ECOREGION **North Sea**
STOCK **Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and IIIa West (Skagerrak)**

Advice summary for 2011

Management Objective (s)	**Landings in 2011**
Transition to an **MSY approach** with caution at low stock size	5700 t to 40 900 t for transition to the MSY framework by 2011 to 2015, respectively.
Cautiously avoid impaired recruitment (**Precautionary Approach**)	Zero
Cautiously avoid impaired recruitment and achieve other objective(s) of a **management plan** (e.g., catch stability)	32 240 t

Stock status

Fishing mortality	2007	2008	2009
F_{MSY}	Above	Above	Above
F_{PA}/F_{lim}	Between	Between	Between
Spawning Stock Biomass (SSB)	2008	2009	2010
MSY $B_{trigger}$	Below	Below	Below
B_{PA}/B_{lim}	Below	Below	Below

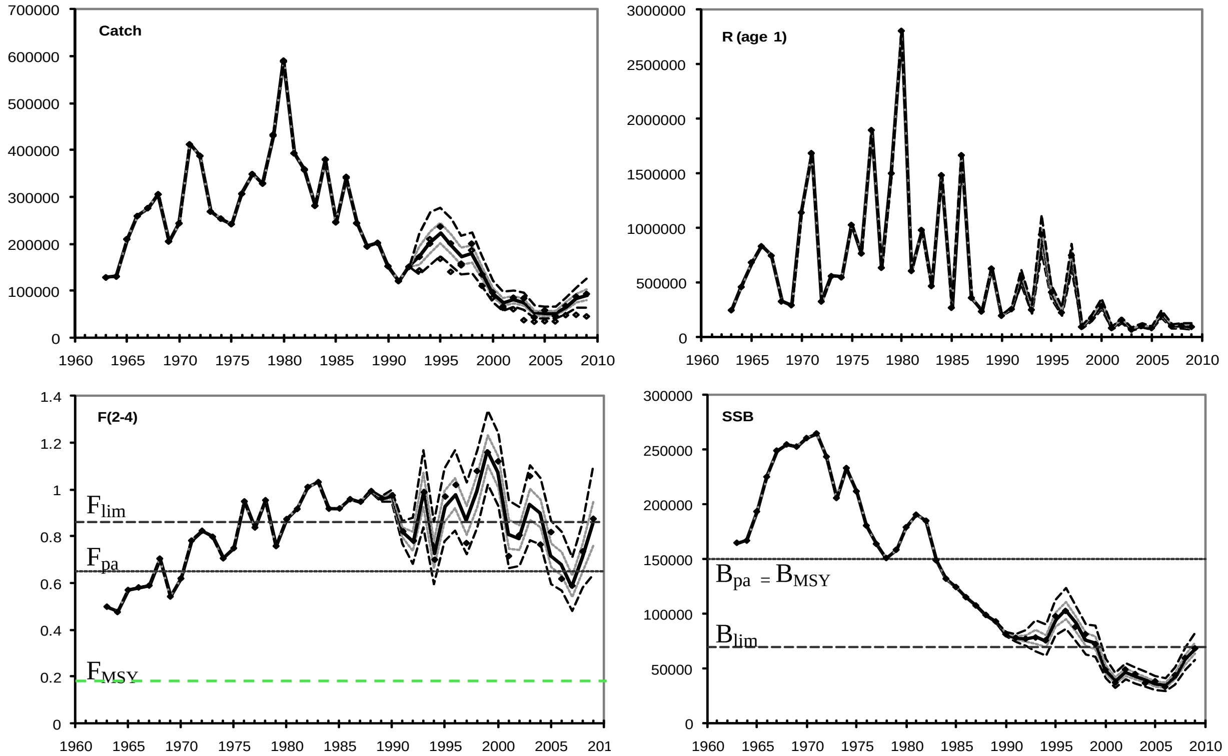

Figure 6.4.2.1 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and IIIa West (Skagerrak). Summary of stock assessment with percentiles (5,25,75,95), catch recorded and estimated (from 1993), weights in tonnes.

SSB has increased since its historical low in 2006, but remains below B_{lim}. Fishing mortality declined after 2000, and although its most recent trajectory is considered uncertain, it is estimated to be well above the long-term objectives of maximum yield, and likely above F_{pa}. Recruitment since 2000 is poor, The assessment this year is considered more uncertain than the assessment conducted last year.

