*ICES Advice on fishing opportunities, catch, and effort*
*Baltic Sea ecoregion*
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# Cod (*Gadus morhua*) in subdivisions 22–24, western Baltic stock (western Baltic Sea)

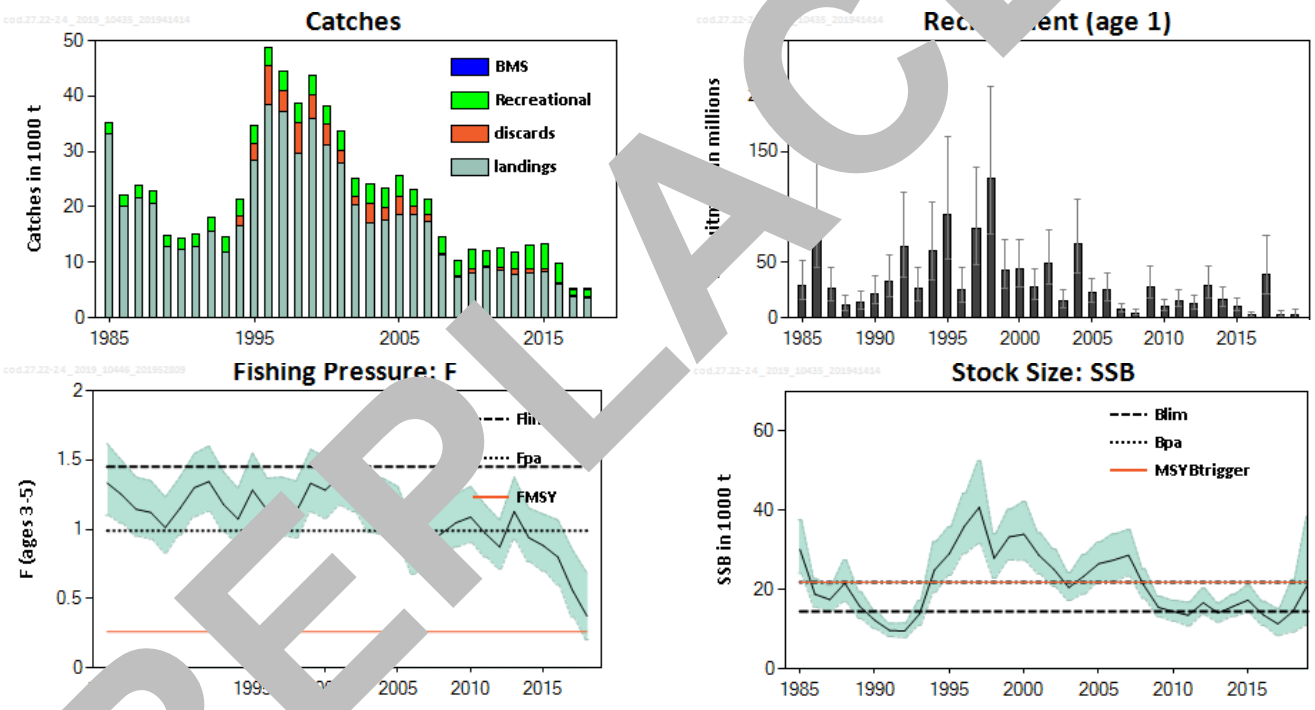
## ICES advice on fishing opportunities

***Please note: This advice was updated in September 2019 (ICES, 2019)***

ICES advises that when the EU multiannual plan (MAP) is applied, total catches in 2020 that correspond to the F ranges in the plan are between 5205 tonnes and 11006 tonnes. According to the MAP, catches higher than those corresponding to $F_{MSY}$ (7245 tonnes) can only be taken under conditions specified in the MAP, whilst the entire range is considered precautionary when applying the ICES advice rule. Assuming recreational catches at recent [illegible] this implies commercial catches between 3065 tonnes and 5105 tonnes.

## Stock development over time

The spawning-stock biomass (SSB) has been fluctuating around the limit referen[illegible]oint ($B_{Lim}$ [illegible]nce 2[illegible], but has increased in the last two years and is presently above $B_{lim}$ and close to MSY $B_{trigger}$ [illegible] fishin[illegible] mortal[illegible]s above $F_{MSY}$, although a large decrease in F has occured in later years. Recruitment (R) has [illegible] low s[illegible] 1999; recruitment in 2017 (the 2016 year class) is estimated to be above average in this period. The recruit[illegible] 2018 an[illegible]019 (age 1) are the lowest in the time series.




**Figu[illegible]**d in subdiv[illegible]ons 22–24, western Baltic stock. Summary of the stock assessment. Recruitment, F, and SSB have [illegible] intervals (95%) in the plot. The EU landing obligation entered into force in 2015; therefore, BMS landings (fish bel[illegible]w the minimum conservation reference size [MCRS]) have been included since 2017.

## Stock and e[illegible]itation status

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

**Table 1** Cod in subdivisions 22–24, western Baltic stock. State of the stock and fishery relative to reference points.

| | | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2016 | 2017 | 2018 | | 2017 | 2018 | 2019 | |
| Maximum sustainable yield | $F_{MSY}$ | ✗ | ✗ | ✗ | Above | MSY $B_{trigger}$ | ✗ | ✗ | ✗ Below trigger |
| Precautionary approach | $F_{pa}$,$F_{lim}$ | ✓ | ✓ | ✓ | Harvested sustainably | $B_{pa}$,$B_{lim}$ | ✗ | o | o Increased risk |
| Management plan | $F_{ranges}$ | ✗ | ✓ | ✓ | Within range | MSY $B_{trigger}$ | ✗ | ✗ | ✗ Below trigger |

## Catch scenarios

**Table 2** Cod in subdivisions 22–24, western Baltic stock. Assumptions made for the interim ye… in the …st. Weights are in tonnes. Recruitment is in thousands.

| Variable | Value | Notes |
|---|---|---|
| $F_{ages\ 3–5}$ (2019) | 0.33 | Base… catch co…int in … |
| SSB (2020) | 29613 | R… on catch const… 019 |
| $R_{age\ 1}$ (2019) | 2226 | …m the …ssment |
| $R_{age\ 1}$ (2020) | 11659 | …m the l… ten years* |
| $R_{age\ 1}$ (2021) | 11622 | Sa… from th…st ten years* |
| Total catch (2019) | …8 | Comm… …reational catches. |
| Commercial catches (2019) | 5848 | Calculate… the 2019 TAC (9515 tonnes) p… assumed discard ratio as in 2018 (4…), and accounting for the proportion c… estern Baltic cod in commercial …tches in subdivisions 22–24 in 2018 (59%). |
| Recreational catches (2019) | 2140 | Average over 3 years (2016–2018) |

* Recruitment is randomly resampled from the last ten years' as… …m… …estimates and the median of these random draws is used. This will vary slightly every time this is done.

