

ECOREGION Baltic Sea
STOCK Plaice in Subdivisions 21, 22, and 23 (Kattegat, Belts, and Sound)

Advice for 2013

This is the first time ICES advises on plaice in the Kattegat, the Belt Sea, and the Sound; previously advice was given for Kattegat and Skagerrak combined and for the Baltic Sea (Subdivisions 22–32). Based on the ICES approach for data-limited stocks, ICES advises that catches should be no more than 1800 tonnes.

This is the first year ICES is providing quantitative advice for data-limited stocks (see Quality considerations).

Stock status

| F (Fishing Mortality) | | |
|--|---|-----------------------------|
| 2009–2011 | | |
| MSY (F_{MSY}) | ? | Unknown |
| Precautionary approach (F_{pa}, F_{lim}) | ? | Unknown |
| Qualitative evaluation | ↘ | Decreasing, at historic low |
| SSB (Spawning-Stock Biomass) | | |
| 2008–2012 | | |
| MSY ($B_{trigger}$) | ? | Unknown |
| Precautionary approach (B_{pa}, B_{lim}) | ? | Unknown |
| Qualitative evaluation | ↗ | Increasing |

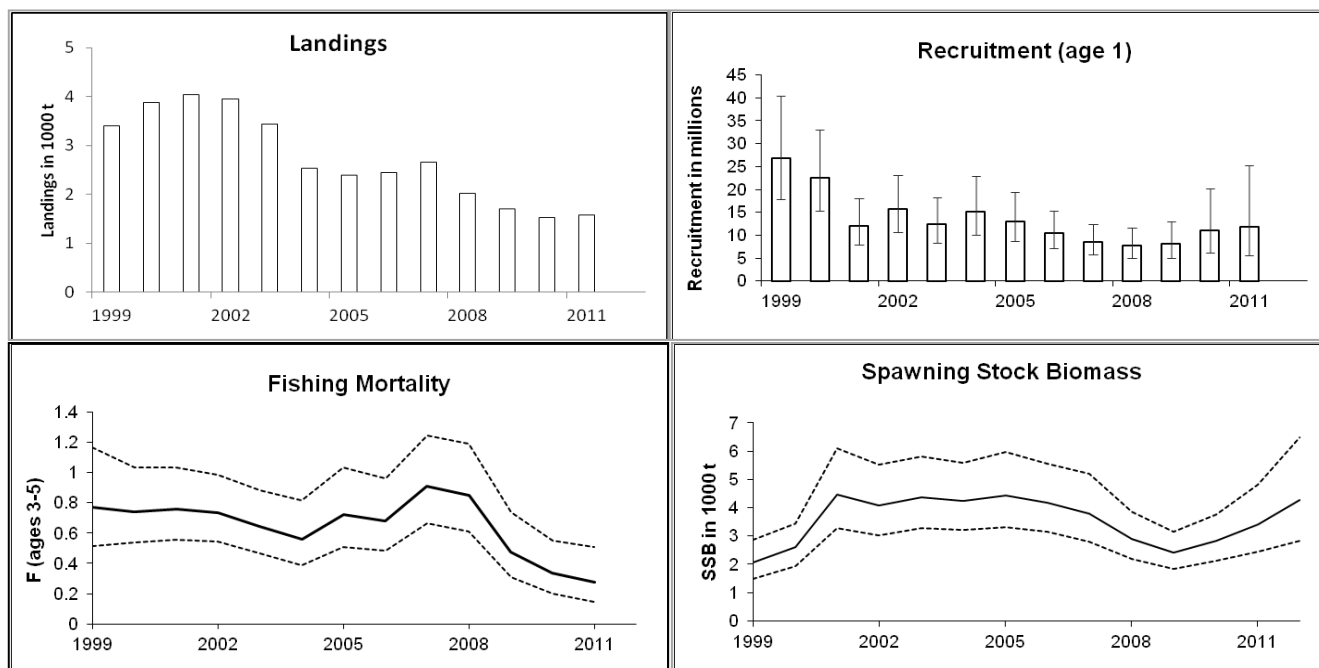


Figure 8.4.11.1 Plaice in Subdivisions 21, 22, and 23 (Kattegat, Belts, and Sound). Summary of stock assessment (weights in thousand tonnes).