Management plans

The EU–Norway agreement management plan as updated in December 2008 (Annex 6.4.2). The EU has adopted a long-term plan for this stock with the same aims (Council Regulation (EC) 1342/2008). ICES evaluated both plans in 2009 and concludes they are in accordance with the precautionary approach if implemented and enforced adequately.

Biology

Cod are widely distributed throughout the North Sea. Scientific survey data indicate that historically, young fish (ages 1 and 2) have been found in large numbers in the southern part of the North Sea. Adult fish have in the past been concentrated in the Southern Bight, the north east coast of England, in the German Bight, the east coast of Scotland and in the north-eastern North Sea. As stock abundance fluctuates, these groupings appear to be relatively discrete but the area occupied has contracted. During recent years, the highest densities of 3+ cod have been observed in the deeper waters of the central to northern North Sea.

Environmental influence on the stock

There is a negative effect of increasing temperatures on cod recruitment in the North Sea. The exact processes are still unknown and explanations range from changes in the availability of food resources for cod larvae to increasing predation pressure caused by high grey gurnard abundances. Age 1 and older cod are influenced by cannibalism and seal predation. Multi species model runs estimate a decrease in cannibalism rates for age 1 and age 2 cod at current low stock levels, while seal predation on ages 3 to 6 has increased over the years due to an increase in seal abundance.

The fisheries

Cod are taken by towed gears in mixed demersal fisheries. Haddock is a specific target for some fleets, but is also caught as part of a mixed fishery catching haddock, whiting, *Nephrops*, plaice and sole. The meshsize for targeted fisheries was increased to 120 mm in 2002.

Catch by fleet	Total catch (2009) is unknown, 30.8 kt recorded landings, 14.6 kt recorded discards. Unaccounted removals are estimated between 40% and 100% of recorded catch

Effects of the fisheries on the ecosystem

Gillnet fishery for cod results in a substantial bycatch of harbour porpoise. In 2001 the total bycatch in the cod fishery was around 2000 porpoises. Since 2001, effort reductions in this fishery have likely led to decreased bycatches of porpoises. The effect of otter trawling on the benthic invertebrate community in the northern North Sea is estimated to represent an annual mortality of approximately 25% of the standing-crop biomass.

Quality considerations

There are conflicting trends from the IBTS Q1 and Q3 indices used in the assessment. The comparison of the outcomes of two independent assessment methods suggests that the long-term trends are well captured in the present assessment, Discards account for 30–50% of the total catch (2007–2009). Discards are estimated from relatively few numbers compared to landings. Raised discard information was not available for Dutch, French and Belgian fleets, respectively accounting for 10%, 6% and 4% of cod landings in 2009. These are sources of added uncertainty in the assessment.

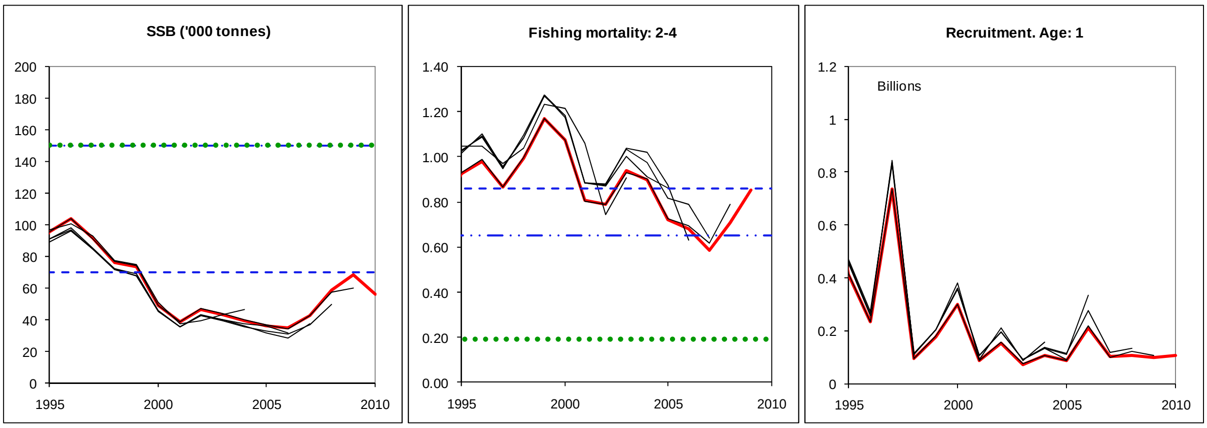

Figure 6.4.2.2 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and IIIa West (Skagerrak). Historical assessment results (final year recruitment estimates included).

