

8.3.2 Cod (*Gadus morhua*) western Baltic stock in Subdivisions 22–24 (Western Baltic Sea)

ICES stock advice

ICES advises that when the MSY approach is applied, catches of the western Baltic cod stock in 2016 should be no more than 5385 tonnes. This includes recreational catch but does not include catches of the eastern Baltic cod stock in the Western Baltic area (Subdivisions 22–24). If some eastern Baltic stock catches are allocated to the Western Baltic area (Subdivisions 22–24) TAC, a sub-TAC should be given for Subdivisions 22–23 to protect the western Baltic cod stock.

Stock development over time

The spawning-stock biomass (SSB) has increased in 2014–2015; however, it is below the limit reference point B_{lim} . The fishing mortality is well above F_{MSY} . Recruitment has been low since the mid-2000s compared to earlier years.



Figure 8.3.2.1 Western Baltic cod stock in Subdivisions 22–24. Summary of stock assessment (weights in thousand tonnes). Recruitment, F , and SSB have uncertainty boundaries (95%) in the plot.

Stock and exploitation status

Table 8.3.2.1 Western Baltic cod stock in Subdivisions 22–24. State of the stock and fishery, relative to reference points.

		Fishing pressure			Stock size		
		2012	2013	2014	2013	2014	2015
Maximum Sustainable Yield	F_{MSY}	✗	✗	✗ Above	MSY	✗	✗ Below trigger
Precautionary approach	F_{pa} , F_{lim}	?	?	? Undefined	B_{pa} , B_{lim}	✗	✗ Reduced reproductive capacity
Management Plan*	F_{MGT}	-	-	- Not applicable	SSB_{MGT}	-	- Not applicable

*The current management plan and the basis for the stock assessment no longer match.

Catch options

Table 8.3.2.2 Western Baltic cod stock in Subdivisions 22–24. The basis for the forecast. Weights in tonnes. Recruitment in thousands.

Variable	Value	Source	Notes
F ages 3–5 (2015)	0.84	ICES (2015a)	Set to F_{2014} (F_{sq})
SSB (2016)	27 450	ICES (2015a)	
R_{age0} (2016)	45 071	ICES (2015a)	Sampled from the last 10 years
R_{age1} (2016)	17 916	ICES (2015a)	Based on age 0 in 2015 sampled from the last 10 years
R_{age1} (2017)	18 660	ICES (2015a)	Based on age 0 in 2016 sampled from the last 10 years
Total catch (2015)	16 642	ICES (2015a)	Based on F_{sq}
Commercial wanted catch (2015)	13 716	ICES (2015a)	Based on F_{sq} and average fraction from total catch in 2012–2014
Commercial unwanted catch (2015)	368	ICES (2015a)	Based on F_{sq} and average fraction from total catch in 2012–2014
Recreational catches (2015)	2 558		Mean recreational catch (2012–2014)

Table 8.3.2.3 Western Baltic cod stock in Subdivisions 22–24. The forecast and catch options. Weights in thousand tonnes.

Rational	Total catch 2016*	Basis	F_{total} 2016	SSB 2017	%SSB change [^]
MSY approach	5 385	$F = F_{MSY} \times (SSB_{2016} / MSY B_{trigger})$	0.19	43 505	58
F_{MSY}	7 163	F_{MSY}	0.26	41 348	51
F_{MSY} ranges without Advice Rule ^{^^}	4 321	$MSY F_{lower}$	0.15	44 817	63
	11 543	$MSY F_{upper}$	0.45	36 129	32
F_{MSY} ranges with Advice Rule included ^{^^}	3 221	$F = MSY F_{lower(AR)} \times (SSB_{2016} / MSY B_{trigger})$	0.11	46 172	68
	8 618	$F = MSY F_{upper(AR)} \times (SSB_{2016} / MSY B_{trigger})$	0.32	39 732	45
Zero catch	0	$F_{2015} \times 0$	0	49 947	82
Management plan ^{**}	17 317	90% F_{2014} (F_{3-6})	0.8***	29 184	7
Management plan long-term target ^{**}	13 907	$F_{total} = 0.6$ (F_{3-6})	0.6***	33 226	21
Other options	12 715	$F_{2014} \times 0.6$	0.51	34 667	26
	9 670	$F_{2014} \times 0.44$	0.37	38 400	40
	15 883	$F_{2014} \times 0.8$	0.68	30 976	13
	17 346	$F_{2014} \times 0.9$	0.76	29 330	7
	18 703	$F_{2014} \times 1.0$	0.84	27 717	1
	19 964	$F_{2014} \times 1.1$	0.93	26 323	-4
	23 365	$F_{2014} \times 1.4$	1.18	22 483	-18
	26 132	$F_{2014} \times 1.7$	1.43	19 396	-29

* Includes commercial (wanted and unwanted) and recreational catch.

