ICES
CIEM

International Council for
the Exploration of the Sea
Conseil International pour
l'Exploration de la Mer

Plaice (*Pleuronectes platessa*) in subdivisions 21–23 (Kattegat, Belt Seas, and the Sound)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 11 914 tonnes.

Management of plaice in the Baltic Sea (SDs 22–32) with a combined TAC for Plaice in subdivisions 21–23 and Plaice in subdivisions 24–32 prevents effective control of the single-stock exploitation rates and could lead to the overexploitation of either stock

Stock development over time

Fishing pressure on the stock is below F_{MSY} and spawning-stock size is above MSY $B_{trigger}$, B_{pa}, and B_{lim}.
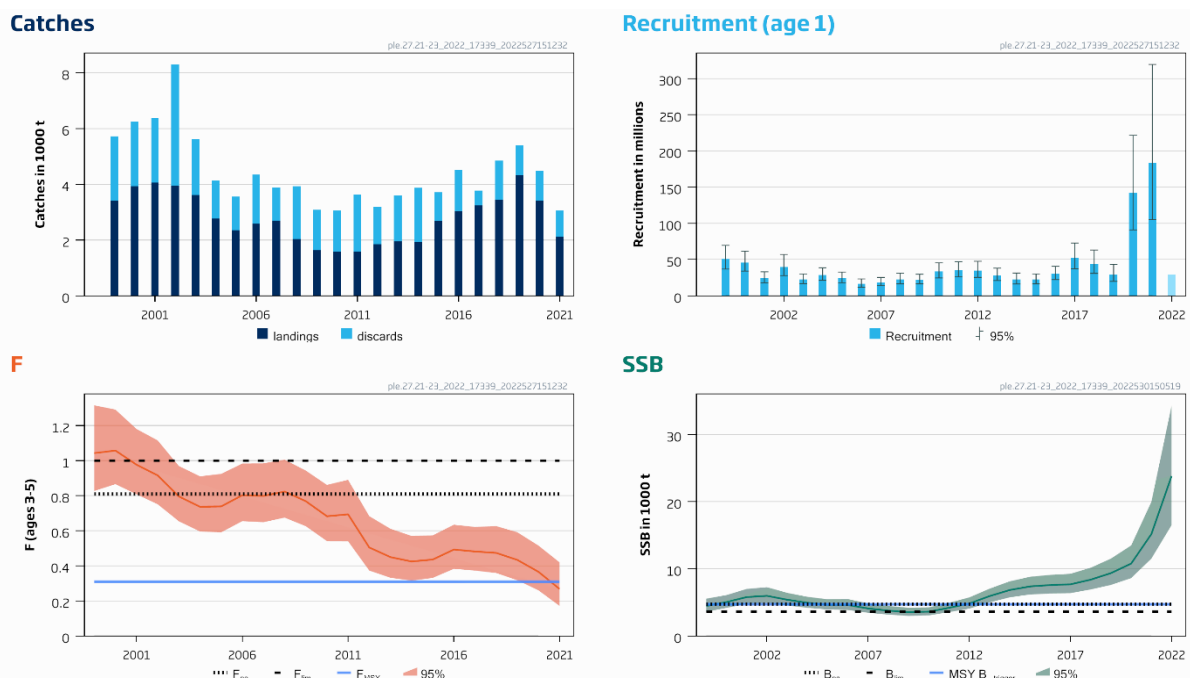

Figure 1   Plaice in subdivisions 21–23. Summary of the stock assessment. The assumed recruitment value for 2022 is shaded in a lighter colour.

Catch scenarios

Table 1   Plaice in subdivisions 21–23. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{ages\ 3-5}$ (2022)	0.268	$F_{status\ quo} = F_{2021}$
SSB (2023)	31 756	Short-term forecast; tonnes
$R_{age\ 1}$ (2022–2024)	29 240	Median resampled from the entire time-series of recruitment; thousands
Total catch (2022)	7 178	Short-term forecast using F_{2022}; tonnes
Projected landings (2022)	4 855	Short-term forecast, assuming average landings ratio by age in 2019–2021; tonnes
Projected discards (2022)	2 323	Short-term forecast, assuming average discard ratio by age 2019–2021; tonnes

