

Cod (*Gadus morhua*) in subdivisions 24–32, eastern Baltic stock (eastern Baltic Sea)

ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, there should be zero catch in 2023. This advice applies to all catches from the stock in subdivisions 24–32.

Stock development over time

Spawning-stock size is below B_{lim} and B_{pa} . No reference points for fishing pressure have been defined for this stock.

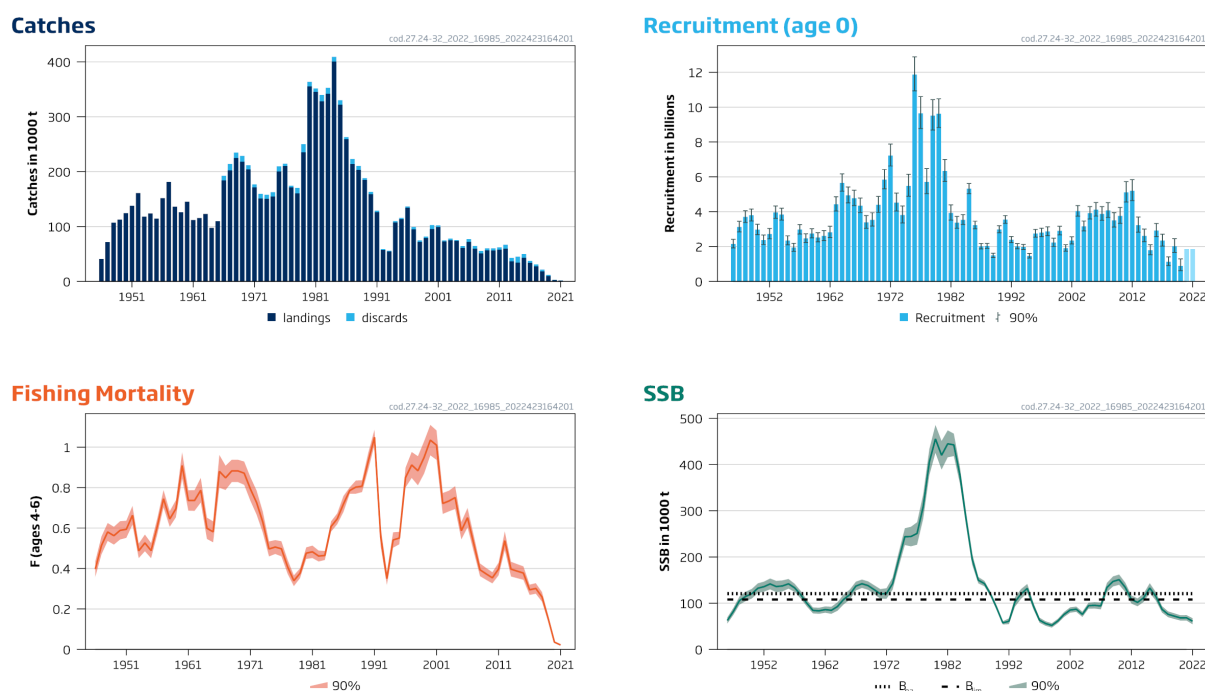


Figure 1 Cod in subdivisions 24–32, eastern Baltic stock. Summary of the stock assessment. The assumed recruitment (R) values for 2021 and 2022 are shaded in a lighter colour. Landings since 2017 include landings below minimum conservation reference size (BMS).

Catch scenarios

Table 1 Cod in subdivisions 24–32, eastern Baltic stock. Values in the forecast and for the interim year and.

Variable	Value	Notes
$F_{ages\ 4-6}$ (2022)	0.03	Fishing mortality based on catch constraint
SSB (2022)	60 979	From assessment; tonnes
$R_{age\ 0}$ (2021–2024)	1 862 290	Average of 2016–2020; thousands
$M_{ages\ 4-6}$ (2022–2024)	0.78	Natural mortality estimated in 2021 by the assessment
Total catch (2022)	2 595	EU TAC 595 + Russian quota 2 000; tonnes

Table 2 Cod in subdivisions 24–32, eastern Baltic stock. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2023)	F (2023)	SSB* (2023)	SSB* (2024)	Probability of SSB (2024) < B _{lim} (%) [#]	% SSB change	% catch change**	% advice change***
ICES advice basis								
F = 0	0	0	60 789	64 453	> 99	6	–100	0
Other scenarios								
F = 0.05	3 553	0.050	59 759	62 313	> 99	4	101	-
F = F (2021)	1 589	0.022	60 251	63 555	> 99	5	–10	-
Catch = TAC (2022)	2 595	0.037	59 973	62 875	> 99	5	47	-
Catch = 0.75 × TAC (2022)	1 946	0.028	60 205	63 431	> 99	5	10	-

*SSB at spawning time.

**Catch in 2023 compared to catch in 2021 (1 764 tonnes).

***The advised catch for 2022 was zero tonnes.

[#] This probability relates to the short-term probability of SSB < B_{lim} and is not comparable to the long-term probability of SSB < B_{lim} tested in simulations when estimating fishing mortality reference points.

Basis of the advice

Table 3 Cod in subdivisions 24–32, eastern Baltic stock. The basis of the advice.

Advice basis	Precautionary approach
Management plan	This stock is shared between the EU and Russia. An EU multiannual plan (MAP) that includes cod is in place for stocks in the Baltic Sea (EU, 2016, 2019,) but F _{MSY} ranges are not available for this stock. Russia does not have a management plan for this stock.