** The current management plan and the basis for the stock assessment no longer match.

*** The fishing mortality provided for a reference F age range of 3–6.

[^] SSB 2017 relative to SSB 2016.

^{^^} According to ICES (2015b), F_{MSY} ranges are specified with and without the ICES Advice Rule (AR). For ranges without the AR F_{lower} and F_{upper} are not modified by SSB in the catch advice year. For the ranges with the AR, $SSB_{2016} < MSY B_{trigger}$; therefore, $F_{lower(AR)}$ and $F_{upper(AR)}$ are reduced by the factor $SSB / MSY B_{trigger}$.

Basis of the advice

Table 8.3.2.4 Western Baltic cod stock in Subdivisions 22–24. The basis of the assessment and advice.

Advice basis	MSY approach
Management plan	ICES is not using the management plan as basis for advice but has used the MSY. A management plan for cod in the western Baltic Sea was agreed in September 2007 by the EU (EC, 2007). This plan aims for a reduction in F by 10% each year until the target F is reached. ICES evaluated the management plan in 2009 and 2011 and considered it, at that time, to be in accordance with the precautionary approach. ICES has in 2006–2013 provided advice in accordance with the management plan (10% annual reduction in F). Although the catches for most years since 2008 have been below the level advised by ICES, the fishing mortality has not declined as anticipated. This seems to be due to a systematic overestimation of fishing possibilities in ICES catch forecast. Due to this effect it is considered that following the relative F reductions (10%) as stipulated in the plan will not reduce F. Furthermore, the current assessment is conducted for the western Baltic cod stock only (i.e. cod in Subdivisions 22–23 plus the western Baltic cod stock component in Subdivision 24). The current management plan and the basis for the stock assessment no longer match.

Quality of the assessment

Mixing of the eastern and western Baltic cod stocks is a major issue in Subdivision 24. The stock mixing within Subdivision 24 is variable spatially and possibly between seasons and age-groups. This introduces uncertainty to the stock separation. Also, stock separation data has been extrapolated for 13 out of 21 years in the time-series. The longest gap in the data is from 2001 to 2007. For later years a splitting key is available at least for every second year. Furthermore, preparation of assessment input data to separate between the western and eastern Baltic cod stocks involves a number of additional assumptions which introduce uncertainty to the assessment. Nevertheless, the present assessment is considered to provide a more realistic picture of the western Baltic cod stock development, compared to the assessments conducted in earlier years on mixed populations within the area of Subdivisions 22–24. Thus, the uncertainties introduced to earlier assessments by the eastern Baltic stock component (e.g. age-reading issues, higher discards) have been reduced in the current assessment. Data for stock separation prior to 1994 has not been processed and the current assessment is truncated to 1994.

The estimation of recreational catches is a minimum estimate for the whole period as it includes only German data. The German data is considered reliable after 2005 and was extrapolated for previous years.

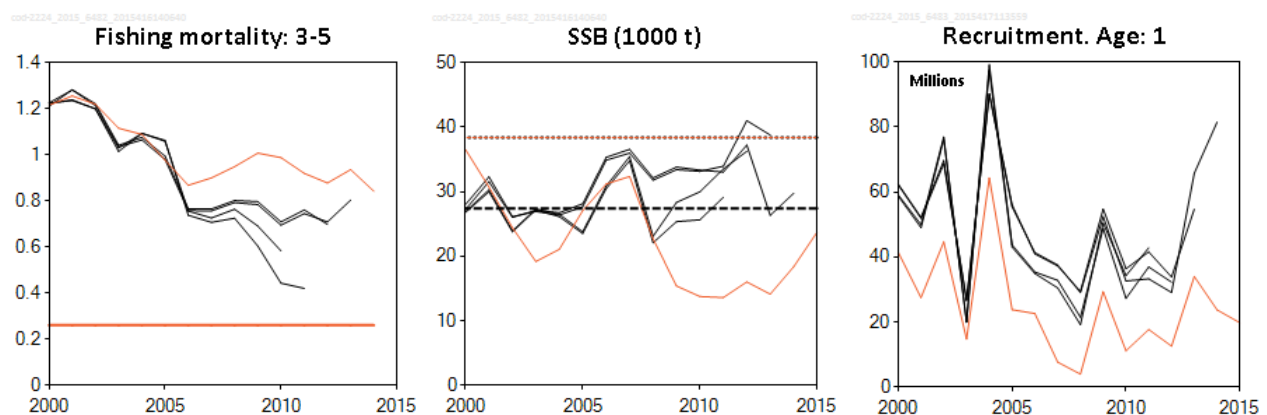


Figure 8.3.2.2 Western Baltic cod stock in Subdivisions 22–24. Historical assessment results (final-year recruitment estimates included). The assessments for previous years were for cod in the area of Subdivisions 22–24 that contains a fraction of the eastern Baltic cod stock. This year's assessment is conducted for the western Baltic cod stock only, and is not comparable to the previous assessments conducted for Subdivisions 22–24.