An exploratory assessment is presented, which is considered highly uncertain because of the short time-series available. The exploratory assessment shows that fishing mortality has dropped since 2006, and SSB has been increasing since 2009.

Management plans

No specific management objectives are known to ICES.

Biology

Plaice aggregate at spawning grounds in the first quarter of the year. Stock boundaries are not completely clear, due to potentially large connectivity between areas occurring through spawning migration, larval drift, and juvenile homing.

Environmental influence on the stock

Growth patterns for plaice in this area are highly variable, likely because of the great diversity of the local hydrographical conditions in the Skagerrak and Kattegat.

The fisheries

Plaice is caught all year round mainly from winter to spring. In Subdivision (SD) 22 plaice is mostly taken in mixed fisheries together with cod. In SD 21 plaice is almost exclusively a bycatch in the combined *Nephrops*-sole fishery. Historical information on discard ratio in SDs 20 and 21 (Skagerrak and Kattegat) is around 15–25% in weight.

Catch distribution Total landings (2011) = 1586 tonnes (87% active gears and 11% passive gears).

Quality considerations

This is the first year ICES presents advice for plaice in the Kattegat separate from the Skagerrak. Uncertainty in the catch-at-age information and inappropriate survey spatial coverage make it difficult to conduct a separate assessment for the local components in this area. This assessment is the first attempt to carry out an assessment on plaice in SDs 21–23. Therefore, it is to be considered as a premature assessment with room for improvements until the data foundation is more complete.

The methods applied to derive quantitative advice for data limited stocks are expected to evolve as they are further developed and validated.

Scientific basis

| | |
|-----------------------------|--|
| Assessment type | Age-based analytical assessment (SAM). |
| Input data | Four survey indices (IBTS Q1, IBTS Q3, KASU Q4, KASU Q1); |
| Discards and bycatch | Not included in the assessment yet, but some data are available. |
| Indicators | None. |
| Other information | Before 2012, advice was given for Division IIIa plaice; this advice is now split into plaice in Kattegat, Belts, and Sound and plaice in Skagerrak (Advice Section 6.4.6). |
| Working group report | WGNSSK , WKPESTO |

ECOREGION **Baltic Sea**
STOCK **Plaice in Subdivisions 21, 22 and 23 (Kattegat, Belts and Sound)**

Reference points

| | <i>Type</i> | <i>Value</i> | <i>Technical basis</i> |
|------------------------|--------------------------|--------------|---|
| MSY Approach | MSY B _{trigger} | Undefined. | |
| | F _{MSY} | 0.25 | F _{MSY} for neighbouring North Sea stock. Since selectivity in Kattegat is towards larger fish (discards are considerably lower) this proxy is considered conservative and in the range of other possible proxies. |
| Precautionary approach | Not defined | | |

(unchanged since: 2012)

Preliminary yield and spawning biomass per Recruit F-reference points:

| | Fish Mort Ages 3-5 | Yield/R | SSB/R |
|---------------------|-----------------------|---------|-------|
| F _{0.1} | 0.15 | 0.23 | 1.51 |
| F _{max} | 0.38 | 0.26 | 0.60 |
| F _{SPR30%} | 0.16 | 0.24 | 1.37 |

Outlook for 2013

Due to uncertainty in the assessment, reliable predictions cannot be presented.

ICES approach to data-limited stocks

For data-limited stocks with abundance and fishing mortality information, ICES uses as harvest control rule an index-adjusted *status quo* catch, further modified so as to reach the F_{MSY} proxy in 2015. The advice is based on a comparison of the two most recent biomass index values with the three preceding values, combined with recent catch or landings data, and subsequently multiplied by the appropriate ratio of values of F.

For this stock, the biomass is estimated to have increased by 42% in 2008–2010 (average of three years) and 2011–2012 (average of two years), whereas the current fishing mortality should be reduced by 18% in 2013 as a first step to reach the F_{MSY} proxy by 2015. Since the product of 1.42 and 0.82 is 1.16, this implies an increase in catches of 16% in relation to last three years' average landings, corresponding to catches of no more than 1800 t.