Quality of the assessment

Sampling of landings and discards was low in 2020 and 2021 due to a combination of COVID-19 disruption and low catches. Low quotas may also have caused misreporting of landings. However, the perception of the stock status and present advice are considered robust to possible uncertainties in catch data in the most recent years.

The estimated decline in growth and increase in natural mortality are both in line with biological knowledge on the stock. The exact values for growth parameters estimated for recent years are uncertain, however, because of imprecise age information. This is also affecting natural mortality estimates, because growth and natural mortality are related in the assessment model. The results of the stock assessment in terms of SSB and F, however, were found to be robust in spite of these uncertainties (ICES, 2019).

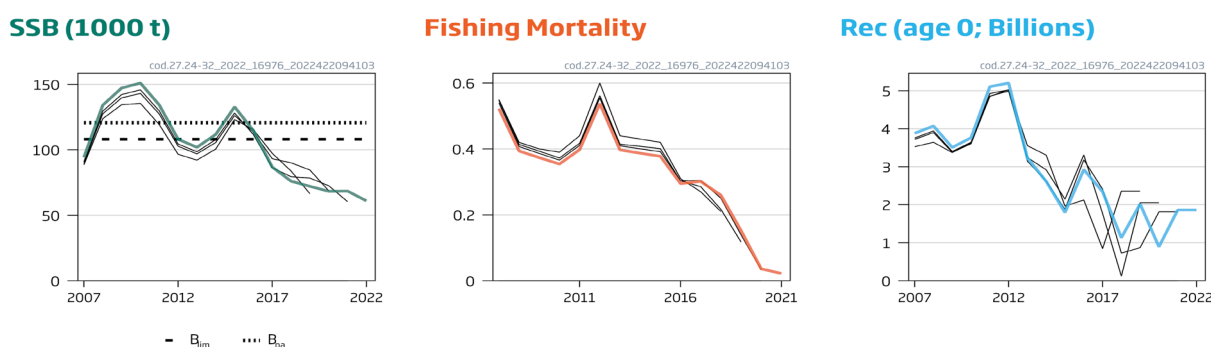


Figure 2 Cod in subdivisions 24–32, eastern Baltic stock. Historical assessment results (last two years recruitment assumptions are included for each line). The stock was benchmarked in 2019.

Issues relevant for the advice

The poor status of the eastern Baltic cod is largely driven by biological changes in the stock during the last decades. Growth, condition (weight-at-length), and size-at-maturation have substantially declined (Figure 3). These developments indicate that the stock is distressed and is expected to have reduced reproductive potential. Natural mortality has increased and is estimated to be considerably higher than fishing mortality in recent years. The size of the largest fish in the population has shown a decline since 1990 (Figure 3).

The declining trend in size-at-maturation over time means that the development of the commercialized cod biomass (≥ 35 cm) is not consistent with SSB, especially since 2000 (Figure 4). This is because SSB in recent years has included small mature cod that were not part of the SSB in earlier years. The 2021 biomass of both commercial sized cod and SSB are close to the lowest level observed since the 1950s.

The low growth, poor condition, and high natural mortality of cod are related to changes in the ecosystem that include:

- i) poor oxygen conditions that can affect cod both directly through altering their metabolism and indirectly through a shortage of benthic prey, as well as the survival of offspring;
- ii) reduced availability of fish prey in the main distribution area of cod. Sprat and herring have had a more northerly distribution in recent years, and there is less overlap with the distribution of the cod stock. It is, however, unclear whether the small remaining cod stock would be impacted by this shift of distribution.
- iii) high levels of parasite infestations; these coincide with an increased abundance of grey seals. It is unknown whether the parasite infection is the cause or an effect of the poor condition of cod.

These drivers are interrelated, and their cumulative effect on the cod stock is unclear.

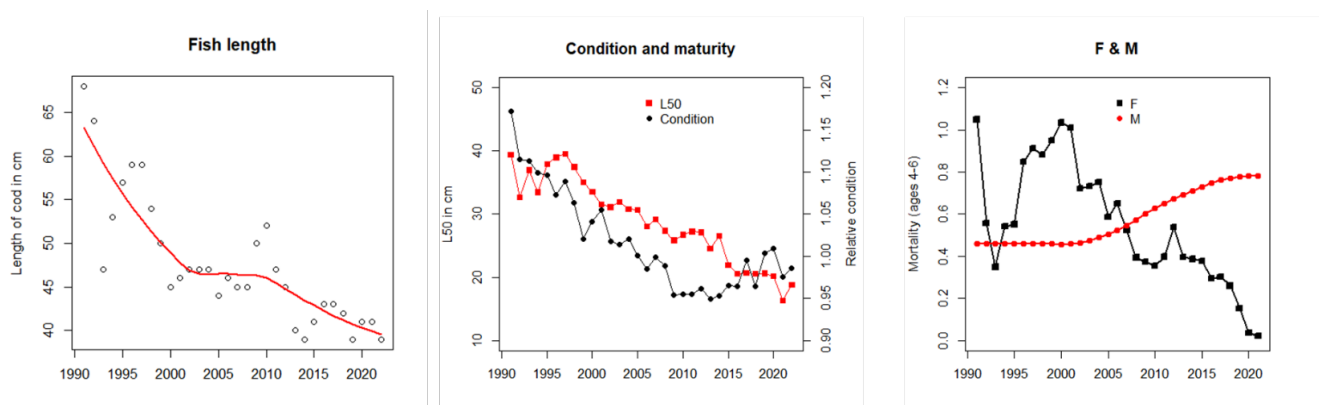


Figure 3 Cod in subdivisions 24–32, eastern Baltic stock. Left panel: indicator of size structure of the stock (length at the 95th percentile of the length distribution; data from BITS-Q1 survey). Middle panel: length at which half of the stock has become mature (L_{50}) and average condition of cod (weight-at-length) relative to the average of the time-series (data from BITS-Q1 survey). Right panel: estimates of fishing mortality (F) and natural mortality (M) for ages 4–6 in stock assessment.