Issues relevant for the advice

A mixture of eastern and western Baltic cod stocks is caught in the western Baltic management area (Subdivisions 22–24). The assessment and this advice only include the western Baltic (WB) cod stock in Subdivisions 22–24.

To derive a management area-based total catch for the western Baltic area (Subdivisions 22–24), the assumed catch of the eastern Baltic (EB) stock taken in Subdivision 24 could be added to the advised total catch for the WB cod stock. Any allocated catch of EB cod in Subdivision 24 should be deducted from the advised catch for the EB cod stock when setting the TAC for the eastern Baltic area (Subdivisions 25–32).

ICES is not in a position to give specific advice for a management area-based total catch for the western Baltic management area (Subdivisions 22–24) because it requires management choices. ICES also has no basis for advising on the allocation of the advised catch to commercial and recreational fisheries. The commercial catches corresponding to the advice will depend on the recreational landings and vice versa.

ICES notes, however, that the following topics should be taken into account:

- The distribution area of the WB cod stock is within Subdivisions 22–24.
- The distribution area for EB cod includes Subdivision 24.
- Commercial fishing in Subdivisions 22–23 will provide a catch of the WB cod stock only.
- Commercial fishing in Subdivision 24 will provide a mixed catch of the EB and WB cod stocks.
- Recreational catches of cod in the western Baltic management area are considered to consist of 100% WB cod. Recreational fisheries are currently not regulated by total catch limits. The total landings weight is rather stable from year to year and seems independent of the stock size of WB cod. A catch weight for recreational fishing must be subtracted from the advised catch of WB cod to get the catch weight for commercial fishing.
- The catch in Subdivision 24 of EB cod has been estimated to be a significant part of the total catch taken in the western Baltic management area.
- Species TAC for an area that includes two stocks of the species must be set to minimize the risk of overexploitation of the weakest stock, which at present is the WB cod.

These facts have management implications and a number of potential approaches:

- Set aside an amount to cover the recreational fishery in Subdivisions 22–24.
- A simple solution to area allocation would be to set the TAC for the WB management area to the advised catch for the WB cod stock and include the assumed catch for EB cod for Subdivision 24 into the TAC for management area Subdivisions 25–32 (see examples 1 and 2, Table 8.3.2.5). This option, however, will slightly increase the fishing mortality in the EB cod stock as some EB cod will still be caught in Subdivision 24.
- An alternative area allocation would be to include the advised catch for EB cod for Subdivision 24 into the WB management area TAC. In doing so it must be ensured that the allocated catch of EB cod is not taken in Subdivisions 22–23, to minimize the risk of overexploitation of the WB cod stock. This could be done by setting a sub-TAC for Subdivisions 22–23. To protect the local spawners in Subdivision 22 no more than 65% of the western Baltic stock commercial catch should be taken in in Subdivisions 22–23 (see examples 3 to 6, Table 8.3.2.5).

A number of specific catch options are provided below in Table 8.3.2.5; these have been selected to illustrate ways to respond to the issues discussed above. It is recognized that other options might be considered, and for that purpose Table 8.3.2.6 provides a guide to calculating the area TACs from the advice. None of the present options illustrating the allocation of EB cod to Subdivision 24, including the three options illustrated below (Table 8.3.2.5), are preferred over the other by ICES; this is considered a managerial decision. Similarly, ICES does not address whether it is possible to regulate recreational catch. Options 1, 3, and 5, included in Table 8.3.2.5, assume *status quo* recreational catch.

Table 8.3.2.5 Western Baltic cod stock in Subdivisions 22–24. Examples for calculations to derive catch limits for management areas (TACs) from the stock-based ICES advice for Baltic cod. Weights in tonnes. The basis of the calculations (A–H) is described in Table 8.3.2.6 and Figure 8.3.2.3.

Rationale		Western Baltic cod stock			Eastern Baltic cod stock		TAC 22–24	Sub-TAC 22–23 ^^^	TAC 25–32
		advised	recreat. catch	commercial catch ***	advised	comm. catch in SD 24			
		A	B	C	D	E	F	G	H
1	Maximum protection for western stock, max. TAC for eastern area, recr. fishery assumed unchanged	5 385	2 558 *	2 827	29 220	0	2 827	not required	29 220
2	Maximum protection for western stock, max. TAC for eastern area, recr. fishery reduced proportionally	5 385	829 **	4 284	29 220	0	4 284	not required	29 220
3	Same proportion of stock in WB area as 2014 (with MSY/precautionary advice), recr. fishery assumed unchanged	5 385	2 558 *	2 827	29 220	4 450 ^	7 277	1 838	24 770
4	Same proportion of stock in WB area as 2014 (with MSY/precautionary advice), recr. fishery reduced proportionally	5 385	829 **	4 284	29 220	4 450 ^	8 734	2 785	24 770
5	Maximum TAC for western area, recr. fishery assumed unchanged	5 385	2 558 *	2 827	29 220	7 121 ^^	9 948	1 838	22 099
6	Maximum TAC for western area, recr. fishery reduced proportionally	5 385	829 **	4 284	29 220	7 121 ^^	11 405	2 785	22 099

* Recreational catch for 2014 (incomplete, only German data included in the assessment and forecast).

