	1363	488	48	79	1980	2390
1999	0	?	0	NA	685	32	108	826	2670
2000	0	?	0	1522	407	60	130	2124	2407
2001	0	2	0	1619	458	77	80	2236	2500
2002	0	1	0	1580	627	96	73	2377	2622
2003	15?	1	0	1903	586	163	84	2891	3459
2004	?59	1	0	1883	617	191	159	3010	3731
2005	20?	1	0	1937	512	327	220	3203	4430
2006	21?	2	0	2116	736	308	23	3396	4377
2007	178	1	0	2075	873	376	18	3521	4064
2008	187	0	0	1506	934	380	20	3027	4107
2009	174	0	0	2904	801	395	15	4288	3889
2010	216	4	0	3441	879	399	14	4952	4562
2011	152	2	0	2688	928	395	17	4183	3858
2012	154	3	0	2492	946	376	12	3982	3987

Year	Belgium	Denmark	Germany	France	UK	Netherlands	Channel Is.	Total	Total ICES
2013	146	4	2	2868	841	370	12	4243	4137
2014	148	1	1	1322	1080	253	11	2816	2682
2015	40	0	0	1113	701	218	9	2081	2066
2016	23	0	1	545	567	156	7	1300	1295
2017*	22	0		423	437	57	11	949	984
2018*	18	0	0	297	431	165	0	912	801

* Preliminary.

Summary of the assessment

Table 12   Sea bass in divisions 4.b–c, 7.a, and 7.d–h. Assessment summary. Weights are in tonnes and recruitment in thousands. High and low refers to 95% confidence intervals.

Year	Recruitment age 0			SSB			F ages 4–15			Commercial landings	Commercial discards*	Recreational removal**
	Low	Value	High	Low	Value	High	Low	Value	High			
1985	74	862	1649	18600	24810	31019	0.070	0.096	0.122	994		1713
1986	433	2469	4506	16390	21938	27485	0.083	0.113	0.143	1318		1550
1987	14534	20458	26382	14719	19651	24584	0.110	0.149	0.188	1979		1412
1988	9114	16119	23124	13426	17849	22272	0.089	0.119	0.1??	1239		1305
1989	79578	93569	107559	12979	17065	21150	0.090	0.120	0.151	1161		1204
1990	2215	7374	12533	11764	15593	19422	0.090	0.12?	0.155	1064		1082
1991	8602	14562	20522	10088	13634	17179	0.103	0.1?2	0.181	1226		988
1992	15797	22786	29774	8665	11894	15123	0.106	0.1?5	0.?3	1186		998
1993	5453	10557	15661	9160	12117	15075	0.107	0.13?	0.?71	1256		1150
1994	22843	32088	41332	11898	14699	17500	0.099	0.?24	0.148	1370		1378
1995	40622	51030	61438	15668	18556	21444	0.111	0.13?	0.161	1835		1551
1996	432	2914	5397	17597	20666	23735	0.?53	?.?8	0.22	3022		1570
1997	45059	56168	67277	16778	19884	22991	0.142	0.175	0.21	2620		1496
1998	8994	18334	27674	15627	18670	2?713	0.138	0.170	0.20	2390		1448
1999	41905	54392	66880	15107	18052	2099?	0.1??	0.184	0.22	2670		1449
2000	17955	27423	36891	15250	18133	21?6	0.?36	0.169	0.20	2407		1496
2001	17253	29225	41198	16176	19119	2206?	0.137	0.169	0.20	2500		1572
2002	32494	47319	62144	16904	19937	22??	0.135	0.167	0.198	2622	17	1655
2003	33020	45959	58899	17922	210??	?4227	0.159	0.197	0.23	3459	16	1727
2004	23697	34346	44995	18495	21?76	2??56	0.163	0.20	0.24	3731	59	1771
2005	14954	22710	30466	18937	22??	?749	0.183	0.23	0.27	4430	96	1782
2006	17519	25061	32603	18571	22078	25586	0.182	0.23	0.27	4377	53	1777
2007	18588	27150	35712	183?5	21??5	25455	0.170	0.21	0.25	4064	50	1798
2008	8968	15775	22582	19?57	?552	26048	0.168	0.21	0.25	4107	8	1824
2009	8083	13076	18068	19??9	2?102	26555	0.163	0.20	0.24	3889	151.2	1812
2010	549	3423	6296	19583	22973	26363	0.189	0.23	0.28	4562	147.9	1726
2011	8739	13192	17646	18095	2?351	24607	0.175	0.22	0.26	3858	22	1592
2012	2787	5831	8?76	16716	19794	22871	0.190	0.24	0.28	3987	156.6	1440
2013	9586	16744	23?0?	1?851	17758	20665	0.21	0.27	0.33	4137	53.4	1241
2014	9215	18780	?334?	12200	14982	17763	0.170	0.22	0.27	2682	24.7	1048
2015	854	3661	646?	10174	12885	15595	0.149	0.199	0.25	2066	39.5	737
2016	2298	13452	2460?	8360	11025	13689	0.088	0.122	0.153	1295	198.6	228
2017		12383		7685	10353	13020	0.071	0.101	0.127	984	271.102	223
2018		123?3^		7559	10313	13068	0.055	0.079	0.101	801	482.4	156
2019		12383		7559	10884	13884						

* Incomplete for some fleets.
** Estimated.
^ Geometric mean recruitment (2005–2016).

Sources and references

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