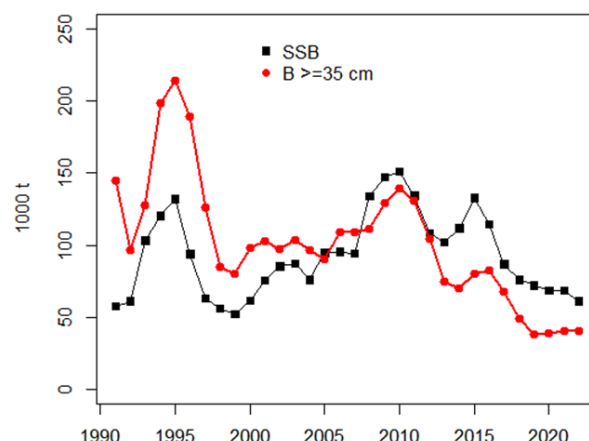


Figure 4 Cod in subdivisions 24–32, eastern Baltic stock. Spawning stock biomass (SSB) at spawning time and biomass (B) of commercial sized cod (≥ 35 cm in length) at the beginning of the year.

The concept of F_{MSY} assuming long-term equilibrium is not presently considered appropriate for this stock due to a large decline in productivity in later years. At the current low productivity the stock is estimated to remain below B_{lim} in the medium term, even with no fishing. Furthermore, fishing at any level will target the remaining few commercial-sized (≥ 35 cm) cod; this will deteriorate the stock structure further and reduce its reproductive potential.

The eastern Baltic cod stock is mainly distributed and caught in the eastern Baltic cod management area (subdivisions [SDs] 25–32), but it is also distributed and caught mixed with western Baltic cod in SD 24; this is part of the western Baltic management area (SDs 22–24). The assessment and this advice is for the eastern Baltic cod stock in the entire area of its distribution (SDs 24 and 25–32). The proportion of eastern Baltic cod is high in the eastern part of SD 24 and relatively low in its western part.

In EU fisheries the eastern Baltic cod is caught as bycatch only in recent years, mainly in flatfish fisheries. There are gears available that could reduce cod bycatches in flatfish fisheries (Stepputtis *et al.*, 2020); however, these gears are not in use at present. Reducing the bycatch of cod in flatfish fisheries is necessary to enhance the recovery of the cod stocks.

Recreational catches of eastern Baltic cod are considered to be much lower than those of western Baltic cod. The majority were taken by Polish anglers (540 t in 2018*; ICES, 2020). Since 2020, recreational fishing has been prohibited in SDs 25 and 26 and outside six nautical miles from the coast in SD 24; it is therefore assumed that recreational catches of eastern Baltic cod are negligible.

Reference points

Table 4 Cod in subdivisions 24–32, eastern Baltic stock. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	Undefined		ICES (2019)
	F_{MSY}	Undefined		ICES (2019)
Precautionary approach	B_{lim}	108 036t	SSB in 2012 which produced the last strong year-class, in the recent period of low productivity	ICES (2022a)
	B_{pa}	120 637 t	$B_{lim} \times \exp(1.645 \times \sigma)$, where $\sigma = 0.07$	ICES (2022a)
	F_{lim}	Undefined		
	F_{pa}	Undefined		
Management plan	SSB _{mgt}	Undefined		
	F_{mgt}	Undefined		

* Version 2: year 2018 specified

Basis of the assessment

Table 5 Cod in subdivisions 24–32, eastern Baltic stock. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022b)
Assessment type	Age-length based analytical assessment with Stock Synthesis model (ICES, 2022a)
Input data	Commercial catches (international landings, length distributions from catch sampling). Survey indices include two trawl surveys (BITSQ1 [G2916] and BITS-Q4 [G8863]); indices of spawning-stock biomass and larval abundance from ichthyoplankton surveys; three commercial historical CPUE indices and two historical CPUE survey indices. Maturity and weight-at-length are from BITS-Q1 surveys (regularly updated). Age-length keys (annual) are from BITS-Q1 and BITS-Q4 surveys. Annual stock separation key (from commercial catches) to split catches in Subdivision 24 into eastern and western Baltic cod, derived from otolith shape analyses combined with genetics.
Discards and bycatch	Discard estimates are available from observer programmes and included in the catch data
Indicators	Condition (weight-at-length), size-at-maturation, size structure of the stock
Other information	This stock was benchmarked in 2019 (WKBALTCOD2; ICES, 2019)
Working group	Baltic Fisheries Assessment Working Group (WGBFAS)

History of the advice, catch, and management

Table 6 Cod in subdivisions 24–32, eastern Baltic stock. ICES advice, TACs, ICES landings, and ICES catches. All weights are in tonnes.