**Table 3** Cod in subdivisions 22–24, w… Baltic stock. Ann… catch scenarios. All weights are in tonnes.

| Basis | Total catch * (2020) | Recreational catch | Co… …rcial ca… | $F_{to…}$ …20) | $F_{commercial}$ (2020) | SSB (2021) | % SSB change *** | % Advice change ^ |
|---|---|---|---|---|---|---|---|---|
| ICES advice basis | | | | | | | | |
| EU MAP**: $F_{MSY}$ | 7245 | 2140 | 5105 | 0.26 | 0.18 | 32310 | 10 | −52 |
| F = Proposed $F_{MSY\ lower}$ ^^ | 5… | … | 3065 | 0.18 | 0.11 | 34657 | 18 | −43 |
| F = Proposed $F_{MSY\ upper}$ ^^^ | 1006 | 2140 | 8866 | 0.43 | 0.35 | 27251 | −7 | −54 |
| Other scenarios | | | | | | | | |
| $F_{MSY}$ | 72… | …140 | 5105 | 0.26 | 0.18 | 32310 | 10 | −52 |
| Zero co… …rcial catc… | 2140 | 2140 | 0 | 0.07 | 0 | 38560 | 32 | −86 |
| $F = F_{pa}$ | 19551 | 2140 | 17411 | 0.99 | 0.88 | 16350 | −44 | 30 |
| $F = F_{lim}$ | 23904 | 2140 | 21764 | 1.45 | 1.32 | 11054 | −62 | 59 |
| SSB (2021) = $B_{lim}$ | 20972 | 2140 | 18832 | 1.11 | 1.00 | 14500 | −51 | 40 |
| SSB (2021) = $B_{pa}$ | 15148 | 2140 | 13008 | 0.66 | 0.57 | 21876 | −25 | 0.85 |
| SSB (2021) = MSY $B_{trigger}$ | 15148 | 2140 | 13008 | 0.66 | 0.57 | 21876 | −25 | 0.85 |
| $F = F_{2019}$ | 9089 | 2140 | 6949 | 0.34 | 0.26 | 29818 | 2 | −39 |

* Includes commercial and recreational catch.
** EU Multi-Annual Plan for the Baltic Sea (EU, 2016a).
*** SSB 2021 relative to SSB 2020.
^ Total catch in 2020 relative to total catch corresponding to the advice for 2019 (15 021 t, MAP $F_{MSY}$), including commercial and recreational catch.
^^ Total catch in 2020 relative to total catch corresponding to the advice for 2019 for $F_{MSY\ lower}$ (9094 t, MAP $F_{MSY\ lower}$), including commercial and recreational catch.
^^^ Total catch in 2020 relative to total catch corresponding to the advice for 2019 for $F_{MSY\ upper}$ (23 992 t, MAP $F_{MSY\ upper}$), including commercial and recreational catch.

Last year's estimation of the large 2016 year class has been revised down by 54%. This year class is the most important year class contributing to the catch and the revised estimate is largely responsible for the 52% decr[illegible] the 2020 catch advice.

## Basis of the advice

**Table 4** Cod in subdivisions 22–24, western Baltic stock. The basis of the advice.

| | |
|---|---|
| Advice basis | EU Baltic multiannual plan. |
| Management plan | The EU multiannual plan (MAP) in place for stocks in the Ba[illegible]a incl[illegible] cod (EU, 20[illegible]6a). The advice, based on the $F_{MSY}$ ranges, is considered precautionary. |

## Quality of the assessment

The estimate of the abundance of the 2016 year class has bee[illegible]evised sign[illegible]ntly downwards in the updated assessment. The SSB development is very dependent on this year cla[illegible]ecause t[illegible]younger and older year classes are very low in abundance). A survey observation of the 2016 [illegible]ear class in 2[illegible]er than expected, which explains the downward revision in SSB.

In 2018 the recreational catches included in the stock asse[illegible]men[illegible]nst[illegible]ted 30% of the total catches. The uncertainty around recreational catches is considered higher than in co[illegible]ial catches. In addition, the catches in the recreational fishery are difficult to quantify in the intermediate year. It is [illegible] difficult to partition catches between commercial and recreational in the forecast.

In Subdivision 24 catches of cod a[illegible]ture [illegible]stern[illegible]d western Baltic cod stocks, which is variable temporally and spatially and over size groups. A metho[illegible] split t[illegible]nes into the two stocks is applied each year which is based on data most years but which [illegible]lso int[illegible]olated fo[illegible] years with no observations. This introduces uncertainty in the allocation of catches to the stoc[illegible]

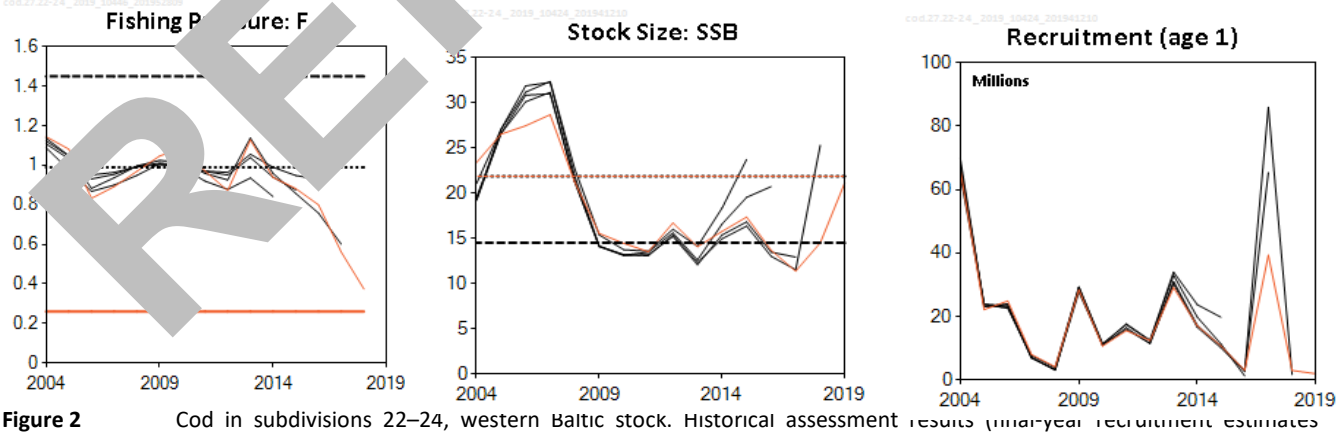



**Figure 2** Cod in subdivisions 22–24, western Baltic stock. Historical assessment results (final-year recruitment estimates included). The stock was benchmarked in 2019 (ICES, 2019a).

## Issues relevant for the advice

The reference points were re-estimated and changed at the stock benchmark in 2019 (ICES, 2019a). $B_{lim}$ was revised downwards from 27 400 t to 14 500 t (47%), based on new information on the productivity of the stock at low biomasses.

$F_{MSY}$ and the lower and upper range were also re-estimated and the ranges narrowed. In this case there was no change to $F_{MSY}$ (0.26), but the $F_{MSY\ lower}$ is changed from 0.15 to 0.18, and $F_{MSY\ upper}$ is changed from 0.45 to 0.43.

The increase of SSB in the forecast is mainly due to one strong year class (the 2016 year class). Fishing mortality in 2018 was still above $F_{MSY}$. The 2016 year class will account for the majority of the predicted catches in 2020 (72%) and SSB in 2021 (71%) (Figure 3). Additionally, the 2017 and 2018 year classes are historically low. If no stronger year classes occur in the coming years this will lead to a rapid decline of the stock. ICES therefore suggests to use the $F_{MSY\ lower}$ value in the MAP when setting the TAC.

The SSB in 2020 is predicted to be above MSY $B_{trigger}$. In this situation, catch scenarios applicable under the MAP correspond to fishing mortalities between $F_{lower}$ and $F_{upper}$. However, according to the MAP, catch [illegible] corresponding to F higher than $F_{MSY}$ can only be taken under conditions specified in the MAP.