Scientific basis

Assessment type	Age-based assessment model with estimates of unaccounted removals (B-ADAPT) A state-space model with estimates of unaccounted removals (SAM) used as comparison
Input data	Two survey indices (from IBTS Q1 and IBTS Q3 surveys)
Discards and by-catch	Included in the assessment (since 2004)
Indicators	None
Other information	Latest benchmark was performed in 2009
Working group report	WGNSSK

ECOREGION North Sea
STOCK Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and IIIa West (Skagerrak)

Reference points

	Type	*Value*	*Technical basis*
MSY Approach	MSY $B_{trigger}$	150 000 t	The default option of $\mathbf{B}_{pa}$
	F_{MSY}	0.19	Provisional proxy is F_{max} 2010, within the range of Fishing mortalities consistent with F_{MSY} (0.16 - 0.42)
Precautionary approach	B_{lim}	70 000 t	$\mathbf{B}_{loss}$ **(~1995)**
	B_{pa}	150 000 t	$\mathbf{B}_{pa}$ = Previous MBAL and signs of impaired recruitment below 150 000 t.
	F_{lim}	0.86	$\mathbf{F}_{lim}$ = $\mathbf{F}_{loss}$ (~1995)
	F_{pa}	0.65	$\mathbf{F}_{pa}$ = Approx. 5th percentile of $\mathbf{F}_{loss}$, implying an equilibrium biomass > $\mathbf{B}_{pa}$.

(unchanged since: 2010)

Yield and spawning biomass per Recruit F-reference points (2010):

	Fish Mort Ages 2-4	Yield/R	SSB/R
Average last 3 years	0.70	0.34	0.45
$\mathbf{F}_{max}$	0.19	0.62	3.36
$\mathbf{F}_{0.1}$	0.13	0.59	4.73
$\mathbf{F}_{med}$	0.84	0.28	0.30

Outlook for 2011

Basis: Management plan assumption F (2010) = mean (F2007-2009) rescaled to F2009 *0.87 = 0.74; Recruitment (2010) Resampled 1998-2009 bootstraped = 107 mln ; SSB (2011) = 54.3; HC landings (2010) = 48.1; Discards (2010) = 25.2;

Rationale	Landings (2011) [1)]	Basis	F total (2011)	F land (2011)	F disc (2011)	Discards (2011)	SSB (2012)	%SSB Change[2)]	%TAC Change[3)]
Management Plan	32.2	F_{08}*0.55 with TAC constraint	0.44	0.28	0.17	17.7	72.0	32%	-20%

Basis: F (2010) = mean (F2007-2009) rescaled to F2009 = 0.85; Recruitment (2010) Resampled 1998-2009 bootstraped = 107 mln; SSB (2011) = 49.2; HC landings (2010) = 52.9; Discards (2010) = 27.8

Rationale	Landings (2011) [1)]	Basis	F total (2011)	F land (2011)	F disc (2011)	Discards (2011)	SSB (2012)	%SSB Change[2)]	%TAC Change[3)]
MSY framework	5.7	F_{MSY} *SSB(2011)/$B_{trigger}$	0.07	0.04	0.03	3.1	93.4	90%	-86%
MSY transition scheme	40.9	Fpa	0.65	0.41	0.24	23.3	53.9	10%	+1%
Management Plan	32.2	F_{08}*0.55 with TAC constraint, F_{2010}=F_{sq}	0.48	0.30	0.18	18.2	62.9	29%	-20%
Zero Catch	0.0	F=0	0.00	0.00	0.00	0.0	100.0	103%	-100%
Status quo	48.2	F_{sq}	0.85	0.53	0.32	28.0	45.1	-8%	20%
	14.5	F_{MSY}	0.19	0.12	0.07	8.0	83.3	69%	-64%

Units: '000 tonnes.
1) Landings are assumed to include unallocated removals other than the estimated discards. If unaccounted removals are expected to occur as estimated for 2009, then the total allowed landings for 2011 should be reduced accordingly by 50%.
2) SSB 2012 relative to SSB 2011.
3) Landings 2011 (including unallocated removals) relative to TAC 2010.