** Based on the reduction of total assumed catch (2015) to total advised catch (2016): factor 0.32.

*** Difference between advised total catch and recreational catch.

^ Assumed catch of EB cod reduced proportionally with advised catch for EB cod.

^^ Catch of EB cod in Subdivision 24 (2014).

^^^ Based on the mean fraction of commercial catch in Subdivisions 22–24 on the western Baltic cod stock (2012–2014): 0.65.

Table 8.3.2.6 Western Baltic cod stock in Subdivisions 22–24. Guide to calculations to obtain area TACs for western and eastern Baltic cod from ICES stock-based catch advice, taking into account the historical migration of the eastern stock to the western area, allocation for recreational catches for the western stock, and protection of local spawners in Subdivisions 22–23. Illustrations of calculations (A–H) can be found in Table 8.3.2.5 and Figure 8.3.2.3.

Parameter		Calculation / value	Notes
Advised catch of WB cod stock	A	no more than 5 385 t	If MSY approach is applied, catches of western Baltic cod stock in 2016
Amount set aside for recreational landings	B	Managers choice	Recreational catch that was estimated at 2 558 tonnes as an average of the last three years.
Allocated commercial catch of WB cod in Subdivisions 22–24	C	$C = A - B$	Subtract catch set aside for recreational fisheries
Advised catch of EB cod stock	D	no more than 29 220 t	If MSY approach is applied, catches of western Baltic cod stock in 2016
Amount of EB cod to be taken in Western Baltic (Subdivision 24)	E	Managers choice	See examples in Table 8.3.2.2.
Allocated commercial catch for WB area	F	$E + C$	The overall TAC for Subdivisions 22–24
Allocated commercial catch for WB area (Subdivisions 22–23)	G	$F \times 0.65$ or C	Remainder $F - G$ is to be taken in Subdivision 24
Allocated catch for EB area (Subdivisions 25–32)	H	$D - E$	EB stock minus component that is allocated to Subdivision 24