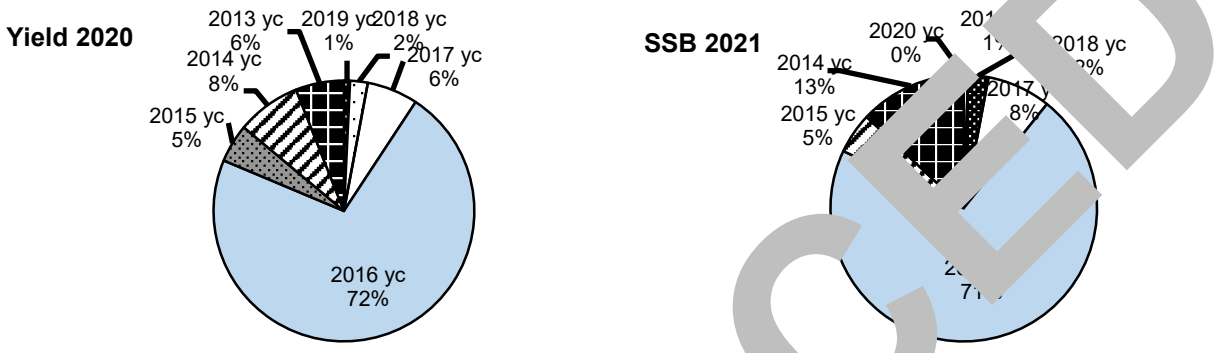



**Figure 3** Cod in subdivisions 22–24, western Baltic st[illegible]ive predicted [illegible]bution of year classes in the yield 2020 and spawning-stock biomass 2021.

Landings of fish below the minimum conservation referenc[illegible] (MCRS, 35 cm) are very low in the management area (24 t below minimum size [BMS] reported in 2018). Discarding [illegible]l takes place despite the fact that the landing obligation has been in place since 2015. The estima[illegible] amount of disca[illegible] is 157 tonnes in 2018 (approximately 4.2%), based on observer data. ICES understands that this is [illegible]n accordanc[illegible]h the current regulations.

A spawning closure was introdu[illegible] (no d[illegible]od fishing in February and March; EU, 2015, 2016b, 2017) and covered the peak spawning [illegible]; betw[illegible] 2016 a[illegible] 2018 both a very large and a historically low recruitment were produced with a similar spawn[illegible]sto[illegible]ze (Eero *et al.*, 2019). The span of years implemented for the closure was too short to evaluate its im[illegible]. In 20[illegible] spawning closure was implemented.

A mixture of ea[illegible]n (EB) [illegible]d weste[illegible]altic (WB) cod stocks is caught in the western Baltic management area (subdivisions 22–2[illegible] The [illegible]essment and this advice is for the western Baltic cod stock.

Recreati[illegible]hes o[illegible]in[illegible] western Baltic management area are considered to consist exclusively of WB cod. A bag-li[illegible] was i[illegible]oduced f[illegible]e first time in 2017 (EU, 2016b) due to the poor stock status and this has lead (*inter alia*) to [illegible]p in t[illegible]reational catches in 2017 and 2018 (1315 tonnes and 1600 tonnes, respectively). For 2019 the bag limit i[illegible] increa[illegible]rom 5 to 7 fish per day per angler. The impact on the recreational catches in 2019 is unknown and the [illegible]ational catch value used for the intermediate year (2140 t) is based on a 3-year mean. The recreational catch in 202[illegible]ll depend on a management decision on the regulations for the recreational fishery. In the absence of other informat[illegible]n the recreational catch assumed in the forecast has been kept constant.

To derive a management area-based total for commercial cod catch for the western and eastern Baltic areas (subdivisions 22–24 and 25–32) in line with ICES advice for the two cod stocks, ICES considers that the following issues should be taken into account:

1. The distribution area of the WB cod stock is subdivisions 22–24. The proportions of the WB cod stock commercial catch taken in subdivisions 22–23 and Subdivision 24 have been quite stable since 1994, amounting to 76% and 24%, respectively, on average in the most recent three years (Table 6).

2. The distribution area of the EB cod stock is subdivisions 24 and 25–32.
3. Commercial fishing in subdivisions 22–23 will provide a catch of the WB cod stock only.
4. Commercial fishing in subdivisions 25–32 will provide a catch of the EB cod stock only.
5. Commercial fishing in Subdivision 24 will provide a mixed catch of the EB and WB cod stocks. In the most recent three years, the ratio EB cod / WB cod commercial catch in Subdivision 24 has been 2.90 (Table 6).
6. In an area that includes two stocks of a species, the species TAC should be set such that the risk of overexploitation of the weakest stock is minimized.

The European Commission has requested ICES to provide information on catch opportunities by management area consistent with the stock advice, assuming a *status quo* distribution of the fisheries on subareas and stocks (option A in Table 5). There could be other allocation schemes, but such schemes are not known to ICES.

One example (Option A in Table 5) assumes that the geographical distribution of the comm[illegible]al catch in [illegible]0 remains as outlined in point 1 above and with average recreational catch in 2020, in which case the d[illegible]ution of a [illegible]mmercial catch of 5105 t of WB cod will be 3880 t in subdivisions 22–23 and 1225 t in Su[illegible]ision 2[illegible]oweve[illegible]atches in Subdivision 24 should be zero in order to comply with the zero catch advised fo[illegible] cod. With a[illegible] *status quo* effort in subdivisions 22–23, this would result in a TAC of 3880 t for the western mana[illegible]ent ar[illegible]which ca[illegible]ly be fished in subdivisions 22–23. Alternatively, the implied commercial catch (5105 t) could [illegible]k[illegible]ntirely i[illegible] subdivisions 22–23. This would represent an increase of effort in this area which is considered the mai[illegible]wning [illegible]nds for WB cod. This may negatively affect the spawning success of WB cod due to disturba[illegible]ough the [illegible] recruitment cannot be quanitifed). Given this circumstance the reintroduction of a tempo[illegible] fishery closure d[illegible]g spawning time could be considered.

Option B (Table 5) assumes that the geographical distribution of the [illegible]ercia[illegible]tch in 2020 remains as outlined in point 1 above and with average recreational catch in 20[illegible]h means th[illegible]ibution of a commercial catch of 5105 t of WB cod will be 3880 t in subdivisions 22–23 and 122[illegible]n [illegible]ion 24. Under these circumstances the additional amount of EB cod fished in Subdivision 24 is estimated to [illegible]355[illegible]ning the same ratio between EB cod and WB cod as observed on average during 2016–2018 in the comm[illegible]atches (i.e. 2.90, see point 5 above). This would result in a TAC of 8660 t for the western management area which c[illegible]d be taken across the entire western Baltic management area. This option is not in line with the ca[illegible]dvice for EB cod.

Figure 4 provides a graphic present[illegible]f hov[illegible]rrive[illegible]ea-based TACs from the ICES stock advice.

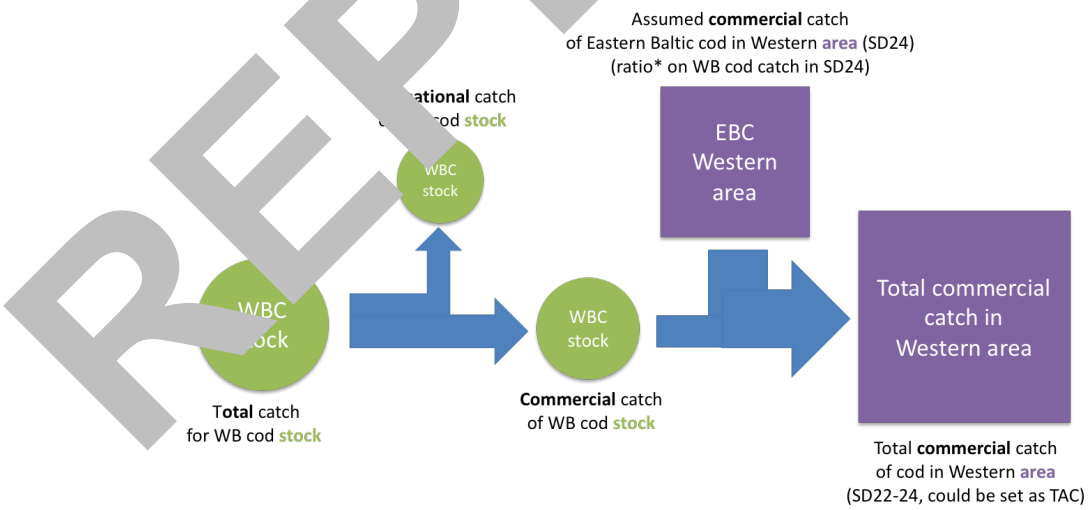



**Figure 4** Cod in subdivisions 22–24, western Baltic cod. Illustration of calculations to obtain area TACs for western and eastern Baltic cod from ICES stock-based catch advice, taking into account stock mixing in Subdivision 24 and recreational catches for the western stock.