Additional considerations*Management considerations*

The flatfish benchmark group (ICES, 2010) recommended exploring the potential to perform an integrated assessment of the continuum of plaice stocks from the Baltic to the English Channel. ICES evaluated the stock identity of plaice in the Skagerrak and Kattegat (ICES, 2012a, 2012b), for which combined advice has been given until now. Adjacent waters, such as the North Sea in the West and the Belts and Sound in the East are taken into account, based on known migration of local components between their spawning and feeding grounds. Although work on stock identity is still under development, the collected information on biology and fishery of plaice in Division IIIa and adjacent waters is considered to imply changes in assessment units as well as in management areas. This assessment is the first attempt to carry out an assessment on plaice in SDs 21–23. Therefore, it is to be considered as a premature assessment with room for improvements until the data foundation is more complete.

Kattegat has different area names depending on the point of view. Seen from the Baltic the Kattegat is called "Subdivision 21", originally based on the area classification of the International Baltic Sea Fishery Commission. Seen from the Atlantic, however, Kattegat is classified as "Division IIIaS", based on the NEAFC system. In this assessment Kattegat is called SD 21 (Figure 8.4.11.2).

The surveys are not in full agreement, but they tend to indicate that there have been a number of large year classes over the period 2000–2006, but that the recent year classes have been lower.

The effects of regulations

Landings declined dramatically in the late seventies in the whole area. Implementation of a number of changes in the regulatory systems in the Kattegat between 2007 and 2008 as well as continuous reductions in the allowed days-at-sea to protect Kattegat cod have also significantly changed the fishing patterns of the Danish and Swedish fleets since the early 2000s. In SD 23 (the Sound) catches have been low over the whole period.

TACs are set for Kattegat separately, based on a combined advice for Kattegat and Skagerrak. There is a single TAC for plaice in the whole Baltic area SDs 22–32.

Uncertainties in assessment and forecast

Due to time constraints, only biological information from Denmark was made available for SDs 22 and 23 and it was therefore applied to both Swedish and German landings. No discard information was readily available this year, but will be available in the future.

The surveys are not in full agreement, but they tend to indicate that there have been a number of large year classes over the period 2000–2006, but that the recent year classes have been lower.

Comparison with previous assessment and advice

The stock structure of plaice in the Skagerrak and Kattegat area is revised (ICES, 2012b). This is the first time an assessment is produced for plaice in the Kattegat, Sound, and Belts. The assessment is based on an exploratory assessment.

Last year, the advice was based on precautionary considerations to reduce catches of plaice in the Skagerrak and Kattegat. This year the advice is based on ICES approach to data-limited stocks for Skagerrak separately.

Assessment and management area

The stock is managed by a TAC for Division IIIaEast (Kattegat), and a TAC for plaice in the Baltic (SDs 22–32). The advice is valid for Kattegat, the Sound, and the Belts.

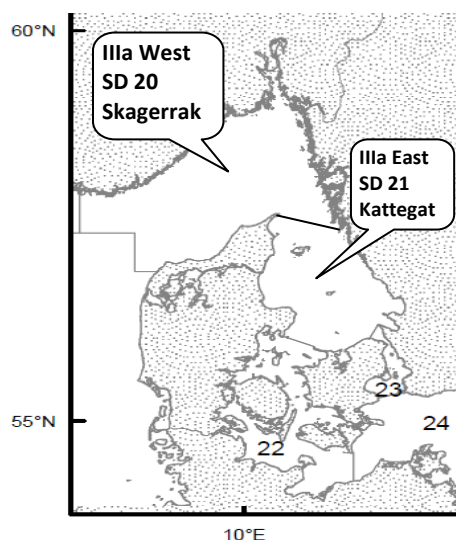


Figure 8.4.11.2 Plaice in the Skagerrak and Kattegat. Subareas in the region.