Year	ICES advice	Catches corresp. to advice	Landings corresp. to advice	Agreed TAC	ICES landings (SDs 25–32)	ICES eastern Baltic stock catches (SDs 24 and 25–32)
1987	Reduce towards $F_{\max}$		245 000		207 000	223 295
1988	TAC		150 000		194 000	210 527
1989	TAC		179 000	220 000*	179 000	188 361
1990	TAC		129 000	210 000*	153 000	163 276
1991	TAC		122 000	171 000*	123 000	129 020
1992	Lowest possible level		-	100 000*	55 000**	59 110
1993	No fishing		0	40 000*	45 000**	56 154
1994	TAC		25 000	60 000*	100 856**	109 984
1995	30% reduction in fishing effort from 1994 level		-	120 000*	107 718**	115 843
1996	30% reduction in fishing effort from 1994 level		-	165 000*	124 189	136 788
1997	20% reduction in fishing mortality from 1995 level		130 000	180 000*	88 600	99 251
1998	40% reduction in fishing mortality from 1996 level		60 000	136 950*	67 428	74 940
1999	Proposed F_{pa} (= 0.6)		88 000	126 000*	72 995	81 653
2000	40% reduction in F from 1996–1998 level		60 000	105 000*	89 289**	102 833
2001	Fishing mortality of 0.30		39 000	105 000*	91 328**	102 402
2002	No fishing		0	76 000*	67 740**	74 824
2003	70% reduction in F		See option table	75 000	69 476**	78 093
2004	90% reduction in F		< 13 000	45 400	68 578**	75 276
2005	No fishing		0	42 800	55 032**	64 495
2006	Develop management plan		< 14 900	49 200	65 532**	77 086

Year	ICES advice	Catches corresp. to advice	Landings corresp. to advice	Agreed TAC	ICES landings (SDs 25–32)	ICES eastern Baltic stock catches (SDs 24 and 25–32)
2007	No fishing		0	44 300	50 843**	64 656
2008	No fishing		0	42 300***	42 235**	55 578
2009	Limit (total) landings to 48 600 tonnes		≤ 48 600	49 380***	48 439**	60 513
2010	Follow management plan		56 800	56 100***	50 277	60 400
2011	See scenarios		-	64 500***	50 368	62 245
2012	Follow management plan		74 200	74 200***	51 225	67 024
2013	Follow management plan		65 900	68 700***	31 355	42 977
2014	Follow management plan		70 301	73 400***	28 909	45 289
2015	20% reduction in catches	29 085		55 800***	38 079	50 008
2016	Precautionary approach^	≤ 29 220		46 900***	29 313	37 438
2017	Precautionary approach^	≤ 26 994		36 957***	25 496	30 965
2018	Precautionary approach^	≤ 26 071		34 288***	15 907	21 605
2019	Precautionary approach^	≤ 16 685		29 912***	8 383	11 938
2020	Precautionary approach^	0		7 500***	2 319	2 899
2021	Precautionary approach^	0		3 595***	1 387	1 764
2022	Precautionary approach^	0		2 595***		
2023	Precautionary approach^	0				

* For the total Baltic Sea until and including 2003.

** Reported landings in 1992–1995 and 2000–2009 are likely to be minimum estimates due to incomplete reporting.

*** TAC is for SDs 25–32 and is calculated as EU + Russian autonomous quotas.

^ ICES provides stock-based advice (for the eastern Baltic cod stock).

History of the catch and landings

Table 7 Cod in subdivisions 24–32, eastern Baltic stock. Catch distribution by fleet in 2021 as estimated by ICES.

Catch (2021)	Landings		Discards
1 764 tonnes	Active gears 77 %	Passive gears 23 %	113 tonnes
	1 651 tonnes		

Table 8 Cod in subdivisions 24–32, eastern Baltic stock. History of ICES estimates of landings, discards, and catch by area. Weights are in tonnes. The landings obligation has been in place since 2015, though landings below minimum conservation reference size (also known as ‘below minimum size’ [BMS]) have only been possible to separate since 2017.