**Table 5** Cod in subdivisions 22–24, western Baltic stock. The scenarios illustrate the implications of zero catch advice for eastern Baltic cod on the commercial catch by management area, assuming a recreational catch of 2140 tonnes in 2020. Weights are in tonnes.

| Area | Commercial catch WB cod stock | | | Commercial catch EB cod stock | | | Commercial catch of cod by management area (TAC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | | H | |
| | Advice Total | SDs 22–23 | SD 24 | Total | SD 24 | SDs 25–32 | SDs22–24 | % TAC change (SDs 22–24)* | SDs 25–32 | % TAC change (SDs 25–32)** |
| *a. Status quo distribution, with no catch of EB cod in the Western Baltic management area* | | | | | | | | | | |
| Calculation | | = A × 0.76^ | = A × 0.24^ | | = C × 2.90^^ | = D − E | = B + C + E | | = F | |
| EU MAP: $F_{MSY}$ | 5105 | 3880 | 0 | 0 | 0 | 0 | 3880 | −59 | 0 | −100 |
| F=MAP $F_{MSY}$ lower | 3065 | 2329 | 0 | 0 | 0 | 0 | 2329 | | | −100 |
| *b. Status quo* distribution, with catch of EB cod in the Western Baltic management area | | | | | | | | | | |
| Calculation | | = A × 0.76^ | = A × 0.24^ | | = C × 2.90^^ | = D − E | = B + C + E | | = F | |
| EU MAP: $F_{MSY}$ | 5105 | 3880 | 1225 | - | 3555 | - | 866[illegible] | −9[illegible] | | |
| F=MAP $F_{MSY}$ lower | 3065 | 2329 | 736 | - | 2134 | - | [illegible]9 | −45 | - | - |

* Compared to the 2019 TAC for subdivisions 22–24 (9515 tonnes).

** Compared to the 2019 TAC for subdivisions 25–32 (29 912 tonnes).

^ Average proportions of the WB cod stock commercial catch that has been [illegible] subdivisi[illegible] and Subdivision 24 in the most recent three years (2016–2018; Table 6).

^^ The EB cod catch / WB cod commercial catch ratio observed in Subdivisio[illegible] in the most [illegible]ent three years (2016–2018; Table 6).

**Table 6** Cod in subdivisions 22–24, western Baltic stock. Catches (tonnes) used in the stock assessments of the western (WB) and eastern (EB) Baltic cod stocks in the western Baltic management area.

| Year | WB cod stock | | | | | EB cod stock | | | Management area SDs 22–24 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Landings | Discards | Recreational catch | Proportion* of discards | Proportion* of comm. catch in SD 24 | Landings in SD 24 | Discards in SD24 | % of catch in SD 24 | Total landings | Discards | Recreational catch | total catch | EBC/ WBC stock commercial catch in SD 24 |
| 1985 | 33188 | | 2075 | | 0.29 | 6971 | | 2.11 | [illegible] | | 2075 | 42234 | 0.71 |
| 1986 | 20088 | | 2078 | | 0.36 | 6604 | | 2.51 | [illegible]692 | | 2078 | 28770 | 0.93 |
| 1987 | 21692 | | 2081 | | 0.37 | 6874 | | [illegible]08 | [illegible]56 | | 2081 | 30647 | 0.86 |
| 1988 | 20672 | | 2082 | | 0.47 | 8487 | | 4.03 | 29[illegible] | | 2082 | 31241 | 0.87 |
| 1989 | 12795 | | 2083 | | 0.49 | 5721 | | 3.04 | 18510 | | 2083 | 20599 | 0.92 |
| 1990 | 12237 | | 2085 | | 0.49 | 5543 | | 3.39 | 17780 | | 2085 | 19865 | 0.92 |
| 1991 | 12931 | | 2087 | | 0.32 | 3762 | | 2.92 | 16693 | | 2087 | 18780 | 0.92 |
| 1992 | 15672 | | 2420 | | 0.19 | 2324 | | [illegible] | 17996 | | 2420 | 20416 | 0.76 |
| 1993 | 11815 | | 2752 | | 0.27 | 388[illegible] | | 6.92 | 15700 | | 2752 | 18452 | 1.20 |
| 1994 | 16642 | 1614 | 3088 | 0.09 | 0.41 | 6551 | | 6.52 | 23193 | 2235 | 3088 | 28516 | 0.97 |
| 1995 | 28310 | 3016 | 3417 | 0.10 | 0.29 | 5585 | [illegible]3 | 5.40 | 33895 | 3684 | 3417 | 40996 | 0.68 |
| 1996 | 38505 | 6868 | 3419 | 0.15 | 0.32 | 10040 | [illegible]116 | 8.16 | 48545 | 7984 | 3419 | 59948 | 0.77 |
| 1997 | 37077 | 3981 | 3420 | 0.10 | 0.33 | 6547 | 641 | 7.24 | 43624 | 4623 | 3420 | 51666 | 0.53 |
| 1998 | 29634 | 5575 | 3410 | 0.16 | [illegible]7 | 4582 | [illegible]631 | 6.96 | 34216 | 6206 | 3410 | 43833 | 0.40 |
| 1999 | 35934 | 4378 | 3416 | 0.11 | 0.[illegible] | 6221 | 599 | 8.35 | 42155 | 4978 | 3416 | 50549 | 0.52 |
| 2000 | 31132 | 3738 | 3432 | 0.11 | 0.32 | 631[illegible] | 1209 | 7.32 | 37448 | 4947 | 3432 | 45827 | 0.68 |
| 2001 | 27781 | 2449 | 3427 | 0.0[illegible] | [illegible]36 | [illegible] | 389 | 7.99 | 35574 | 2838 | 3427 | 41840 | 0.75 |
| 2002 | 20410 | 1395 | 3437 | [illegible] | [illegible]31 | [illegible]60 | 562 | 7.51 | 25470 | 1957 | 3437 | 30864 | 0.84 |
| 2003 | 17205 | 3473 | 3448 | 0[illegible] | 0.34 | 5729 | 862 | 8.44 | 22934 | 4336 | 3448 | 30718 | 0.95 |
| 2004 | 17686 | 2189 | 3445 | 0.11 | 0.27 | 5309 | 188 | 7.30 | 22995 | 2377 | 3445 | 28817 | 1.04 |
| 2005 | 18493 | 3265 | 3771 | 0.15 | 0.42 | 6064 | 1729 | 12.08 | 24557 | 4994 | 3771 | 33322 | 0.86 |
| 2006 | 18503 | 1686 | 29[illegible] | [illegible]8 | [illegible]27 | 6767 | 144 | 8.97 | 25270 | 1831 | 2923 | 30024 | 1.28 |
| 2007 | 17384 | 1325 | 2[illegible] | 0.07 | 0.35 | 8792 | 875 | 14.95 | 26176 | 2200 | 2782 | 31158 | 1.46 |
| 2008 | 11302 | 336 | 3039 | 0.03 | 0.31 | 8811 | 787 | 17.27 | 20112 | 1123 | 3039 | 24274 | 2.66 |
| 2009 | 7313 | 351 | [illegible]648 | 0.0[illegible] | 0.42 | 8284 | 464 | 14.46 | 15597 | 815 | 2648 | 19060 | 2.75 |
| 2010 | 8007 | 838 | [illegible]67 | [illegible] | 0.36 | 6049 | 533 | 10.90 | 14055 | 1371 | 3367 | 18793 | 2.08 |
| 2011 | 9107 | 29[illegible] | [illegible]95 | [illegible].03 | 0.24 | 7545 | 482 | 12.90 | 16652 | 781 | 2595 | 20029 | 3.59 |
| 2012 | 8622 | 37[illegible] | [illegible] | 0.04 | 0.31 | 8469 | 536 | 13.43 | 17091 | 905 | 3661 | 21657 | 3.28 |
| 2013 | 7697 | 1007 | 3106 | 0.12 | 0.29 | 5359 | 1243 | 15.36 | 13056 | 2250 | 3106 | 18413 | 2.62 |