1

Table 2   Plaice in subdivisions 21–23. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2023)	F (2023)	SSB (2024)	% SSB change*	% advice change**
ICES advice basis					
MSY approach: (F = F_{MSY})	11 914	0.31	34 276	7.9%	35%
Other scenarios					
F = 0	0	0.00	44 594	40%	−100%
F=F_{2022}	10 441	0.27	35 287	11%	18%
F = F_{pa}	24 912	0.81	22 717	−28%	182%
F = F_{lim}	28 574	1.00	19 602	−38%	224%
SSB (2024) = MSY $B_{trigger}$	46 788	3.31	4 730	−85%	430%
SSB (2024) = B_{pa}	46 788	3.31	4 730	−85%	430%
SSB (2024) = B_{lim}	48 307	3.91	3 635	−89%	448%
MSY approach: (F = F_{MSY}) lower	7 306	0.180	38 069	20%	−17%
SSB (2024) = SSB (2023)	14 506	0.393	31 756	0%	64%
MSY approach: (F = F_{MSY}) upper	19 906	0.59	27 038	−15%	126%
20% increase on advised catch for 2022	10 585	0.272	35 165	11%	20%

* SSB 2024 relative to SSB 2023.
** Catches in 2023 relative to ICES advised catch for 2022 (8 821 tonnes).

The advised catch has increased for 2023, as the SSB continues to increase due to incoming large year classes.

Basis of the advice

Table 3   Plaice in subdivisions 21–23. The basis of the advice.

Advice basis	MSY approach
Management plan	The EU multiannual plan for the Baltic Sea (EU, 2016, 2019) applies to bycatches of this stock taken when fishing for the target stocks described in the plan. Catches taken in the Kattegat (Subdivision 21) are covered by the North Sea multiannual plan (EU, 2018).

Quality of the assessment

Revisions in SSB and F are likely due to recent changes in fishing patterns and extraordinarily high recruitment pulses.
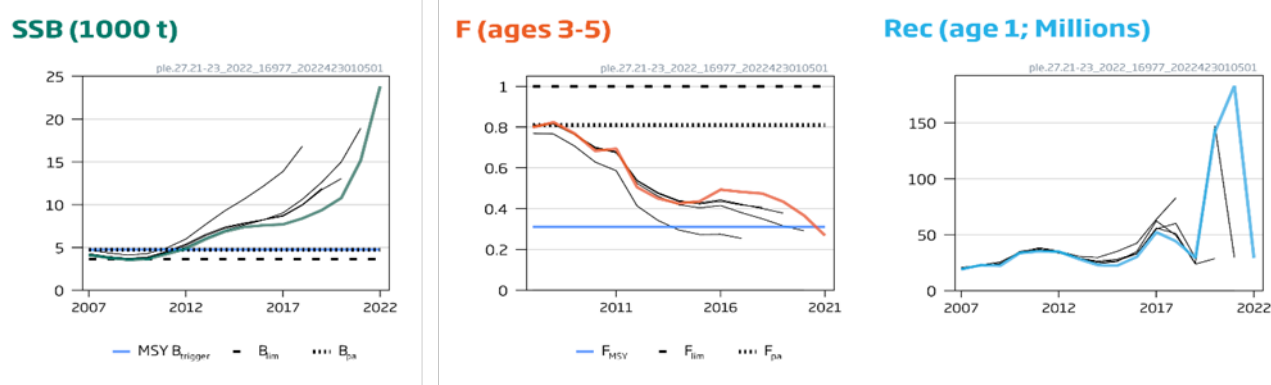

Figure 2   Plaice in subdivisions 21–23. Historical assessment results. (Final-year recruitment assumptions included for each line). The reference points were revised in 2019, and only the last four assessment results should be compared to the reference points indicated.

Issues relevant for the advice

The fishery in Subdivision (SD) 22 has changed from being a directed cod fishery to becoming a targeted flatfish fishery.

Plaice in the Baltic Sea (ple.27.21–23 and ple.27.24–32) are both experiencing extraordinarily high recruitment pulses from the 2019 and 2020 year classes. High catches of below minimum size (BMS) plaice are to be expected in a *status quo* demersal fishery (e.g. *Nephrops* fishery in SD 21 and targeted flatfish fisheries in SD 22).

The management areas for plaice in the Baltic Sea (i.e. SDs 21 and 22–32) are different from the stock areas (i.e. SDs 21–23 and 24–32). As for the plaice stock in SDs 24–32 (ICES, 2022a), this section provides an option for calculating TACs by management area, based on the catch distribution observed in 2021. The catch ratio between SDs 21 and 22–23 in 2021 was used to calculate a split of the advised catches for the stock in SDs 21–23 for 2023. The advised catch for the stock in SDs 24–32 was added to the calculated catch for SDs 22–23 in order to obtain plaice catches by management area that would be consistent with ICES advice for the two stocks assuming that the distribution of catches would be the same observed in 2021. If the distribution changes in 2023 the combined TAC may not be consistent with ICES advice. The details of this calculation are presented in Table 4. This results in catches of no more than 3232 tonnes in SD 21, and 13 315 tonnes in SDs 22–32.