Year	Eastern Baltic cod stock in subdivisions 25–32					Eastern Baltic cod stock in Subdivision 24				Eastern Baltic cod stock in subdivisions 24 and 25–32
	Unallocated*	Discards	Landings BMS	Total landings	Catch	Discards	Landings BMS	Total landings	Catch	Total catch
1966		8 735		177 318	186 053			6 624	6 624	192 677
1967		11 733		195 446	207 179			6 899	6 899	214 078
1968		9 700		216 353	226 053			8 614	8 614	234 667
1969		10 654		212 160	222 814			5 980	5 980	228 794
1970		7 625		198 451	206 076			5 720	5 720	211 796
1971		5 426		164 840	170 266			6 586	6 586	176 852
1972		8 490		143 833	152 323			7 307	7 307	159 630
1973		7 491		143 164	150 655			7 320	7 320	157 975
1974		7 933		147 815	155 748			6 923	6 923	162 671
1975		9 576		194 649	204 225			5 676	5 676	209 901
1976		4 341		203 303	207 644			6 972	6 972	214 616
1977		2 978		164 792	167 770			6 643	6 643	174 413
1978		9 875		154 009	163 884			6 553	6 553	170 437
1979		14 576		227 699	242 275			7 745	7 745	250 020
1980		8 544		347 619	356 163			7 721	7 721	363 884
1981		6 185		331 642	337 827			13 759	13 759	351 586
1982		11 548		316 052	327 600			12 239	12 239	339 839
1983		10 998		332 148	343 146			9 853	9 853	352 999
1984		8 521		391 952	400 473			8 709	8 709	409 182
1985		8 199		315 083	323 282			6 971	6 971	330 253
1986		3 848		252 558	256 406			6 604	6 604	263 010
1987		9 340		207 081	216 421			6 874	6 874	223 295
1988		7 253		194 787	202 040			8 487	8 487	210 527
1989		3 462		179 178	182 640			5 721	5 721	188 361
1990		4 187		153 546	157 733			5 543	5 543	163 276
1991		2 741		122 517	125 258			3 762	3 762	129 020
1992		1 904		54 882	56 786			2 324	2 324	59 110
1993	18 978	1 558		50 711	52 269			3 885	3 885	56 154
1994	44 000	1 956		100 856	102 812	621		6 551	7 172	109 984
1995	18 993	1 872		107 718	109 590	668		5 585	6 253	115 843
1996	10 815	1 443		124 189	125 632	1 116		10 040	11 156	136 788
1997		3 462		88 600	92 062	641		6 547	7 189	99 251
1998		2 299		67 428	69 727	631		4 582	5 213	74 940
1999		1 838		72 995	74 833	599		6 221	6 820	81 653
2000	23 118	6 019		89 289	95 308	1 209		6 316	7 525	102 833
2001	23 677	2 891		91 328	94 219	389		7 794	8 183	102 402
2002	17 562	1 462		67 740	69 202	562		5 060	5 622	74 824
2003	22 147	2 024		69 477	71 501	862		5 729	6 592	78 093
2004	19 563	1 201		68 578	69 779	188		5 309	5 497	75 276
2005	14 991	1 670		55 032	56 702	1 729		6 064	7 793	64 495
2006	17 836	4 644		65 531	70 175	144		6 767	6 911	77 086
2007	12 418	4 146		50 843	54 989	875		8 792	9 667	64 656
2008	2 673	3 746		42 234	45 980	787		8 811	9 598	55 578
2009	3 189	3 328		48 438	51 766	464		8 284	8 747	60 513
2010		3 543		50 276	53 819	533		6 049	6 581	60 400
2011		3 850		50 368	54 218	482		7 545	8 027	62 245
2012		6 795		51 225	58 020	536		8 469	9 004	67 024
2013		5 020		31 355	36 375	1 243		5 359	6 602	42 977
2014		9 627		28 909	38 536	1 298		5 455	6 753	45 289
2015		5 970		38 079	44 049	930		5 029	5 959	50 008

Year	Eastern Baltic cod stock in subdivisions 25–32					Eastern Baltic cod stock in Subdivision 24				Eastern Baltic cod stock in subdivisions 24 and 25–32
	Unallocated*	Discards	Landings BMS	Total landings	Catch	Discards	Landings BMS	Total landings	Catch	Total catch
2016		3 279		29 313	32 591	306		4 541	4 847	37 438
2017		3 238	179	25 496	28 734	227	22	2 004	2 231	30 965
2018		3 103	108	15 907	19 010	300	15	2 295	2 595	21 605
2019		1 337	57	8 383	9 720	621	8	1 598	2 219	11 938
2020		101	8	2 319	2 420	50	1	429	479	2 899
2021		85	4	1 387	1 472	28	2	264	291	1 764

* ICES estimates. No information available for years prior to 1993.

Table 9 Cod in subdivisions 24–32, eastern Baltic stock. History of ICES estimates of landings of cod caught in the eastern Baltic management area (SDs 25–32) by country. Weights are in tonnes.