* Version 2: header corrected.

| Year | WB cod stock | | | | | EB cod stock | | | Managment area SDs 22–24 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Landings | Discards | Recreational catch | Proportion* of discards | Proportion* of comm. catch in SD 24 | Landings in SD 24 | Discards in SD24 | % of catch in SD 24 | Total landings | Discards | Recreational catch | total catch | EBC/ WBC stock commercial catch in SD 24 |
| 2014 | 8083 | 837 | 4044 | 0.09 | 0.33 | 5455 | 1298 | 14.91 | 13538 | 2[illegible] | 4044 | 19716 | 2.30 |
| 2015 | 8390 | 432 | 4568 | 0.05 | 0.29 | 5029 | 930 | 11.9[illegible] | 134[illegible] | 1361[illegible] | 4568 | 19348 | 2.35 |
| 2016 | 6122 | 143 | 3505 | 0.02 | 0.31 | 4541 | 306 | 12.9[illegible] | 1[illegible]3 | [illegible]49 | 3505 | 14617 | 2.53 |
| 2017 | 3861 | 180 | 1315 | 0.04 | 0.20 | 1994 | 238 | 7.21 | [illegible]855 | [illegible]17 | 1315 | 7587 | 2.79 |
| 2018 | 3555 | 157 | 1600 | 0.04 | 0.21 | 2284 | 311 | [illegible]01 | [illegible]29 | 469 | 1600 | 7907 | 3.39 |

## Reference points

**Table 7** Cod in subdivisions 22–24, western Baltic stock. Reference points, values, and their technical basis. Weights in tonnes.

| Framework | Reference point | Value | Technical basis | Source |
|---|---|---|---|---|
| MSY approach | MSY $B_{trigger}$ | 21 876 | $B_{pa}$ | ICES (2019a) |
| | $F_{MSY}$ | 0.26 | Stochastic simulations with segmented regression stock–recruitment relationship. | ICES (2019a) |
| Precautionary approach | $B_{lim}$ | 14 500 | Average of lowest SSB in years with above average recruitment (1991, 1993, 2003, 2016). | ICES (2019a) |
| | $B_{pa}$ | 21 876 | $1.4 \times B_{lim}$ | ICES (2019a) |
| | $F_{lim}$ | 1.45 | Equilibrium scenarios with stochastic recruitment: F value corresponding to 50% probability of (SSB < $B_{lim}$). | (2019a) |
| | $F_{pa}$ | 0.99 | $F_{lim} \times e^{-1.645\sigma}$; $\sigma = 0.25$ | ICES 19a) |
| Management plan | MSY $B_{trigger}$ | 21 876 | MSY $B_{trigger}$ | ICES 019a) |
| | $B_{lim}$ | 14 500 | $B_{lim}$ | 2019a) |
| | MAP $F_{MSY}$ | 0.26 | $F_{MSY}$ | ES (2019a) |
| | Target range $F_{MSY\ upper}$ to $F_{MSY}$ | 0.26–0.43 | Consistent with the ranges ng i more than 5% reduction in long-term ompared with MSY. | ICES (2019a) |
| | Target range $F_{MSY}$ to $F_{MSY\ lower}$ | 0.18–0.26 | Consistent with anges resulting i e than 5% reduct in long-term v ld co ared with MSY. | ICES (2019a) |

## Basis of the assessment

**Table 8** Cod in subdivisions 22–24, western Baltic stoc sis ssment and advice.

| | |
|---|---|
| ICES stock data category | 1 (ICES, 2018). |
| Assessment type | Age-based analytical assessment SA 2019b) that uses catches (landings, discards, and recreational catch) in the model and i forecast. |
| Input data | Commercial cat (landings, age distr ions from catch sampling) and recreational catch (Germany, Sweden, and Den Annual stock ep ration key (from commercial catches) to split catches in Subdivision 24 into e and we Baltic cod, derived from otolith shape analyses combined with genetic s ava fo of the 34 years in the present time-series). The allocation of catc o stoc the re g years was performed by interpolation. Three survey indices (FEJUCS (a BITS-Q nd BITS-Q4), annual maturity data from BITS-Q1 surveys. Natural mortalities for age 1 der fr multispecies assessment, unchanged since 1996. |
| Discards and bycatch | Included e assessment since 1994, data series from the main fleets. |
| Indicators | No e. |
| Other informatio | benchmarked 2019 (ICES, 2019a). The basis for the assessment changed in 2015 to being for the western B tic cod stock, whereas assessments in earlier years were for the area of subdivisions 22–24. |
| Working grou | Baltic Fi ies Assessment Working Group (WGBFAS) |

## Infor on fr stakeho

There ditiona ilable information.

## History of the advice, catch, and management

**Table 9** Cod in subdivisions 22–24, western Baltic stock. ICES advice and official landings. All weights are in tonnes.