Table 4   Plaice in subdivisions (SDs) 21–23. Calculation of TACs by management area based on the catch distribution observed in 2021. Weights are in tonnes.

Basis		Catch 2021	Landings 2021	ICES stock advice 2023 (catch)	
Stock area-based	SDs 21–23	3 053	2 126	11 914	
	SDs 24–32	1 317	767	4 633	
Total advised catch, 2023 (SDs 21-32)				16 547	
Management area-based	SD 21	828	215		
	SDs 22–23	2 225	1 912		
	SDs 22–32[*]	3 542	2 679		
		Calculation			Result
Share of SD 21 of the total catch in SDs 21–23 in 2021		= 828/3 053			0.271
		(catch in 2021 SD 21/catch in 2021 SDs 21–23)			
Catch in 2023 for SD 21		= 11 914*0.271			3 232
		(ICES stock advice in 2023 (catch) for SDs 21–23 × share)			
Catch in 2023 for SD 22–32		= 16 547–3 232			13 315
		(total advised catch in 2023 SDs 21–32 minus catch SD 21)			
		(landings in 2021 SD 21/landings in 2021 SDs 21–23			

Reference points

Table 5   Plaice in subdivisions 21–23. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	4 730	B_{pa}; in tonnes	ICES (2019)
	F_{MSY}	0.31	Stochastic simulations (EqSim) with segmented regression	ICES (2019)
Precautionary approach	B_{lim}	3 635	B_{loss} in 2009, from the 2019 assessment; in tonnes	ICES (2019)
	B_{pa}	4 730	$B_{lim} \times e^{1.645*\sigma}$, σ = 0.16; in tonnes	ICES (2019)
	F_{lim}	1.00	The F that on average leads to B_{lim}	ICES (2019)
	F_{pa}	0.81	F_{P05}, the F that provides a 95% probability for SSB to be above B_{lim}	ICES (2021)
Management plan	SSB_{mgt}	Not defined		
	F_{mgt}	Not defined		

---

[*] Version 2: label of SDs corrected.

Basis of the assessment

Table 6   Plaice in subdivisions 21–23. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022b)
Assessment type	Age-based analytical assessment SAM (ICES, 2022c) that uses catches in the model and in the forecast
Input data	Commercial catches; two combined survey indices (NS-IBTSQ1 [G1022] and BITS-Q1 [G2916], NS-IBTS-Q3 [G2829] and BITS-Q4 [G8863]); mean maturity data for the modelled period (Q1 surveys); natural mortalities are fixed and assumed to be 0.1 except for age 1, which has 0.2
Discards and bycatch	Discard information is available from 2002 (back-calculated to 1999) from the main fleets and is included
Indicators	None
Other information	The stock was last benchmarked in 2015 (ICES, 2015) and revised in 2019 (ICES, 2019)
Working group	Baltic Fisheries Assessment Working Group (WGBFAS)

History of the advice, catch, and management

Table 7   Plaice in subdivisions (SDs) 21–23. ICES advice, TACs, and ICES catches. All weights are in tonnes.

Year	ICES advice	Catch corresp. to advice for SDs 21–23	Catch corresp. to advice for Skagerrak and Kattegat combined	TAC Kattegat (SD 21)	TAC Baltic Sea (SDs 22–32)	ICES landings (SDs 21–23)^^	Discards (SDs 21–23)^^
1992	TAC		14 000	2 800		2 700	
1993	Precautionary TAC		-	2 800		1 700	
1994	If required, precautionary TAC		-	2 800		2 100	
1995	If required, precautionary TAC		-	2 800		2 100	
1996	If required, precautionary TAC		-	2 800		3 500	
1997	No advice		-	2 800		3 400	
1998	No increase in F from the present level		11 900	2 800		2 900	
1999	No increase in F from the present level		11 000	2 800		3 400	2 313
2000	F < F$_{pa}$		11 800	2 800		3 900	2 313
2001	F < F$_{pa}$		9 400	2 350		4 100	2 313
2002	F < F$_{pa}$		8 500*	1 600**		3 900	4 357
2003	F < F$_{pa}$		18 400	3 000		3 400	2 004
2004	F < F$_{pa}$		***	1 800		2 600	1 368
2005	F < F$_{pa}$		< 9 500	1 900		2 400	1 197
2006	No increase in F		< 9 600	1 900		2 400	1 769
2007	Maintain current TAC		< 9 600	2 100		2 600	1 190
2008	No increase in catch		< 9 400	2 300		2 000	1 901
2009	Same advice as last year		< 9 400	2 300		1 700	1 447
2010	Same advice as last year		< 9 400	2 300		1 500	1 488
2011	Last three years' (2007–2009) average landings		< 8 000	1 988	3 041	1 600	2 045
2012	Reduce catch		-	1 988	2 889	1 800	1 350