Year	Denmark	Estonia	Finland	Germany, Dem. Rep.	Germany, Fed. Rep.	Latvia	Lithuania	Poland	Russia	Sweden	USSR	Faroe Islands	Norway	Unallocated**	Total
1966	37 070		26	10 589	12 831			56 007		22 525	38 270				177 318
1967	39 105		27	21 027	12 941			56 003		23 363	42 980				195 446
1968	44 109		70	24 478	16 833			63 245		24 008	43 610				216 353
1969	44 061		58	25 979	17 432			60 749		22 301	41 580				212 160
1970	42 392		70	18 099	19 444			68 440		17 756	32 250				198 451
1971	46 831		53	10 977	16 248			54 151		15 670	20 910				164 840
1972	34 072		76	4 055	3 203			57 093		15 194	30 140				143 833
1973	35 455		95	6 034	14 973			49 790		16 734	20 083				143 164
1974	32 028		160	2 517	11 831			48 650		14 498	38 131				147 815
1975	39 043		298	8 700	11 968			69 318		16 033	49 289				194 649
1976	47 412		287	3 970	13 733			70 466		18 388	49 047				203 303
1977	44 400		310	7 519	19 120			47 702		16 061	29 680				164 792
1978	30 266		1 437	2 260	4 270			64 113		14 463	37 200				154 009
1979	34 350		2 938	1 403	9 777			79 754		20 593	75 034	3 850			227 699
1980	49 704		5 962	1 826	11 750			123 486		29 291	124 350	1 250			347 619
1981	68 521		5 681	1 277	7 021			120 901		37 730	87 746	2 765			331 642
1982	71 151		8 126	753	13 800			92 541		38 475	86 906	4 300			316 052
1983	84 406		8 927	1 424	15 894			76 474		46 710	92 248	6 065			332 148
1984	90 089		9 358	1 793	30 483			93 429		59 685	100 761	6 354			391 952
1985	83 527		7 224	1 215	26 275			63 260		49 565	78 127	5 890			315 083
1986	81 521		5 633	181	19 520			43 236		45 723	52 148	4 596			252 558
1987	68 881		3 007	218	14 560			32 667		42 978	39 203	5 567			20 081
1988	60 436		2 904	2	14 078			33 351		48 964	28 137	6 915			194 787
1989	57 240		2 254	3	12 844			36 855		50 740	14 722	4 520			179 178
1990	47 394		1 731		4 691			32 028		50 683	13 461	3 558			153 546
1991	39 792	1 810	1 711		6 564	2 627	1 865	25 748	3 299	36 490		2 611			122 517
1992	18 025	1 368	485		2 793	1 250	1 266	13 314	1 793	13 995		593			54 882
1993	8 000	70	225		1 042	1 333	605	8 909	892	10 099		558		18 978	50 711
1994	9 901	952	594		3 056	2 831	1 887	14 335	1 257	21 264		779		44 000	100 856
1995	16 895	1 049	1 729		5 496	6 638	4 513	25 000	1 612	24 723		777	293	18 993	107 718
1996	17 549	1 338	3 089		7 340	8 709	5 524	34 855	3 306	30 669		706	289	10 815	124 189
1997	9 776	1 414	1 536		5 215	6 187	4 601	31 396	2 803	25 072		600			88 600
1998	7 818	1 188	1 026		1 270	7 765	4 176	25 155	4 599	14 431					67 428
1999	12 170	1 052	1 456		2 215	6 889	4 371	25 920	5 202	13 720					72 995
2000	9 715	604	1 648		1 508	6 196	5 165	21 194	4 231	15 910				23 118	89 289
2001	9 580	765	1 526		2 159	6 252	3 137	21 346	5 032	17 854				23 677	91 328
2002	7 831	37	1 526		1 445	4 796	3 137	15 106	3 793	12 507				17 562	67 740
2003	7 655	591	1 092		1 354	3 493	2 767	15 374	3 707	11 297				22 147	69 476
2004	7 394	1 192	859		2 659	4 835	2 041	14 582	3 410	12 043				19 563	68 578
2005	7 270	833	278		2 339	3 513	2 988	11 669	3 411	7 740				14 991	55 032
2006	9 766	616	427		2 025	3 980	3 200	14 290	3 719	9 672				17 836	65 532
2007	7 280	877	615		1 529	3 996	2 486	8 599	3 383	9 660				12 418	50 843
2008	7 374	841	670		2 341	3 990	2 835	8 721	3 888	8 901				2 673	42 235

Year	Denmark	Estonia	Finland	Germany, Dem. Rep.	Germany, Fed. Rep.	Latvia	Lithuania	Poland	Russia	Sweden	USSR	Faroe Islands	Norway	Unallocated**	Total
2009	8 295	623			3 665	4 588	2 789	10 625	4 482	10 182				3 189	48 439
2010	10 739	796	826		3 908	5 001	3 140	11 433	4 264	10 169					50 277
2011	10 842	1 180	958		3 054	4 916	3 017	11 348	5 022	10 031					50 368
2012	12 102	686	1 405		2 432	4 269	2 261	14 007	3 954	10 109					51 225
2013	6 052	249	399		541	2 441	1 744	11 760	2 870	5 299					31 355
2014	6 035	166	350		676	1 999	1 088	11 026	3 444	4 125					28 908
2015	9 526	183	388		1 477	2 873	1 845	12 896	3 845	4 438					37 471
2016	6 756	2	57		918	2 656	1 637	9 583	3 392	3 995					28 996
2017***	6 140	1	191		347	2 079	1 726	6 484	4 124	4 405					25 496
2018***	2 684	1	53		241	1 253	694	5 695	3 376	1 912					15 907
2019***	1 058	2	85		299	260	112	3 184	2 701	683					8 383
2020***	21	2	24		13	79	12	377	1 778	12					2 319
2021***	16	2	35		20	11	2	66	1 225	11					1 387

** Working group estimates. No information was available for years prior to 1993.

*** Includes landings below minimum conservation reference size (BMS)

Summary of the assessment

Table 10 Cod in subdivisions 24–32, eastern Baltic stock. Assessment summary. Weights are in tonnes, recruitment in thousands. High and Low refer to 90% confidence intervals.