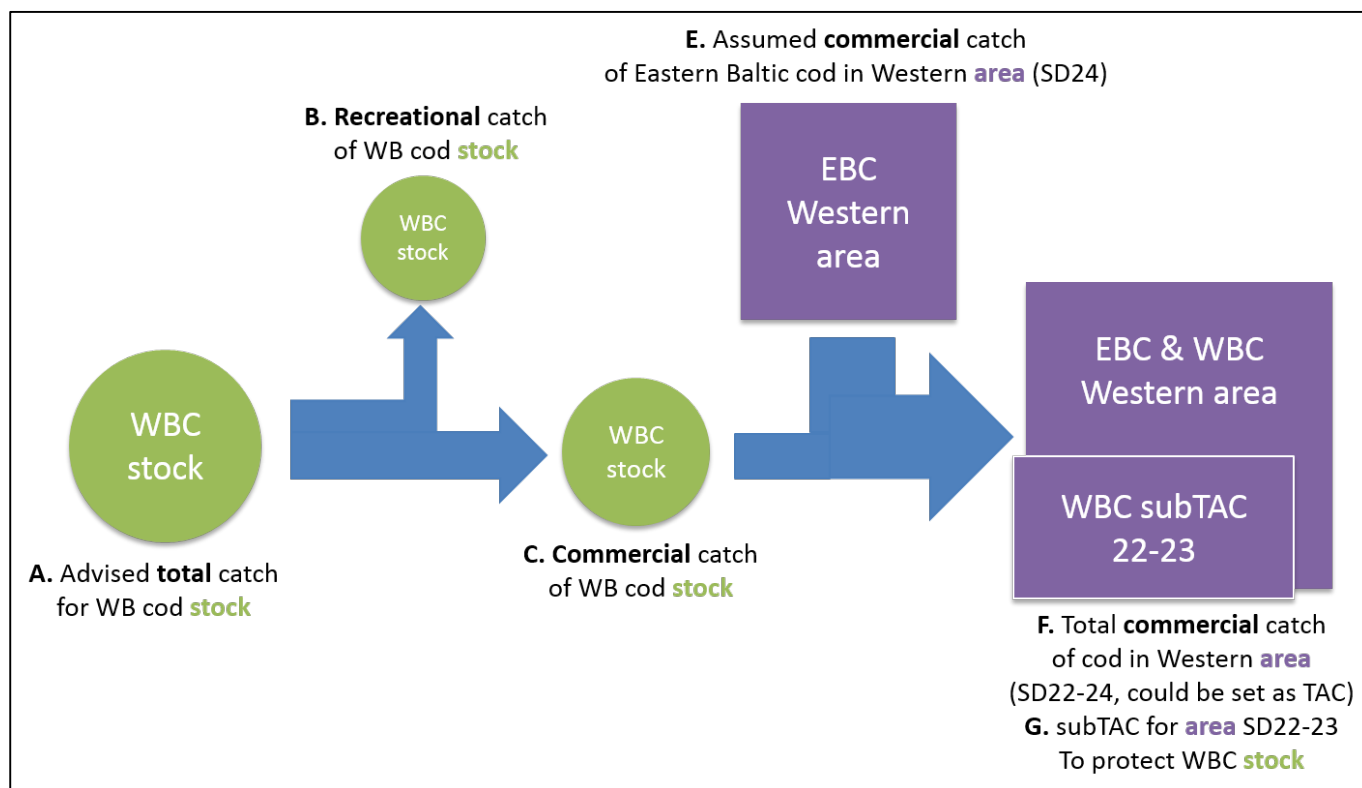


Figure 8.3.2.3 Western Baltic cod stock in Subdivisions 22–24. Illustration of calculations to obtain area TACs for western and eastern Baltic cod from ICES stock-based catch advice, taking into account migration of the eastern stock to the western area, recreational catches for the western stock, and protection for local spawners in Subdivisions 22–23.

Table 8.3.2.7 Western Baltic cod stock in Subdivisions 22–24. ICES catches in the western Baltic management area (Subdivisions 22–24) for western and eastern Baltic cod stocks (in tonnes).

Year	WB cod stock					EB cod stock					EB+WB cod stock
	Landings	Discards	Recreational catch	Fraction of catch in SDs 22–23	Fraction of catch in SD 24	Landings in SD 24	Discards in SD24	Landings in SDs 25–32	Discards in SDs 25–32	Fraction of catch in SD 24	
1994	21 409	2 386	1 991	0.46	0.54	1 784	—	100 856	1 956		
1995	29 854	2 896	2 163	0.66	0.34	4 041	—	107 718	1 872		
1996	38 335	8 851	2 192	0.65	0.35	10 210	—	124 189	1 443		
1997	37 009	4 405	2 337	0.65	0.35	6 615	—	88 600	3 462		
1998	29 628	7 044	2 205	0.61	0.39	4 588	—	67 428	2 299		
1999	35 817	5 202	2 278	0.66	0.34	6 338	—	72 995	1 838		
2000	31 653	3 231	2 244	0.68	0.32	6 694	—	89 289	6 019		
2001	26 983	3 181	2 335	0.64	0.36	7 261	—	91 328	2 891		
2002	19 592	1 077	2 218	0.71	0.29	4 566	—	67 740	1 462		
2003	18 055	4 318	2 187	0.62	0.38	6 569	17	69 476	2 024	0.08	31 147
2004	15 916	3 010	2 474	0.68	0.32	4 925	0	68 578	1 201	0.07	26 325
2005	16 845	2 013	2 967	0.67	0.33	5 191	2 981	55 032	1 670	0.13	29 997
2006	16 472	1 878	1 959	0.70	0.30	6 279	0	65 532	4 644	0.08	26 588
2007	15 859	1 014	1 781	0.65	0.35	7 876	1 186	50 843	4 146	0.14	27 716
2008	11 148	103	1 765	0.67	0.33	8 934	1 020	42 235	3 746	0.18	22 970
2009	7 093	247	2 888	0.51	0.49	8 456	568	48 439	3 328	0.15	19 252
2010	7 641	942	2 607	0.60	0.40	6 479	429	50 277	3 543	0.11	18 098
2011	8 845	230	2 032	0.71	0.29	7 487	551	50 368	3 850	0.13	19 145
2012	8 654	307	2 354	0.64	0.36	8 419	598	50 972	6 795	0.14	20 331
2013	7 742	274	2 428	0.67	0.33	5 226	1 976	31 175	5 020	0.17	17 646
2014	8 099	452	2 891	0.63	0.37	5 439	1 682	28 908	9 627	0.16	18 563

Reference points

Table 8.3.2.8 Western Baltic cod stock in Subdivisions 22–24. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Reference
MSY approach	F_{MSY}	0.26		ICES, 2015b
	MSY $B_{trigger}$	38 400 t	B_{pa}	ICES, 2015c
Precautionary approach	B_{lim}	27 400 t	Break point of the stock–recruitment relationship.	ICES, 2015c
	B_{pa}	38 400 t	$1.4 \times B_{lim}$	ICES, 2015c
	F_{lim}	Not defined.		
	F_{pa}	Not defined.		
Management plan*	SSB_{MGT}	Not defined.		
	F_{MGT}	0.60	EU management plan based on stochastic simulations (reference F age range 3–6).	EC, 2007

* The basis for the management plan (cod in the area of Subdivisions 22–24) is not comparable to the basis for the current stock assessment (western Baltic cod stock).