| Year | ICES advice | Total catch from the stock corresponding to the advice | Commercial catch corresponding to advice* | Agreed TAC** | ICES estimated total commercial landings subdivisions 22–24 (eastern and western Baltic cod stocks) |
|---|---|---|---|---|---|
| 1987 | TAC | | 9000 | | 28566 |
| 1988 | TAC | | 16000 | | 29159 |
| 1989 | TAC | | 14000 | [illegible]000 | 18516 |
| 1990 | TAC | | 8000 | 2[illegible] | 17780 |
| 1991 | TAC | | 11000 | 1710[illegible] | 16693 |
| 1992 | Substantial reduction in F | | - | [illegible]00000 | 17996 |
| 1993 | F at lowest possible level | | | [illegible]40000 | 21228 |
| 1994 | TAC | | 22000 | 6000[illegible] | 30695 |
| 1995 | 30% reduction in fishing effort from 1994 level | | [illegible] | 1[illegible]0 | 33895 |
| 1996 | 30% reduction in fishing effort from 1994 level | | - | 165000 | 50845 |
| 1997 | Fishing effort should not be allowed to increase above the level of recent years | | - | 180000 | 43624 |
| 1998 | 20% reduction in F from 1996 | | 35000 | 160000 | 34216 |
| 1999 | At or below $F_{sq}$ with 50% probability | | [illegible]000 | 126000 | 42155 |
| 2000 | Reduce F by 20% | | 44600 | 105000 | 38347 |
| 2001 | Reduce F by 20% | | 48600 | 105000 | 34244 |
| 2002 | Reduce F to below 1.0 | | 36300 | 76000 | 24158 |
| 2003 | Reduce F to below 1.0 | | [illegible]***22600 or 28800 | 75000 | 24624 |
| 2004 | Reduce F to below 1.0 | | < 29600 | 29600 | 20854 |
| 2005 | Reduce F to below 0.92 | | < 23400 | 24700 | 22045 |
| 2006 | Management plan | | < 28400 | 28400 | 22751 |
| 2007 | Keep SSB at $B_{pa}$ | | < 20500 | 26700 | 23736 |
| 2008 | Rebuild SSB to [illegible] | | < 13500 | 19200 | 20082 |
| 2009 | Rebuild SS[illegible] $B_{pa}$ | | < 13700 | 16300 | 15549 |
| 2010 | Manage[illegible]t plan | | < 17700 | 17700 | 14120 |
| 2011 | See scenar[illegible] | | - | 18800 | 16332 |
| 2012 | M[illegible]ement [illegible] | | 21300 | 21300 | 17072 |
| 2013 | Mana[illegible]ent pla[illegible] | | 20800 | 20000 | 12968 |
| 20[illegible] | Mana[illegible]ent plan | | 17037 | 17000 | 13538 |
| 20[illegible] | MS[illegible] | | 8793 | 15900 | 13418 |
| 2016 | [illegible] approach (F = 0.23) | ≤ 7797 | | 12720 | 10629 |
| 2017 | [illegible]pproach (F = 0.15) | ≤ 3475 | ≤ 917 | 5597 | 5865^ |
| 2018 | MA[illegible]nges: $F_{lower}$ to $F_{MSY}$ adjusted by $SSB_{2018}$/MSY $B_{trigger}$ (F = 0.11–0.188) | 3130–5295 | 1376–3541 | 5597 | 5850^ |
| 2019 | MAP range: $F_{MSY}$ $F_{lower}$ to $F_{upper}$ (F = 0.15–0.45) | 9094–23992 | 5867–22238 | 9515 | |
| 2020 | MAP range: $F_{MSY}$ $F_{lower}$ to $F_{upper}$ (F = 0.18–0.43) | 5205–11006 | | | |

* Values since 2016 are for the western Baltic cod stock only, whereas in earlier years they are for the area of subdivisions 22–24 and include a fraction of the eastern Baltic cod stock.
** Included in TAC for total Baltic, until and including 2003.
*** Two options based on implementation of the adopted mesh regulation.

^ Including BMS.

## History of the catch and landings

**Table 10** Cod in subdivisions 22–24, western Baltic stock. Catch distribution in 2018 as estimated by ICES.

| Catch (2018) | Commercial landings | | Commercial discards | Recreational catch |
|---|---|---|---|---|
| 5312 t | active gears 56% | passive gears 44% | 157 t | 1600 t |
| | 3555 t | | | |

**Table 11** Cod in subdivisions 22–24, western Baltic management area. History of commercial catch; both the official and ICES estimated values are presented by area. The table includes landings of the western Baltic cod stock as well as of the eastern Baltic cod stock in Subdivision 24. All weights are in tonnes.

| Year | Total for managment area | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Human consumption landings (HC) | | | | BMS | Discards | loc. | l catch |
| | 22 | 23 | 24 | HC (SDs 22–24) | | | | |
| 1992 | 9887 | 2739 | 5370 | 17996 | | | | 17996 |
| 1993 | 7296 | 1275 | 7129 | 15700 | | | | 21228 |
| 1994 | 8229 | 1628 | 13336 | 23193 | | 235 | 75 | 32930 |
| 1995 | 16936 | 3158 | 13801 | 33895 | | 84 | | 37579 |
| 1996 | 21417 | 4031 | 23097 | 48545 | | | 00 | 58829 |
| 1997 | 21966 | 2663 | 18995 | 43624 | | 46 | | 48247 |
| 1998 | 15093 | 3074 | 16049 | 34216 | | 6207 | | 40423 |
| 1999 | 20409 | 3521 | 18225 | 42155 | | 4 78 | | 47133 |
| 2000 | 18934 | 3149 | 16264 | 38347 | | 7 | | 43294 |
| 2001 | 14976 | 2817 | 16451 | 34244 | | 9 | | 37083 |
| 2002 | 11968 | 2409 | 9781 | 24158 | | 958 | | 26116 |
| 2003 | 9573 | 1925 | 13127 | | | 4336 | | 28960 |
| 2004 | 9091 | 2320 | 9430 | 0841 | | 2377 | 13 | 23231 |
| 2005 | 8729 | 2621 | 10686 | 036 | | 4994 | 9 | 27039 |
| 2006 | 9979 | 1914 | 10858 | | | 1831 | | 24582 |
| 2007 | 7840 | 2713 | 13183 | 2 6 | | 2199 | | 25935 |
| 2008 | 5687 | 2139 | 12256 | 20 | | 1123 | | 21205 |
| 2009 | 3451 | 839 | 11259 | 55 9 | | 815 | | 16364 |
| 2010 | 3925 | 1179 | 6 | 4120 | | 1371 | | 15491 |
| 2011 | 5493 | 1198 | 9 | 16332 | | 780 | | 17112 |
| 2012 | 4896 | 112 | 1105 | 17072 | | 905 | | 17977 |
| 2013 | 4675 | 96 | 7 | 12968 | | 2250 | | 15218 |
| 2014 | 4316 | 361 | 52 | 13538 | | 2135 | | 15673 |
| 2015 | 499 | 1232 | 3 | 13419 | | 1361 | | 14780 |
| 2016 | 3 | 11 | 6 | 10629 | 34 | 449 | | 11112 |
| 2017 | 5 | 1 | 269 | 5833 | 32 | 421 | | 6286 |
| 2018 | 20 | 870 | 942 | 5826 | 24 | 476 | | 6326 |

**Table 12** Cod in subdivisions 22–24, western Baltic management area. History of commercial landings for human consumption presented by area for each country participating in the fishery. The table includes landings of the western Baltic cod stock as well as of the eas[illegible]cod stock in Subdivision 24. All weights are in tonnes.