Sources

- ICES. 2010. Report of the Benchmark Workshop on Flatfish (WKFLAT), 25 February–4 March 2010, Copenhagen, Denmark. ICES CM 2010/ACOM:37.
- ICES. 2012a. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), 27 April–3 May 2012. ICES CM 2012/ACOM:13.
- ICES. 2012b. Report of the Workshop on the Evaluation of Plaice Stocks (WKPESTO). 28 February–1 March 2012, ICES Headquarters, Copenhagen. ICES CM 2012/ACOM:32.

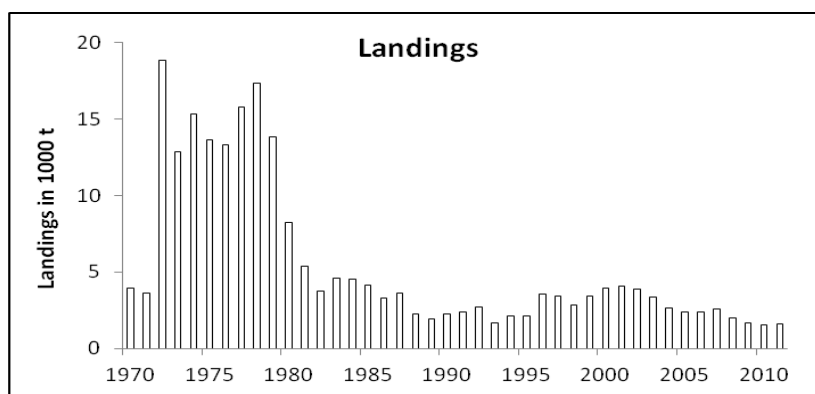


Figure 8.4.11.3 Plaice in Subdivisions 21, 22, and 23 (Kattegat, Belts, and Sound). ICES estimates of landings (full time-series, the exploratory assessment starts in 1999).

Table 8.4.11.1 Plaice in Subdivisions 21, 22, and 23 (Kattegat, Belts, and Sound). ICES advice, management, and landings. **NB up until 2012, advice was given for Skagerrak and Kattegat combined.**

| Year | ICES Advice | Predicted catch corresp. to advice Kattegat, Belts, and Sound | Predicted catch corresp. to advice for Skagerrak and Kattegat combined | TAC Kattegat (SD 21) | TAC Baltic Sea (SDs 22–32) | ICES landings |
|------|--|---|--|----------------------|----------------------------|---------------|
| 1992 | TAC | | 14.0 | 2.8 | | 2.7 |
| 1993 | Precautionary TAC | | - | 2.8 | | 1.7 |
| 1994 | If required, precautionary TAC | | - | 2.8 | | 2.1 |
| 1995 | If required, precautionary TAC | | - | 2.8 | | 2.1 |
| 1996 | If required, precautionary TAC | | - | 2.8 | | 3.5 |
| 1997 | No advice | | - | 2.8 | | 3.4 |
| 1998 | No increase in F from the present level | | 11.9 | 2.8 | | 2.9 |
| 1999 | No increase in F from the present level | | 11.0 | 2.8 | | 3.4 |
| 2000 | $F < F_{pa}$ | | 11.8 | 2.8 | | 3.9 |
| 2001 | $F < F_{pa}$ | | 9.4 | 2.35 | | 4.1 |
| 2002 | $F < F_{pa}$ | | 8.5 ¹ | 1.6 ² | | 3.9 |
| 2003 | $F < F_{pa}$ | | 18.4 | 3.0 | | 3.4 |
| 2004 | $F < F_{pa}$ ³ | | ³ | 1.8 | | 2.6 |
| 2005 | $F < F_{pa}$ | | < 9.5 | 1.9 | | 2.4 |
| 2006 | No increase in F | | < 9.6 | 1.9 | | 2.4 |
| 2007 | Maintain current TAC | | < 9.6 | 2.1 | | 2.6 |
| 2008 | No increase in catch | | < 9.4 | 2.3 | | 2.0 |
| 2009 | Same advice as last year | | < 9.4 | 2.3 | | 1.7 |
| 2010 | Same advice as last year | | < 9.4 | 2.3 | | 1.5 |
| 2011 | Last three years average landings (2007–2009) | | < 8.0 | 2.0 | 3.041 | 1.6 |
| 2012 | Reduce catch | | - | | 2.889 | |
| 2013 | Increase catch by 16%, transition to F_{MSY} proxy for data-limited stocks by 2015 | < 1.8 | | | | |

Weights in thousand tonnes.