Basis of the assessment

Table 8.3.2.9 Western Baltic cod stock in Subdivisions 22–24. The basis of the assessment and advice.

ICES stock data category	1 (ICES, 2015d)
Assessment type	Age-based analytical assessment (SAM; ICES, 2015a) that uses catches in the model and in the forecast.
Input data	Commercial catches (international landings, ages and length frequencies from catch sampling), recreational catch (only German data included). Two survey indices (BITS-Q1 and BITS-Q4); Annual maturity data from BITS-Q1 surveys. Natural mortalities for age 1 derived from multispecies assessment, unchanged since 1996. Annual stock separation key to split catches in Subdivision 24 to eastern and western cod, derived from otolith shape analyses combined with genetics.
Discards and bycatch	Included in the assessment since 1994, data series from the main fleets.
Indicators	None.
Other information	Benchmarked in 2015 (ICES, 2015c). The basis for the assessment changed this year to being for the western Baltic cod stock, whereas assessments in earlier years were for the area of Subdivisions 22–24.
Working group	Baltic Fisheries Assessment Working Group (WGBFAS)

Information from stakeholders

There is no available information.

History of advice, catch, and management

Table 8.3.2.10 Western Baltic cod stock in Subdivisions 22–24. History of ICES advice, the agreed TAC, and ICES estimates of landings. Weights in thousand tonnes.

Year	ICES advice	Predicted catch corresponding to advice	Agreed TAC*	ICES estimated landings Subdivisions 22–24
1987	TAC	9		29
1988	TAC	16		29
1989	TAC	14	220	19
1990	TAC	8	210	18
1991	TAC	11	171	17
1992	Substantial reduction in F	-	100	18
1993	F at lowest possible level	-	40	21
1994	TAC	22	60	31
1995	30% reduction in fishing effort from 1994 level	-	120	34
1996	30% reduction in fishing effort from 1994 level	-	165	51
1997	Fishing effort should not be allowed to increase above the level of recent years	-	180	44
1998	20% reduction in F from 1996	35	160	34
1999	At or below F_{sq} with 50% probability	38	126	42
2000	Reduce F by 20%	44.6	105	38
2001	Reduce F by 20%	48.6	105	34
2002	Reduce F to below 1.0	36.3	76	24
2003	Reduce F to below 1.0	22.6–28.8**	75	25
2004	Reduce F to below 1.0	< 29.6	29.6	21
2005	Reduce F to below 0.92	< 23.4	24.7	22
2006	Management plan	< 28.4	28.4	23
2007	Keep SSB at B_{pa}	< 20.5	26.7	24
2008	Rebuild SSB to B_{pa}	< 13.5	19.2	20
2009	Rebuild SSB to B_{pa}	< 13.7	16.3	15.3
2010	Management plan	< 17.7	17.7	14.1
2011	See scenarios	-	18.8	16.3
2012	Management plan	21.3	21.3	17.1
2013	Management plan	20.8	20.0	13.0
2014	Management plan	17.0	17.0	13.5
2015	MSY approach	8.793***	15.9	
2016	MSY approach (F = 0.19)	$\leq 5.385^{\wedge}$		

* Included in TAC for total Baltic, until and including 2003.

** Two options based on implementation of the adopted mesh regulation.

*** Commercial catch.

$\wedge$ Estimated for the western Baltic cod stock including recreational catches. The values for the other years are for the area of Subdivisions 22–24 and include a fraction of the eastern Baltic cod stock.

History of catch and landings

Table 8.3.2.11 Western Baltic cod stock in Subdivisions 22–24. Catch distribution by fleet in 2014 as estimated by ICES.

Total catch (2014)		Commercial landings		Commercial discards	Recreational catch (partially reported)
11.4 kt	60% trawl	40% gillnet		0.5 kt	2.9 kt
	8.0 kt				

Table 8.3.2.12 Western Baltic cod stock in Subdivisions 22–24. History of commercial landings, both official and ICES estimated values are presented by area for each country participating in the fishery (includes landings of the eastern Baltic cod stock in Subdivision 24).