Year	ICES advice	Catch corresp. to advice for SDs 21–23	Catch corresp. to advice for Skagerrak and Kattegat combined	TAC Kattegat (SD 21)	TAC Baltic Sea (SDs 22–32)	ICES landings (SDs 21–23)^^	Discards (SDs 21–23)^^
2013	Increase catch by 16%, transition to F_{MSY}	< 1 800^		1 800	3 409	2 000	1 637
2014	Increase landings by 20%	2 224^		2 160	3 409	1 931	1 946
2015	Increase catch by 20%	4 031		2 626	3 409	2 687	1 021
2016	MSY approach	≤ 8 639		2 347	4 034	3 020	1 501
2017	MSY approach	≤ 8 333		2 343	7 862	3 253	988
2018	MSY approach	≤ 5 405		1 483	7 076	3 459	1 387
2019	Precautionary approach	≤ 15 237		1 705	10 122	4 334	1 054
2020	Precautionary approach	≤ 10 636		1 141	6 894	3 409	1 061
2021	MSY approach	≤ 5 176		719	7 240	2126	927
2022	MSY approach	≤ 8 821		1038[†]	9 050		
2023	MSY approach	≤ 11 914					

* In March 2002, ICES revised its advice to 11 600 tonnes for both areas combined.

** The TAC for the two areas combined was adjusted to 11 200 tonnes in mid-2002.

*** The exploitation of this stock should be conducted in the context of mixed fisheries.

^ Landings.

^^ On 1/1/2017 the EU landing obligation was introduced for plaice in SDs 22–32. In 2017, landings include those below minimum size (BMS), while for 2019 onward Denmark and Sweden BMS catches are included in discards.

History of the catch and landings

Table 8   Plaice in subdivisions 21–23. Catch distribution by fleet in 2021 as estimated by ICES.

Catch (2021)	Landings		Discards*
3 053 tonnes	Active gears 64 %	Passive gears 36 %	927 tonnes
	2 126 tonnes		

* BMS landings are included in discards.

Table 9   Plaice in subdivisions (SDs) 21–23. History of commercial catch and landings. ICES estimated landings by area and country, estimated discards, and officially reported BMS. All weights are in tonnes. Missing values indicate no reported catch; zeros represent either zero reported catch or the rounding down of catch of below one tonne.

Year and SD	Denmark		Germany		Sweden		Aggregate BMS	Total catches
	Discards	Landings	Discards	Landings	Discards	Landings		
2002	3 877	3 654	22	39	458	246		8 296
SD 21	3 314	1 880	0		446	204		5 844
SD 23	178	75	0		13	42		308
SD 22	385	1 699	22	39		0		2 145
2003	1 635	3 308	17	31	353	279		5 623
SD 21	1 235	2 132	0		351	253		3 971
SD 23	23	105	0		1	26		155
SD 22	377	1 071	17	31	0	0		1 496
2004	1 195	2 540	48	54	126	173		4 136
SD 21	711	1 454	0		119	137		2 421
SD 23	48	137	0		7	35		227
SD 22	435	949	48	54		0		1 486
2005	1 048	2 171	37	48	113	135		3 552
SD 21	617	1 145	0		108	100		1 970
SD 23	37	152	0		4	34		227