Year	Recruitment			SSB			Biomass fish ≥ 35 cm	Landings	Discards	Fishing mortality		
	Recruitment (age 0)	High	Low	SSB	High	Low				F (ages 4–6)	High	Low
1946	2 153 930	2 418 679	1 918 160	62 512	69 293	55 731	90 472	40 985		0.40	0.44	0.36
1947	3 130 800	3 450 558	2 840 674	82 320	90 042	74 597	123 563	71 831		0.51	0.56	0.47
1948	3 705 730	4 058 274	3 383 812	105 861	114 825	96 897	175 574	107 104		0.58	0.63	0.54
1949	3 795 980	4 152 393	3 470 159	114 565	124 771	104 359	195 085	112 735		0.56	0.61	0.52
1950	2 968 300	3 284 521	2 682 523	120 498	131 011	109 985	203 319	124 509		0.59	0.63	0.54
1951	2 372 940	2 660 890	2 116 151	132 418	143 074	121 762	223 030	137 815		0.59	0.64	0.55
1952	2 725 780	3 040 381	2 443 732	135 834	146 763	124 905	244 503	161 103		0.66	0.71	0.62
1953	3 959 470	4 332 013	3 618 965	141 733	153 556	129 910	235 258	118 132		0.49	0.52	0.45
1954	3 844 370	4 199 823	3 519 000	136 065	148 357	123 773	232 568	123 947		0.53	0.57	0.49
1955	2 343 080	2 615 155	2 099 311	137 381	149 372	125 390	221 295	114 415		0.49	0.53	0.45
1956	1 944 860	2 186 046	1 730 284	141 972	152 504	131 440	243 427	151 985		0.61	0.65	0.57
1957	2 976 670	3 262 677	2 715 735	133 320	142 307	124 333	255 569	181 366		0.74	0.79	0.70
1958	2 471 330	2 732 944	2 234 760	118 256	126 574	109 938	219 732	136 301		0.64	0.68	0.61
1959	2 749 660	3 023 395	2 500 709	99 820	107 055	92 585	186 519	126 033		0.70	0.74	0.65
1960	2 520 350	2 796 429	2 271 527	84 357	90 852	77 862	171 958	145 408		0.91	0.98	0.84
1961	2 614 610	2 919 996	2 341 163	83 593	90 186	76 999	152 146	112 034		0.74	0.79	0.69
1962	2 825 410	3 169 589	2 518 604	86 230	93 164	79 296	157 388	115 553		0.74	0.79	0.68

Year	Recruitment			SSB			Biomass fish ≥ 35 cm	Landings	Discards	Fishing mortality		
	Recruitment (age 0)	High	Low	SSB	High	Low				F (ages 4–6)	High	Low
1963	4 428 710	4 855 650	4 039 309	84 653	92 334	76 972	159 968	123 047		0.79	0.85	0.73
1964	5 653 450	6 168 939	5 181 036	92 806	102 096	83 515	156 257	97 788		0.60	0.65	0.55
1965	4 942 530	5 422 147	4 505 338	108 168	118 997	97 339	175 250	109 809		0.58	0.63	0.53
1966	4 774 110	5 235 804	4 353 128	118 502	129 479	107 525	218 831	183 942	8 735	0.88	0.96	0.80
1967	4 347 970	4 785 520	3 950 426	137 093	146 693	127 493	251 755	202 345	11 733	0.85	0.91	0.79
1968	3 392 480	3 779 028	3 045 471	142 166	151 298	133 034	276 043	224 967	9 700	0.88	0.94	0.83
1969	3 536 050	3 941 095	3 172 634	138 094	147 284	128 904	271 657	218 140	10 654	0.88	0.94	0.83
1970	4 397 870	4 880 454	3 963 004	129 275	138 922	119 628	257 494	204 171	7 625	0.87	0.93	0.81
1971	5 841 460	6 421 700	5 313 648	120 206	130 680	109 732	230 813	171 426	5 426	0.79	0.85	0.73
1972	7 223 770	7 880 874	6 621 455	120 936	132 481	109 391	217 281	151 140	8 490	0.73	0.79	0.67
1973	4 524 300	5 071 725	4 035 962	142 331	155 514	129 148	234 085	150 484	7 491	0.63	0.68	0.58
1974	3 809 770	4 331 708	3 350 722	194 462	210 035	178 889	292 456	154 738	7 933	0.50	0.53	0.46
1975	5 479 410	6 147 961	4 883 560	244 017	262 210	225 824	391 692	200 325	9 576	0.51	0.54	0.47
1976	11 866 400	12 884 946	10 928 369	244 320	265 561	223 079	427 585	210 275	4 341	0.50	0.54	0.46
1977	9 644 020	10 606 548	8 768 840	250 960	275 268	226 652	404 598	171 435	2 978	0.41	0.44	0.37
1978	5 712 080	6 475 869	5 038 376	309 221	335 924	282 518	425 081	160 562	9 875	0.34	0.37	0.31
1979	9 518 730	10 429 676	8 687 348	405 502	433 789	377 215	584 625	235 444	14 576	0.38	0.40	0.35
1980	9 620 030	10 478 281	8 832 076	455 506	485 891	425 121	738 239	355 340	8 544	0.48	0.50	0.45
1981	6 336 310	6 998 075	5 737 124	420 049	451 150	388 948	714 104	345 401	6 185	0.48	0.51	0.45
1982	3 932 000	4 394 013	3 518 566	444 880	474 122	415 638	696 918	328 291	11 548	0.46	0.49	0.43
1983	3 373 730	3 731 636	3 050 151	442 621	466 925	418 317	736 771	342 001	10 998	0.46	0.49	0.44
1984	3 538 020	3 833 934	3 264 946	376 758	395 446	358 070	714 897	400 661	8 521	0.61	0.63	0.58
1985	5 322 430	5 622 401	5 038 463	282 484	296 691	268 277	555 608	322 054	8 199	0.65	0.67	0.62
1986	3 230 170	3 456 539	3 018 626	195 127	207 218	183 036	404 659	259 162	3 848	0.72	0.76	0.68
1987	2 016 370	2 180 813	1 864 327	149 816	156 730	142 902	302 459	213 955	9 340	0.79	0.80	0.77
1988	2 036 040	2 186 835	1 895 643	142 466	148 418	136 514	276 452	203 274	7 253	0.80	0.84	0.77
1989	1 492 800	1 622 517	1 373 453	119 437	124 659	114 215	255 358	184 899	3 462	0.81	0.84	0.78
1990	2 986 140	3 199 005	2 787 439	89 960	94 849	85 071	201 728	159 089	4 187	0.93	0.97	0.89
1991	3 546 620	3 777 129	3 330 179	57 477	61 079	53 875	145 002	126 279	2 741	1.05	1.09	1.01
1992	2 395 060	2 578 697	2 224 500	60 988	67 362	54 614	96 455	57 206	1 904	0.56	0.61	0.51
1993	2 016 290	2 176 858	1 867 566	103 033	113 441	92 625	127 345	54 596	1 558	0.35	0.38	0.32
1994	1 971 920	2 125 824	1 829 159	120 338	130 919	109 757	198 523	107 407	2 577	0.54	0.58	0.50
1995	1 467 310	1 605 536	1 340 985	132 087	141 749	122 425	213 888	113 303	2 540	0.55	0.58	0.52
1996	2 751 510	2 983 344	2 537 691	93 773	100 955	86 591	188 975	134 229	2 559	0.85	0.90	0.80
1997	2 798 970	3 052 982	2 566 092	63 253	68 811	57 694	125 859	95 147	4 103	0.91	0.98	0.85
1998	2 869 460	3 132 377	2 628 611	56 034	61 053	51 016	84 996	72 010	2 930	0.88	0.96	0.81
1999	2 229 310	2 481 798	2 002 509	51 983	56 778	47 188	80 280	79 216	2 437	0.95	1.03	0.87