Year	Denmark				Finland	German Dem.Rep.*	Germany, FRG			Estonia		Lithuania	Latvia	Poland		Sweden			Total			Unalloc.	Grand total
	24	22	23	22+24	24	22+24	22	24	22+24	22	24	24	24	24	24	22	23	22+24	22	23	24		
1965				19 457		9 705			13 350									2 182	27 867		17 007		44 874
1966				20 500		8 393			11 448									2 110	27 864		14 587		42 451
1967				19 181		10 007			12 884									1 996	28 875		15 193		44 068
1968				22 593		12 360			14 815									2 113	32 911		18 970		51 881
1969				20 602		7 519			12 717									1 413	29 082		13 169		42 251
1970				20 085		7 996			14 589									1 289	31 363		12 596		43 959
1971				23 715		8 007			13 482									1 419	32 119		14 504		46 623
1972				25 645		9 665			12 313									1 277	32 808		16 092		48 900
1973				30 595		8 374			13 733									1 655	38 237		16 120		54 357
1974				25 782		8 459			10 393									1 937	31 326		15 245		46 571
1975				23 481		6 042			12 912									1 932	31 867		12 500		44 367
1976			712	29 446		4 582			12 893									1 800	33 368	712	15 353		49 433
1977			1 166	27 939		3 448			11 686								550	1 516	29 510	1 716	15 079		46 305
1978			1 177	19 168		7 085			10 852								600	1 730	24 232	1 777	14 603		40 612
1979			2 029	23 325		7 594			9 598								700	1 800	26 027	2 729	16 290		45 046
1980			2 425	23 400		5 580			6 657								1 300	2 610	22 881	3 725	15 366		41 972
1981			1 473	22 654		11 659			11 260								900	5 700	26 340	2 373	24 933		53 646
1982			1 638	19 138		10 615			8 060								140	7 933	20 971	1 778	24 775		47 524
1983			1 257	21 961		9 097			9 260								120	6 910	24 478	1 377	22 750		48 605
1984			1 703	21 909		8 093			11 548								228	6 014	27 058	1 931	20 506		49 495
1985			1 076	23 024		5 378			5 523								263	4 895	22 063	1 339	16 757		40 159
1986			748	16 195		2 998			2 902								227	3 622	11 975	975	13 742		26 692
1987			1 503	13 460		4 896			4 256								137	4 314	12 105	1 640	14 821		28 566
1988			1 121	13 185		4 632			4 217								155	5 849	9 680	1 276	18 203		29 159
1989			636	8 059		2 144			2 498								192	4 987	5 738	828	11 950		18 516
1990			722	8 584		1 629			3 054								120	3 671	5 361	842	11 577		17 780
1991			1 431	9 383					2 879								232	2 768	7 184	1 663	7 846		16 693
1992			2 449	9 946					3 656								290	1 655	9 887	2 739	5 370		17 996
1993			1 001	8 666					4 084								274	1 675	7 296	1 275	7 129	5 528	21 228
1994			1 073	13 831					4 023								555	3 711	8 229	1 628	13 336	7 502	30 695
1995			2 547	18 762	132				9 196				15				611	2 632	16 936	3 158	13 801		33 895
1996			2 999	27 946	50				12 018		50		32				1 032	4 418	21 417	4 031	23 097	2 300	50 845
1997			1 886	28 887	11				9 269		6			263			777	2 525	21 966	2 663	18 995		43 624
1998			2 467	19 192	13				9 722		8		13	623			607	1 571	15 093	3 074	16 049		34 216
1999			2 839	23 074	116				13 224		10		25	660			682	1 525	20 409	3 521	18 225		42 155
2000			2 451	19 876	171				11 572		5		84	926			698	2 564	18 934	3 149	16 264		38 347
2001			2 124	17 446	191				10 579		40		46	646			693	2 479	14 976	2 817	16 451		34 244
2002			2 055	11 657	191				7 322				71	782			354	1 727	11 968	2 409	9 781		24 158
2003			1 373	13 275	59				6 775				124	568			551	1 899	9 573	1 925	13 127		24 624
2004			1 927	11 386					4 651				221	538			393	1 727	9 091	2 320	9 430	13	20 854
2005			1 902	9 867	2				7 002	72	67		476	1 093			720	835	8 729	2 621	10 686	9	22 045
2006			1 899	9 761	242				7 516		91		586	801				1 855	9 979	1 914	10 858		22 751
2007			2 169	8 975	220				6 802		69		273	2 371			534	2 322	7 840	2 713	13 183		23 736
2008			1 612	8 582	159				5 489		134		30	1 361			525	2 189	5 687	2 139	12 256		20 082
2009			567	7 871	259				4 020		194		23	529			269	1 817	3 451	839	11 259		15 549
2010			689	6 849	203				4 250			9	159	319			490	1 151	3 925	1 179	9 016		14 120
2011			783	7 799	149				4 521				24	487			414	2 153	5 493	1 198	9 641		16 332

Year	Denmark				Finland	German Dem.Rep.*	Germany, FRG			Estonia		Lithuania	Latvia	Poland		Sweden			Total			Unalloc.	Grand total
	24	22	23	22+24			22	24	22+24	22	24					22	23	22+24	22	23	24		
2012			733	8 381	260				4 522		3		11	818			390	1 955	4 896	1 123	11 053		17 072
2013			580	6 566	50				3 237				128	708			380	1 317	4 675	960	7 333		12 968
2014	4 597	2 206	795		7		2 109	1 134					39	854	1 230	1	565		4 316	1 361	7 862		13 538

* Includes landings from October to December 1990 of Fed.Rep.Germany.