MSY approach

Following the ICES MSY framework implies fishing mortality to be reduced to 0.07 (lower than F_{MSY} because SSB 2011 < MSY $B_{trigger}$), resulting in landings *including unallocated removals* of less than 5700 t in 2011. This is expected to lead to an SSB of 93 400 t in 2012.

Following the transition scheme towards the ICES MSY framework implies fishing mortality to be reduced to ((0.8*0.85) + (0.2*(0.19*0.33))) = 0.69, but as this is higher than F_{pa}, this is maximised at 0.65. This results in landings *including unallocated removals* of less than 40 900 t in 2011. This is expected to lead to an SSB of 53 900 t in 2012.

The stock is below B_{lim} and recruitment is poor. Therefore, a more rapid transition to the MSY framework may be necessary to rectify the situation. ICES highlights catch options for transition periods ranging from 1–5 years (2011 to 2015, respectively).

PA approach

Even a zero catch in 2011 is not expected to result in SSB reaching B_{pa} in 2012.

Management plan

The EU–Norway agreement management plan as updated in December 2008 aims to be consistent with the precautionary approach and is intended to provide for sustainable fisheries and high yield leading to a target fishing mortality to 0.4. (for details see Annex 6.4.2).

The EU has adopted a long-term plan for this stock with the same aims (Council Regulation (EC) 1342/2008). In addition to the EU-Norway agreement the EU plan also includes effort restrictions reducing kw-days available to community vessels in the main metiers catching cod in direct proportion to reductions in fishing mortality until the target F of 0.4 has been reached. This implies a 13.3% reduction in effort in 2010.

In both plans fishing mortality should be reduced to levels corresponding to75% of F2008 in 2009 and 65% of F2008 in 2010. As long as the long-term phase of the management plans is not reached, in subsequent years further successive reductions of 10% have to be applied leading to a F in 2011 equal to 55% of F2008. This would lead to a TAC reduction of more than 20%. The management plans limits annual TAC variation to 20%. According to these rules, landings should be 32 240 tonnes in total for Subarea IV and Divisions IIIa West and VIId in 2011.

In spite of uncertainty in the assessment, all models and scenarios suggest that the management objectives in terms of reduction of fishing mortality specified in the LTMP cannot be achieved in 2011 unless catches are reduced beyond the 20% limit on inter-annual variability.

Additional considerations

Uncertainty in the assessment

The status of the stock cannot be estimated with certainty. There are conflicting signals from the IBTS Q1 and Q3 surveys used in the assessment. Two alternative assessment methods (B-Adapt and SAM models) using the same set of input data provide similar perception of the stock in the most recent year, but differ in the perception of the unallocated removals (Figure 6.4.2.7**)** varying between a factor 1.4 and 2.0 Both methods conclude that SSB in 2009 is still below B_{lim} and F is still largely above any management target, indicating that the LTMP objective of reducing fishing mortality by 25% in 2009 compared to 2008 has likely not been achieved.

MSY reference points

The choice of the proxy F_{max} as a provisional candidate for F_{MSY} was based on the clear peak at F= 0.19 in the yield per recruit analysis. Extensive simulations and investigations of the productivity of the stock provide a range of possible candidate values (F_{MSY} = 0.16 to 0.42). The estimate of F_{MSY} is strongly dependent on the choice of stock-recruitment (S-R) model. Whilst the statistical fit varies with choice of S-R model, none of the S-R models explored for North Sea cod have a strong correlation between SSB and recruitment. Both the Ricker and the Beverton and Holt models peak beyond the highest observed SSB in the time series. The F_{MSY} value from the Ricker model estimates a B_{MSY} that is 20 times greater than the highest observed in the time series, and the Beverton and Holt estimates B_{MSY} 200 times higher. These results suggest that neither model is appropriate to estimate F_{MSY}. The segmented regression S-R model results in a B_{MSY} that is around 10 times higher than ever observed and an F_{MSY} of 0.19, similar to F_{max}.

Based on these observations, F_{max} is judged to be the most appropriate candidate for a provisional F_{MSY}.