| Year | Denmark | | | Finland | Germany | | | Estonia | | Lithuania | Latvia | Poland | [illegible]den | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Dem.Rep.* | FRG | | | | | | | | | | | | |
| | 22 | 23 | 22+24 | 24 | 22+24 | 22 | 22+24 | 22 | 24 | 24 | 24 | 24 | 22 | [illegible]2+24 | [illegible] | 23 | 24 | Unalloc. | Grand total |
| 1965 | | | 19457 | | 9705 | | 13350 | | | | | | | [illegible]2182 | [illegible]7867 | | 17007 | | 44874 |
| 1966 | | | 20500 | | 8393 | | 11448 | | | | | | | | 27864 | | 14587 | | 42451 |
| 1967 | | | 19181 | | 10007 | | 12884 | | | | | | | [illegible]96 | 28875 | | 15193 | | 44068 |
| 1968 | | | 22593 | | 12360 | | 14815 | | | | | | | 2113 | 32911 | | 18970 | | 51881 |
| 1969 | | | 20602 | | 7519 | | 12717 | | | | | | | 1413 | 29082 | | 13169 | | 42251 |
| 1970 | | | 20085 | | 7996 | | 14589 | | | | | | | 1289 | 31363 | | 12596 | | 43959 |
| 1971 | | | 23715 | | 8007 | | 13482 | | | | | | | 1419 | 32119 | | 14504 | | 46623 |
| 1972 | | | 25645 | | 9665 | | 12313 | | | | | | | 1277 | 32808 | | 16092 | | 48900 |
| 1973 | | | 30595 | | 8374 | | 13733 | | | | | | | 1655 | 38237 | | 16120 | | 54357 |
| 1974 | | | 25782 | | 8459 | | 10393 | | | | | | | 1937 | 31326 | | 15245 | | 46571 |
| 1975 | | | 23481 | | 6042 | | 12912 | | | | | | | 1932 | 31867 | | 12500 | | 44367 |
| 1976 | | 712 | 29446 | | 4582 | | [illegible]893 | | | | | | | 1800 | 33368 | 712 | 15353 | | 49433 |
| 1977 | | 1166 | 27939 | | 3448 | | [illegible] | | | | | | | 550 1516 | 29510 | 1716 | 15079 | | 46305 |
| 1978 | | 1177 | 19168 | | 7085 | | 108[illegible] | | | | | | | 600 1730 | 24232 | 1777 | 14603 | | 40612 |
| 1979 | | 2029 | 23325 | | 7594 | | 9598 | | | | | | | 700 1800 | 26027 | 2729 | 16290 | | 45046 |
| 1980 | | 2425 | 23400 | | 5580 | | [illegible]657 | | | | | | | 1300 2610 | 22881 | 3725 | 15366 | | 41972 |
| 1981 | | 1473 | 22654 | | 116[illegible] | | 1260 | | | | | | | 900 5700 | 26340 | 2373 | 24933 | | 53646 |
| 1982 | | 1638 | 19138 | | 10615 | | 8060 | | | | | | | 140 7933 | 20971 | 1778 | 24775 | | 47524 |
| 1983 | | 1257 | 21961 | | [illegible]9097 | | 9260 | | | | | | | 120 6910 | 24478 | 1377 | 22750 | | 48605 |
| 1984 | | 1703 | 21909 | | 8093 | | 11548 | | | | | | | 228 6014 | 27058 | 1931 | 20506 | | 49495 |
| 1985 | | 1076 | 23024 | | [illegible] | | [illegible]5523 | | | | | | | 263 4895 | 22063 | 1339 | 16757 | | 40159 |
| 1986 | | 748 | 16195 | | [illegible]98 | | 2902 | | | | | | | 227 3622 | 11975 | 975 | 13742 | | 26692 |
| 1987 | | 1503 | 13460 | | [illegible]4896 | | 4256 | | | | | | | 137 4314 | 12105 | 1640 | 14821 | | 28566 |
| 1988 | | 1121 | [illegible] | | [illegible]632 | | 4217 | | | | | | | 155 5849 | 9680 | 1276 | 18203 | | 29159 |
| 1989 | | 636 | 8059 | | [illegible] | | 2498 | | | | | | | 192 4987 | 5738 | 828 | 11950 | | 18516 |
| 1990 | | [illegible] | 858[illegible] | | 1[illegible]19 | | 3054 | | | | | | | 120 3671 | 5361 | 842 | 11577 | | 17780 |
| 1991 | | 14[illegible] | 9[illegible] | | [illegible] | | 2879 | | | | | | | 232 2768 | 7184 | 1663 | 7846 | | 16693 |
| 1992 | | 2449 | [illegible]46 | | [illegible] | | 3656 | | | | | | | 290 1655 | 9887 | 2739 | 5370 | | 17996 |
| 1993 | | 1001 | [illegible] | | [illegible] | | 4084 | | | | | | | 274 1675 | 7296 | 1275 | 7129 | 5528 | 21228 |
| 1994 | | 1073 | 13[illegible] | | [illegible] | | 4023 | | | | | | | 555 3711 | 8229 | 1628 | 13336 | 7502 | 30695 |
| 1995 | | 2547 | 18762 | 132 | [illegible] | | 9196 | | | | 15 | | | 611 2632 | 16936 | 3158 | 13801 | | 33895 |
| 1996 | | 2999 | 27946 | 50 | [illegible] | | 12018 | | 50 | | 32 | | | 1032 4418 | 21417 | 4031 | 23097 | 2300 | 50845 |

| Year | Denmark | | | Finland | Germany | | | Estonia | | Lithuania | Latvia | Poland | Sweden | | | Total | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 22 | 23 | 22+24 | 24 | Dem.Rep.* | FRG | | 22 | 24 | 24 | 24 | 24 | 22 | [illegible] | 22+24 | [illegible] | [illegible] | 24 | Unalloc. | Grand total |
| | | | | | 22+24 | 22 | 22+24 | | | | | | | | | | | | | |
| 1997 | | 1886 | 28887 | 11 | | | 9269 | | 6 | | | 263 | | 777 | [illegible] | 21966 | [illegible]663 | 18995 | | 43624 |
| 1998 | | 2467 | 19192 | 13 | | | 9722 | | 8 | | 13 | 623 | | [illegible]07 | [illegible]571 | 15[illegible]93 | 3074 | 16049 | | 34216 |
| 1999 | | 2839 | 23074 | 116 | | | 13224 | | 10 | | 25 | 660 | | [illegible] | 1525 | [illegible]09 | 3521 | 18225 | | 42155 |
| 2000 | | 2451 | 19876 | 171 | | | 11572 | | 5 | | 84 | [illegible] | | 69[illegible] | [illegible]564 | 18934 | 3149 | 16264 | | 38347 |
| 2001 | | 2124 | 17446 | 191 | | | 10579 | | 40 | | 46 | 646 | | 693 | | 14976 | 2817 | 16451 | | 34244 |
| 2002 | | 2055 | 11657 | 191 | | | 7322 | | | | 7 | 782 | | [illegible]4 | 1727 | 11968 | 2409 | 9781 | | 24158 |
| 2003 | | 1373 | 13275 | 59 | | | 6775 | | | | 12 | 568 | | [illegible] | 1899 | 9573 | 1925 | 13127 | | 24624 |
| 2004 | | 1927 | 11386 | | | | 4651 | | | | 221 | [illegible]38 | | [illegible]3 | 1727 | 9091 | 2320 | 9430 | 13 | 20854 |
| 2005 | | 1902 | 9867 | 2 | | | 7002 | 72 | 67 | | 476 | [illegible] | | 720 | 835 | 8729 | 2621 | 10686 | 9 | 22045 |
| 2006 | | 1899 | 9761 | 242 | | | 7516 | | | | 586 | 801 | | | 1855 | 9979 | 1914 | 10858 | | 22751 |
| 2007 | | 2169 | 8975 | 220 | | | 6802 | | 6[illegible] | | [illegible]371 | [illegible] | | 534 | 2322 | 7840 | 2713 | 13183 | | 23736 |
| 2008 | | 1612 | 8582 | 159 | | | 5489 | | 134 | | [illegible] | [illegible]1 | | 525 | 2189 | 5687 | 2139 | 12256 | | 20082 |
| 2009 | | 567 | 7871 | 259 | | | 4020 | | 194 | | 23 | 529 | | 269 | 1817 | 3451 | 839 | 11259 | | 15549 |
| 2010 | | 689 | 6849 | 203 | | | 4250 | | | | 159 | 319 | | 490 | 1151 | 3925 | 1179 | 9016 | | 14120 |
| 2011 | | 783 | 7799 | 149 | | | [illegible]521 | | | | 24 | 487 | | 414 | 2153 | 5493 | 1198 | 9641 | | 16332 |
| 2012 | | 733 | 8381 | 260 | | | | | 3 | | 11 | 818 | | 390 | 1955 | 4896 | 1123 | 11053 | | 17072 |
| 2013 | | 580 | 6566 | 50 | | | [illegible]32[illegible] | | | | 128 | 708 | | 380 | 1317 | 4675 | 960 | 7333 | | 12968 |
| 2014 | 2206 | 795 | 6804 | 7 | | | [illegible]3243 | | | | 39 | 854 | 1 | 565 | 1231 | 4316 | 1361 | 7862 | | 13538 |
| 2015 | 2781 | 738 | 6623 | 28 | | [illegible]213 | [illegible]915 | | | | 7 | 755 | | 493 | 1858 | 4994 | 1232 | 7193 | | 13418 |
| 2016 | 1576 | 675 | 4881 | 29 | | [illegible]1617 | [illegible]2390 | | | | | 657 | 1 | 448 | 1550 | 3193 | 1123 | 6313 | | 10629 |
| 2017 ** | 1167 | 506 | 2352 | | | [illegible] | 1281 | | | | | 926 | | 435 | 352 | 2196 | 941 | 2714 | | 5852 |
| 2018 ** | 1010 | 475 | 2238 | 0.5 | | [illegible] | 1386 | | | | | 888 | | 395 | 467 | 2018 | 870 | 2962 | | 5850 |