¹⁾ In March 2002 ACFM revised its advice to 11.6 for both areas combined.

²⁾ The TAC for the two areas combined was adjusted to 11 200 tonnes in mid-2002.

³⁾ The exploitation of this stock should be conducted in the context of mixed fisheries.

Table 8.4.11.2 Plaice in Subdivisions 21, 22, and 23 (Kattegat, Belts, and Sound). ICES estimates of landings by country in tonnes.

| Year/SD | Denmark | Germany | Sweden | Denmark | Germany | Sweden | Sweden | Denmark | Total |
|-------------------|---------|---------|--------|---------|---------|--------|--------|---------|-------|
| | 21 | 21 | 21 | 22 | 22 | 22 | 23 | 23 | 21-23 |
| 1970 | | | | 3 757 | 202 | | | | 3959 |
| 1971 | | | | 3 435 | 160 | | | | 3595 |
| 1972 | 15 504 | 77 | 348 | 2 726 | 154 | | | | 18809 |
| 1973 | 10 021 | 48 | 231 | 2 399 | 165 | | | | 12864 |
| 1974 | 11 401 | 52 | 255 | 3 440 | 202 | | | | 15350 |
| 1975 | 10 158 | 39 | 296 | 2 814 | 313 | | | | 13620 |
| 1976 | 9 487 | 32 | 177 | 3 328 | 313 | | | | 13337 |
| 1977 | 11 611 | 32 | 300 | 3 452 | 353 | | | | 15748 |
| 1978 | 12 685 | 100 | 312 | 3 848 | 379 | | | | 17324 |
| 1979 | 9 721 | 38 | 333 | 3 554 | 205 | | | | 13851 |
| 1980 | 5 582 | 40 | 313 | 2 216 | 89 | | | | 8240 |
| 1981 | 3 803 | 42 | 256 | 1 193 | 80 | | | | 5374 |
| 1982 | 2 717 | 19 | 238 | 716 | 45 | | | | 3735 |
| 1983 | 3 280 | 36 | 334 | 901 | 42 | | | | 4593 |
| 1984 | 3 252 | 31 | 388 | 803 | 30 | | | | 4504 |
| 1985 | 2 979 | 4 | 403 | 648 | 94 | | | | 4128 |
| 1986 | 2 470 | 2 | 202 | 570 | 59 | | | | 3303 |
| 1987 | 2 846 | 3 | 307 | 414 | 18 | | | | 3588 |
| 1988 | 1 820 | 0 | 210 | 234 | 10 | | | | 2274 |
| 1989 | 1 609 | 0 | 135 | 167 | 7 | | | | 1918 |
| 1990 | 1 830 | 2 | 202 | 236 | 9 | | | | 2279 |
| 1991 | 1 737 | 19 | 265 | 328 | 15 | | | | 2364 |
| 1992 | 2 068 | 101 | 208 | 316 | 11 | | | | 2704 |
| 1993 | 1 294 | 0 | 175 | 171 | 16 | | 2 | | 1658 |
| 1994 | 1 547 | 0 | 227 | 355 | 1 | | 6 | | 2136 |
| 1995 | 1 254 | 0 | 133 | 601 | 75 | | 12 | 64 | 2139 |
| 1996 | 2 337 | 0 | 205 | 859 | 43 | 1 | 13 | 81 | 3539 |
| 1997 | 2 198 | 25 | 255 | 902 | 51 | | 13 | | 3444 |
| 1998 | 1 786 | 10 | 185 | 642 | 213 | | 13 | | 2849 |
| 1999 | 1 510 | 20 | 161 | 1 456 | 244 | 1 | 13 | | 3405 |
| 2000 | 1 644 | 10 | 184 | 1 932 | 140 | | 26 | | 3936 |
| 2001 | 2 069 | | 260 | 1 627 | 58 | | 39 | | 4053 |
| 2002 | 1 806 | 26 | 198 | 1 759 | 46 | | 42 | | 3877 |
| 2003 | 2 037 | 6 | 253 | 1024 | 35 | 0 | 26 | | 3381 |
| 2004 | 1 395 | 77 | 137 | 911 | 60 | | 35 | | 2615 |
| 2005 | 1 104 | 47 | 100 | 908 | 51 | | 35 | 145 | 2390 |
| 2006 | 1 355 | 20 | 175 | 600 | 46 | | 39 | 166 | 2401 |
| 2007 | 1 198 | 10 | 172 | 894 | 63 | | 69 | 193 | 2599 |
| 2008 | 866 | 6 | 136 | 750 | 92 | 0 | 45 | 116 | 2011 |
| 2009 | 570 | 5 | 84 | 633 | 194 | 0 | 42 | 139 | 1668 |
| 2010 | 428 | 3 | 66 | 748 | 221 | 0 | 17 | 57 | 1541 |
| 2011 ¹ | 328 | 0 | 40 | 851 | 310 | | 11 | 46 | 1586 |