[†] Version 3: TAC corrected

Year and SD	Denmark		Germany		Sweden		Aggregate BMS	Total catches
	Discards	Landings	Discards	Landings	Discards	Landings		
SD 22	394	874	37	48		0		1 353
2006	1 593	2 321	25	45	152	214		4 350
SD 21	1 165	1 400	0		149	175		2 889
SD 23	17	180	0		3	39		239
SD 22	410	742	25	45		0		1 222
2007	962	2 376	56	75	173	241		3 883
SD 21	641	1 244	0		170	172		2 227
SD 23	42	199	0		2	69		312
SD 22	279	933	56	75		0		1 343
2008	1 807	1 754	16	92	79	182		3 930
SD 21	1 471	899	0		76	137		2 583
SD 23	39	120	0		3	45		207
SD 22	297	735	16	92		0		1 140
2009	1 332	1 317	16	191	99	127		3 082
SD 21	1 033	589	0		99	84		1 805
SD 23	10	144	0		0	42		196
SD 22	289	585	16	191		0		1 081
2010	1 212	1 262	149	226	127	83		3 059
SD 21	388	428	5	5	127	66		1 019
SD 23	5	59	0		1	17		82
SD 22	819	775	144	221		0		1 959
2011	1 823	1 224	127	310	95	51		3 630
SD 21	1 042	327	0		94	40		1 503
SD 23	27	46	0		1	11		85
SD 22	754	851	127	310		0		2 042
2012	1 192	1 439	119	365	39	41		3 195
SD 21	277	196	0		39	30		542
SD 23	1	54	0		1	12		68
SD 22	914	1 189	119	365		0		2 587
2013	1 423	1 561	111	320	104	74		3 593
SD 21	756	232	3	1	103	60		1 155
SD 23	1	76	0		1	14		92
SD 22	666	1 252	109	319		0		2 346
2014	1 750	1 497	100	321	96	113		3 877
SD 21	525	343	1	1	94	68		1 032
SD 23	5	57	0		2	45		109
SD 22	1 220	1 097	99	320		0		2 736
2015	784	2 014	115	560	122	113		3 708
SD 21	345	807	0	0	122	87		1 361
SD 23	6	103	0		0	26		135
SD 22	434	1 103	115	560		0		2 212
2016	1 223	2 199	145	681	133	141		4 522
SD 21	633	984	1	1	131	121		1 871
SD 23	17	107	0		2	20		146
SD 22	573	1 108	144	680		0		2 505
2017	583	2 198	126	936	54	110	4	4 011
SD 21	396	703	0	1	52	97		1 249
SD 23		70	0		3	13		86
SD 22	187	1 424	126	936		0		2 673
2018	969	2 300	365	1073	65	65	8	4 845
SD 21	777	482	1	1	61	51	0	1 373
SD 23	42	111	0		5	13		171
SD 22	151	1 708	364	1072	0	0	8	3 303
2019	839	2 775	166	1498	33	52	25	5 388
SD 21	345	332	4	4	29	28	6	748
SD 23	24	102	0		4	24	0	154
SD 22	470	2 342	162	1494	0	0	19	4 487
2020	846	2 551	154	820	53	31	14	4 469

Year and SD	Denmark		Germany		Sweden		Aggregate BMS	Total catches
	Discards	Landings	Discards	Landings	Discards	Landings		
SD 21	522	264	8	2	46	17	1	860
SD 23	29	87	0		7	14	1	138
SD 22	296	2 201	146	818		0	12	3 473
2021	561	1 341	257	758	95	27	14	3 053
SD 21	507	197	12	5	93	13	2	828
SD 23	20	63			2	15	0	101
SD 22	34	1 081	245	753	0	0	12	2 124

Summary of the assessment

Table 10   Plaice in subdivisions 21–23. Assessment summary. Weights are in tonnes; recruitment is in thousands. High and low refers to 95% confidence intervals.