Year	Recruitment			SSB			Biomass fish ≥ 35 cm	Landings	Discards	Fishing mortality		
	Recruitment (age 0)	High	Low	SSB	High	Low				F (ages 4–6)	High	Low
2000	2 905 290	3 164 783	2 667 074	61 685	66 545	56 824	98 031	95 605	7 228	1.03	1.11	0.96
2001	1 912 970	2 109 411	1 734 823	75 634	81 117	70 150	102 586	99 122	3 280	1.01	1.08	0.94
2002	2 344 460	2 560 008	2 147 061	85 295	91 132	79 457	97 161	72 800	2 024	0.72	0.77	0.67
2003	4 038 850	4 352 216	3 748 047	86 984	92 814	81 153	103 775	75 206	2 886	0.73	0.78	0.68
2004	3 167 570	3 463 496	2 896 928	75 945	81 738	70 152	96 299	73 887	1 389	0.75	0.81	0.69
2005	3 919 710	4 292 882	3 578 977	94 711	101 271	88 151	90 217	61 096	3 399	0.59	0.63	0.54
2006	4 119 900	4 528 165	3 748 445	95 354	102 340	88 368	109 236	72 298	4 788	0.65	0.70	0.60
2007	3 879 480	4 292 305	3 506 360	94 102	101 637	86 567	108 999	59 635	5 021	0.52	0.56	0.48
2008	4 073 770	4 521 041	3 670 748	134 027	144 031	124 023	111 363	51 045	4 533	0.39	0.43	0.36
2009	3 508 070	3 945 012	3 119 523	147 125	158 058	136 192	128 926	56 722	3 792	0.37	0.40	0.34
2010	3 762 430	4 246 402	3 333 617	150 960	162 136	139 784	139 270	56 325	4 076	0.35	0.38	0.33
2011	5 106 860	5 724 113	4 556 168	134 254	144 515	123 993	130 988	57 913	4 332	0.40	0.43	0.37
2012	5 203 110	5 838 411	4 636 938	108 036	116 922	99 150	104 710	59 694	7 331	0.54	0.58	0.49
2013	3 230 740	3 697 709	2 822 743	101 880	110 383	93 377	74 816	36 714	6 263	0.40	0.43	0.36
2014	2 614 440	3 004 415	2 275 084	111 734	120 924	102 544	69 805	34 364	10 925	0.39	0.42	0.35
2015	1 795 480	2 105 666	1 530 988	132 770	143 423	122 117	79 970	43 108	6 900	0.38	0.41	0.34
2016	2 923 600	3 325 246	2 570 468	114 636	123 795	105 477	82 233	33 854	3 585	0.29	0.32	0.27
2017	2 344 010	2 712 954	2 025 240	86 790	93 847	79 733	67 473	27 500	3 465	0.30	0.33	0.28
2018	1 131 720	1 408 165	909 546	76 007	82 394	69 619	49 379	18 202	3 403	0.26	0.28	0.24
2019	2 020 550	2 455 165	1 662 871	72 083	78 298	65 868	37 781	9 980	1 958	0.152	0.167	0.138
2020	891 549	1 290 632	615 868	68 267	74 076	62 458	38 536	2 748	152	0.036	0.039	0.033
2021	1 862 290**			68 443	74 396	62 490	40 524	1 651	113	0.022	0.024	0.0199
2022	1 862 290**			60 979	67 706	54 252	40 398					

* Landings since 2017 include landings below minimum conservation reference size or BMS .

**Average of 2016–2020.

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, 15.7.2016. <http://data.europa.eu/eli/reg/2016/1139/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. 2019. Benchmark Workshop on Baltic Cod Stocks (WKBALTCOD2). ICES Scientific Reports. 1:9. 310 pp. <http://doi.org/10.17895/ices.pub.4984>.

ICES. 2020. Working Group on Recreational Fisheries Surveys (WGRFS; outputs from 2019 meeting). ICES Scientific Reports. 2:1. 78 pp. <http://doi.org/10.17895/ices.pub.5744>

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

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>

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

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