Table 8.4.11.3 Plaice in Subdivisions 21, 22, and 23 (Kattegat, Belts, and Sound). Summary of the assessment: Estimated recruitment (in thousands), total stock biomass (TBS), spawning-stock biomass (SSB), and average fishing mortality for ages 3 to 5 (F3–5). (weights in tonnes). Low = 5% confidence limit, High = 95% confidence limit.

| Year | Recruits | Low | High | TBS | Low | High | SSB | Low | High | F35 | Low | High |
|------|----------|-------|-------|------|------|------|------|------|------|-------|-------|-------|
| 1999 | 26903 | 17917 | 40396 | 2990 | 2199 | 4065 | 2063 | 1487 | 2862 | 0.774 | 0.515 | 1.165 |
| 2000 | 22516 | 15312 | 33110 | 3899 | 2914 | 5219 | 2593 | 1949 | 3448 | 0.744 | 0.536 | 1.033 |
| 2001 | 11986 | 7983 | 17997 | 6272 | 4595 | 8562 | 4468 | 3271 | 6102 | 0.761 | 0.559 | 1.035 |
| 2002 | 15670 | 10624 | 23113 | 5334 | 3968 | 7170 | 4088 | 3025 | 5523 | 0.734 | 0.547 | 0.984 |
| 2003 | 12328 | 8319 | 18268 | 5696 | 4304 | 7538 | 4378 | 3295 | 5818 | 0.644 | 0.469 | 0.884 |
| 2004 | 15183 | 10093 | 22838 | 5326 | 4046 | 7010 | 4238 | 3207 | 5599 | 0.562 | 0.388 | 0.814 |
| 2005 | 12944 | 8619 | 19439 | 5681 | 4245 | 7602 | 4446 | 3313 | 5966 | 0.723 | 0.507 | 1.033 |
| 2006 | 10515 | 7175 | 15410 | 5293 | 3987 | 7026 | 4185 | 3151 | 5559 | 0.683 | 0.486 | 0.96 |
| 2007 | 8505 | 5836 | 12395 | 4732 | 3479 | 6437 | 3809 | 2785 | 5211 | 0.91 | 0.665 | 1.247 |
| 2008 | 7672 | 5081 | 11584 | 3595 | 2718 | 4757 | 2911 | 2188 | 3873 | 0.853 | 0.611 | 1.19 |
| 2009 | 8101 | 5021 | 13070 | 2994 | 2295 | 3905 | 2402 | 1835 | 3144 | 0.475 | 0.307 | 0.736 |
| 2010 | 11126 | 6144 | 20145 | 3551 | 2655 | 4750 | 2824 | 2112 | 3776 | 0.334 | 0.202 | 0.553 |
| 2011 | 11830 | 5537 | 25278 | 4288 | 3042 | 6044 | 3423 | 2435 | 4811 | 0.275 | 0.148 | 0.509 |
| 2012 | | | | 5276 | 3450 | 8068 | 4277 | 2817 | 6493 | | | |