Year	Recruitment			SSB			Landings	Discards	Fishing mortality		
	Age 1	High	Low	SSB	High	Low			Ages 3–5	High	Low
1999	50 709	69 717	36 883	4 473	5 559	3 600	3 406	2 313	1.04	1.32	0.83
2000	45 753	61 550	34 011	5 054	6 101	4 186	3 935	2 313	1.06	1.29	0.87
2001	24 316	33 042	17 895	5 796	7 016	4 788	4 054	2 313	0.98	1.18	0.81
2002	39 797	57 035	27 769	5 983	7 278	4 919	3 939	4 357	0.92	1.12	0.75
2003	22 443	30 312	16 616	5 403	6 433	4 538	3 618	2 004	0.80	0.97	0.65
2004	28 863	38 759	21 494	4 952	5 843	4 197	2 766	1 369	0.74	0.91	0.60
2005	24 380	32 747	18 151	4 642	5 471	3 939	2 354	1 197	0.74	0.93	0.59
2006	16 494	23 350	11 652	4 617	5 503	3 873	2 580	1 770	0.80	0.98	0.66
2007	18 919	25 530	14 020	4 097	4 864	3 450	2 691	1 191	0.80	0.99	0.65
2008	22 768	31 458	16 479	3 778	4 479	3 187	2 028	1 902	0.82	1.01	0.68
2009	22 158	29 745	16 507	3 548	4 210	2 990	1 635	1 448	0.77	0.94	0.63
2010	33 536	45 588	24 671	3 618	4 267	3 068	1 570	1 489	0.68	0.86	0.54
2011	35 028	47 063	26 071	4 197	4 959	3 552	1 584	2 045	0.69	0.89	0.54
2012	34 859	47 679	25 487	4 837	5 751	4 068	1 845	1 351	0.51	0.68	0.37
2013	28 306	38 071	21 045	5 939	7 052	5 002	1 956	1 638	0.45	0.61	0.33
2014	22 779	31 600	16 420	6 846	8 150	5 751	1 931	1 946	0.43	0.57	0.32
2015	22 356	30 324	16 482	7 383	8 825	6 176	2 687	1 021	0.44	0.57	0.33
2016	30 226	40 799	22 393	7 587	9 111	6 318	3 020	1 501	0.49	0.64	0.38
2017	52 233	72 998	37 374	7 694	9 274	6 384	3 243	530	0.48	0.62	0.37
2018	44 137	63 148	30 849	8 392	10 174	6 922	3 446	1 400	0.47	0.63	0.36
2019	29 240	43 174	19 803	9 367	11 539	7 604	4 334	1 054	0.43	0.59	0.32
2020	142 019	221 541	91 041	10 786	13 498	8 618	3 409	1 061	0.37	0.52	0.26
2021	183 127	319 481	104 968	15 186	20 012	11 523	2 126	927	0.27	0.42	0.17
2022	29 240*			23 849	34 374	16 518					

* Median and confidence intervals of resampled recruitment from the entire time-series.

Sources and references

EU. 2016. Regulation (EU) 2016/1139 of the European Parliament and of the Council of 6 July 2016 establishing a multiannual plan for the stocks of cod, herring and sprat in the Baltic Sea and the fisheries exploiting those stocks, amending Council Regulation (EC) No 2187/2005 and repealing Council Regulation (EC) No 1098/2007. Official Journal of the European Union, L 191. 15 pp.
http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1139&rid=1.

EU. 2018. Regulation (EU) 2018/973 of the European Parliament and of the Council of 4 July 2018 establishing a multiannual plan for demersal stocks in the North Sea and the fisheries exploiting those stocks, specifying details of the implementation of the landing obligation in the North Sea and repealing Council Regulations (EC) No 676/2007 and (EC) No 1342/2008. Official Journal of the European Union, L. 179. 13 pp. http://data.europa.eu/eli/reg/2018/973/oj.

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, 25.3.2019. 17 pp. http://data.europa.eu/eli/reg/2019/472/oj.

ICES. 2015. Report of the Benchmark Workshop on Plaice (WKPLE), 23–27 February 2015, ICES Headquarters, Copenhagen, Denmark. ICES CM 2015\ACOM:33. 200 pp.

ICES. 2019. Baltic Fisheries Assessment Working Group (WGBFAS). ICES Scientific Reports. 1:20. 653 pp. http://doi.org/10.17895/ices.pub.5949

ICES. 2021. Baltic Fisheries Assesment Working Group (WGBFAS). ICES Scientific Reports. Report. https://doi.org/10.17895/ices.pub.8187

ICES. 2022a. Plaice (Pleuronectes platessa) in subdivisions 24-32 (Baltic Sea, excluding the Sound and Belt Seas). In Report of the ICES Advisory Committee, 2022. ICES Advice 2022, ple.27.24-32, https://doi.org/10.17895/ices.advice.19453583.

ICES. 2022b. Advice on fishing opportunities. In Report of the ICES Advisory Committee, 2022. ICES Advice 2022, section 1.1.1. http://doi.org/10.17895/ices.advice.19928060

ICES. 2022c. Baltic Fisheries Assessment Working Group (WGBFAS). ICES Scientific Reports. 4:44. 659 pp. http://doi.org/10.17895/ices.pub.19793014

Stepputtis, D., Santos, J., Mieske, B., Lichtenstein, U., Schütz, A., and Stechert, R. 2020. Abschlussbericht an das Ministerium für Landwirtschaft und Umwelt Mecklenburg-Vorpommern für das Projekt CODEX (CodExcluder) - Netzmodifikation zur Reduktion des Dorschbeifanges: final report (in Germany, English summary). Thünen-Institute of Baltic Sea Fisheries, Rostock. 99 pp