* Includes landings from October to Dec[illegible]ber 199[illegible] of Fede[illegible]epublic of Germany.
** Including landings of Below Minim[illegible] Conser[illegible]n Referen[illegible]ize (BMS) from logbooks

## Summary of the assessment

**Table 13** Cod in subdivisions 22–24, western Baltic stock. Assessment summary. Weights are in tonnes. Recruitment in thousands. High and Low refer to 95% confidence intervals.

| Year | Recruitment (Age 1) | Recruitment High | Recruitment Low | Stock size: SSB | SSB High | SSB Low | Landings | Discards | Recreational | F (ages 3–5) | F High | F Low |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 28685 | 51446 | 15994 | 30167 | 37625 | 24187 | 33188 | | 2075 | 1.33 | 1.62 | 1.10 |
| 1986 | 79493 | 140449 | 44993 | 18852 | 22728 | 15637 | 20088 | | 2078 | 1.25 | 1.50 | 1.04 |
| 1987 | 25929 | 45037 | 14928 | 17492 | 21054 | 14533 | 21692 | | 2081 | 1.14 | 1.38 | 0.95 |
| 1988 | 11334 | 19924 | 6447 | 21628 | 27473 | 17027 | 20672 | | 2082 | 1.12 | 1.35 | 0.93 |
| 1989 | 13917 | 24189 | 8007 | 15794 | 19521 | 12778 | 12795 | | 208 | 1.01 | 1.23 | 0.83 |
| 1990 | 21545 | 37430 | 12402 | 12279 | 14823 | 10171 | 12237 | | | | 1.38 | 0.96 |
| 1991 | 32863 | 57065 | 18925 | 9710 | 11511 | 8190 | 12931 | | 2087 | 1.3 | 1.55 | 1.09 |
| 1992 | 64599 | 112999 | 36929 | 9547 | 11573 | 7876 | 15672 | | 2420 | 1.34 | 1.60 | 1.13 |
| 1993 | 26179 | 45686 | 15001 | 13817 | 17329 | 11017 | 11815 | | 2 | 1.18 | 1.41 | 0.98 |
| 1994 | 59916 | 104602 | 34320 | 24937 | 32116 | 19363 | 16642 | 16 | 3 | 1.05 | 1.29 | 0.89 |
| 1995 | 93089 | 163896 | 52872 | 29086 | 35817 | 23619 | 28310 | 6 | 3417 | | 1.55 | 1.06 |
| 1996 | 25133 | 44868 | 14078 | 35958 | 44366 | 29144 | 38505 | 868 | 3419 | 14 | 1.37 | 0.95 |
| 1997 | 80526 | 135323 | 47918 | 40762 | 52501 | 31648 | 37077 | 81 | 342 | 1.15 | 1.38 | 0.96 |
| 1998 | 125200 | 208514 | 75175 | 27947 | 34119 | 22892 | 29634 | | | 1.12 | 1.35 | 0.94 |
| 1999 | 43392 | 70377 | 26754 | 33310 | 40304 | 27530 | | 437 | 416 | 1.33 | 1.58 | 1.12 |
| 2000 | 44495 | 71021 | 27876 | 33990 | 42214 | 27368 | 31132 | 3738 | 3432 | 1.28 | 1.52 | 1.08 |
| 2001 | 27508 | 44421 | 17035 | 28683 | 34315 | 23976 | 27781 | 19 | 3427 | 1.38 | 1.63 | 1.17 |
| 2002 | 48892 | 79090 | 30224 | 25137 | 30341 | 20826 | 20410 | 5 | 3437 | 1.33 | 1.58 | 1.13 |
| 2003 | 15230 | 24734 | 9377 | 20519 | 24356 | 17287 | 7205 | 3 | 3448 | 1.16 | 1.39 | 0.98 |
| 2004 | 66051 | 106615 | 40920 | 23390 | 28904 | 18927 | | 189 | 3445 | 1.15 | 1.37 | 0.96 |
| 2005 | 22142 | 35566 | 13785 | 26537 | 3 | 079 | 184 | 3265 | 3771 | 1.08 | 1.31 | 0.90 |
| 2006 | 24905 | 40422 | 15345 | 27471 | 34 | 2 | 18503 | 1686 | 2923 | 0.83 | 1.03 | 0.67 |
| 2007 | 7986 | 12866 | 4956 | 28691 | 351 | 2345 | 4 | 1325 | 2782 | 0.89 | 1.08 | 0.73 |
| 2008 | 4090 | 7206 | 2322 | 21230 | 2525 | 1 | 11302 | 336 | 3039 | 0.97 | 1.17 | 0.80 |
| 2009 | 28372 | 46557 | 17291 | 15546 | 18367 | 157 | 7313 | 351 | 2648 | 1.05 | 1.25 | 0.87 |
| 2010 | 10620 | 17061 | 661 | 14459 | 17318 | 73 | 8007 | 838 | 3367 | 1.09 | 1.31 | 0.90 |
| 2011 | 15517 | 25133 | 95 | 13529 | 16869 | 1 51 | 9107 | 299 | 2595 | 0.97 | 1.18 | 0.80 |
| 2012 | 12418 | 19867 | 7762 | 711 | 2035 | 13717 | 8622 | 370 | 3661 | 0.87 | 1.07 | 0.71 |
| 2013 | 29082 | 47030 | | 84 | 1 | 16 | 11853 | 7697 | 1007 | 3106 | 1.13 | 1.38 | 0.92 |
| 2014 | 17003 | 27514 | 1 | | 157 | 18 | 13224 | 8083 | 837 | 4044 | 0.94 | 1.15 | 0.77 |
| 2015 | 10697 | 1735 | 6 | | 17368 | 1114 | 14286 | 8390 | 432 | 4568 | 0.88 | 1.11 | 0.70 |
| 2016 | 2996 | 5103 | | 9 | 13679 | 17060 | 10967 | 6122 | 143 | 3505 | 0.80 | 1.07 | 0.60 |
| 2017 | 39319 | 5 | 594 | 1007 | 11374 | 15296 | 8458 | 3861** | 180 | 1315 | 0.56 | 0.85 | 0.37 |
| 2018 | 2946 | 6266 | | 385 | 14509 | 22544 | 9338 | 3555** | 157 | 1600 | 0.37 | 0.69 | 0.20 |
| 2019 | 2226* | 707 | | * | 21297 | 38450 | 11129 | | | | | | |

*Output from SAM analysis based on survey data.
**Includes BMS

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