Summary of the assessment

Table 8.3.2.13 Western Baltic cod stock in Subdivisions 22–24. Assessment summary with weights (in tonnes). Recruitment in thousands.

Year	Recruit(Age 1)	High	Low	SSB	High	Low	Landings	Discards	Mean F (Ages 3–5)	High	Low	Rec. catch
1994	65 186	118 648	35 813	31 666	43 304	23 156	21 409	2 386	1.02	1.26	0.83	1 991.21
1995	90 672	163 136	50 396	31 257	39 596	24 674	29 854	2 896	1.14	1.37	0.95	2 162.71
1996	25 387	48 580	13 267	34 269	43 126	27 231	38 335	8 851	1.11	1.31	0.94	2 192.27
1997	80 098	141 272	45 413	35 561	47 172	26 808	37 009	4 405	1.12	1.32	0.95	2 337.32
1998	111 302	196 147	63 157	27 529	34 411	22 023	29 628	7 044	1.13	1.34	0.96	2 204.61
1999	38 910	67 812	22 326	31 761	39 856	25 311	35 817	5 202	1.25	1.48	1.06	2 277.65
2000	41 481	70 880	24 276	36 534	47 393	28 163	31 653	3 231	1.22	1.43	1.04	2 243.64
2001	27 502	45 191	16 736	30 730	37 565	25 139	26 983	3 181	1.26	1.48	1.07	2 334.57
2002	44 623	71 622	27 801	24 416	29 921	19 924	19 592	1 077	1.22	1.44	1.04	2 217.84
2003	14 704	24 715	8 748	19 176	23 065	15 942	18 055	4 318	1.12	1.31	0.95	2 186.96
2004	64 344	103 682	39 931	21 068	26 417	16 801	15 916	3 010	1.09	1.29	0.92	2 473.68
2005	23 766	37 852	14 922	27 065	33 239	22 038	16 845	2 013	0.98	1.17	0.82	2 966.83
2006	22 584	37 001	13 784	31 195	39 226	24 807	16 472	1 878	0.87	1.08	0.70	1 958.85
2007	7 606	12 181	4 749	32 370	40 220	26 053	15 859	1 014	0.90	1.08	0.75	1 780.70
2008	3 911	7 494	2 041	22 697	27 513	18 724	11 148	103	0.95	1.13	0.80	1 765.36
2009	29 319	48 534	17 712	15 386	18 461	12 823	7 093	247	1.01	1.21	0.84	2 888.19
2010	11 107	17 768	6 943	13 747	16 785	11 259	7 641	942	0.99	1.18	0.83	2 607.37
2011	17 654	29 058	10 725	13 586	17 355	10 635	8 845	230	0.92	1.11	0.77	2 032.23
2012	12 555	20 311	7 761	16 012	20 038	12 795	8 654	307	0.88	1.09	0.71	2 353.91
2013	33 996	57 563	20 078	14 118	17 511	11 382	7 742	274	0.94	1.23	0.71	2 427.96
2014	23 695	44 954	12 489	18 363	24 299	13 877	8 099	452	0.84	1.22	0.58	2 891.07
2015	19 750	51 149	7 626	23 742	36 604	15 399						
Average	36 825	64 343	21 213	25 102	31 958	19 771	19 650	2527	1.04	1.26	0.87	2 299.757

Sources and references

EC. 2007. Council Regulation (EC) No 1098/2007 of 18 September 2007 establishing a multiannual plan for the cod stocks in the Baltic Sea and the fisheries exploiting those stocks, amending Regulation (EEC) No 2847/93 and repealing Regulation (EC) No 779/97.

ICES. 2015a. Report of the Baltic Fisheries Assessment Working Group (WGBFAS), 14–21 April 2015, ICES Headquarters, Copenhagen, Denmark. ICES CM 2015/ACOM:10.

ICES. 2015b. EU request to ICES to provide F_{MSY} ranges for selected North Sea and Baltic Sea stocks. *In* Report of the ICES Advisory Committee, 2015. ICES Advice 2015, Book 6, Section 6.2.3.1.

[http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2015/Special Requests/EU FMSY ranges for selected NS and BS stocks.pdf](http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2015/Special%20Requests/EU%20FMSY%20ranges%20for%20selected%20NS%20and%20BS%20stocks.pdf).

ICES 2015c. Report of Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD), 2–6 March 2015, Rostock, Germany. ICES CM 2015/ACOM:35.

ICES 2015d. Advice basis. *In* Report of the ICES Advisory Committee, 2015. ICES Advice 2015, Book 1. In preparation.