Management considerations

Although the most recent levels of SSB and fishing mortality are considered uncertain, fishing mortality rates have been reduced after 2000 and in combination with the 2005 year class, the stock has increased since 2006. The low average age of the spawning stock reduces its reproductive capacity as first-time spawners reproduce less successfully than older fish, a factor that has contributed to the continued low recruitment.

Mixed-fisheries considerations are of primary importance for the management of North Sea cod. ICES (2009a, b) quantitatively evaluated the consistency of the North Sea demersal single-stock exploitation boundaries in a mixed-fisheries and fleet-based perspective, and concluded that the single-stock management objectives for cod could not be achieved under the current management system. The mixed-fisheries projections underlined that large over quota catches would continue to occur, due to restrictive cod TAC compared to other stocks. Achieving cod management objectives would require significant decrease of the fishing mortality exerted by all demersal fisheries. This would correspond to substantial reduction in TAC advice for all demersal stocks, and subsequent adjustment of major components of the fishing effort.

Similar evaluations of the single-species advice will be conducted on a yearly basis.

ICES has observed that there have been considerable problems with the effectiveness of the cod recovery plans. Despite the objective to reduce fishing mortality and to increase the SSB by combined TAC control and effort management, estimated total catches have been much higher than intended. Fishing mortality has been reduced but has remained well above the implied targets. Discarding contributes about half of the total fishing mortality. Under the present implementation and enforcement approach, large reduction in F and the recovery of the stock are unlikely. It is therefore urgent to pursue and improve the actions towards implementation and enforcement in order to achieve reduction in F by effective control of cod catches. ICES notes that there have been considerable efforts to reduce discards by some countries, which have had an impact in reducing their discard rates, the impact these have had on the stock dynamics is difficult to evaluate yet.

Surveys indicate that the year classes are depleting faster than one would expect from the catches and point to unaccounted removals. There is no documented information on the source of these unaccounted removals; while it is assumed that these removals originate mostly from fishing activities, changes in natural mortality may also have an influence. Plausible fishery-based contributions to these unaccounted removals are discards (undersized cod, highgrading and over-quota catches) that do not count against quota, mis- and under-reporting of catches. The recorded landings from 2005–2009 fluctuated between 32% and 56% of the estimated total removals, indicating that the management system has not been effective in controlling the catches.

In the catch options the unallocated removals are assumed part of the estimates of fishing mortality. If unaccounted removals are expected to occur as estimated for 2009, then the total allowed landings for 2011 should be reduced accordingly by 50 %, which is the ratio between the sum of reported landings and estimated discard, and the total estimated removals. The unallocated removals in 2009 as estimated by the SAM model are lower than estimated by B-adapt. If the results from the SAM model are applied, the TAC for 2011 should be reduced by 30% to take unallocated removals into account.

Several nations, who make substantial landings of cod, have not supplied ICES with estimates of discards that can be used within the assessment process, despite the requirement to do so according to EU data collection regulations. In order to improve the quality of the assessment, and hence management advice, these nations should be encouraged to do so.

Cod catch in Division VIId was managed by a TAC for Divisions VIIb-k,VIII, IX, X, and CECAF 34.1.1, (i.e. the TAC covers a small proportion of the North Sea cod stock together with cod in Divisions VIIe-k). Division VIId was allocated a separate TAC from 2009 which is adjusted in line with the revision to the North Sea TAC.

Management plan evaluations

ICES has evaluated the EC management plan (EC 1342/2008 and Annex 6.4.2) and the EU-Norway agreed long term plan in March 2009 and concluded that this management plan is in accordance with the precautionary approach only if implemented and enforced adequately.

Regulations and their effects

Spatial management has been attempted for cod, both in the form of a closure of a large area of the North Sea in 2001 (Council Regulation (EC) 259/2001) and through implementation of a cod protection area in 2004 (EC 2287/2003). None of these measures appeared to have had the desired effect and both were abandoned shortly after implementation.

In 2001, cod in the whole of NEAFC region 2 was a legitimate target species for towed gears with a minimum codend mesh size of 100 mm. As part of the cod recovery measures, the EU and Norway introduced additional technical measures from 1 January 2002 (EC 2056/2001). The basic minimum mesh size for towed gears for cod, apart from some transitional arrangements, has been 120 mm from 2002. This resulted in a shift in effort towards smaller meshed fisheries.

Effort restrictions in the EC were introduced in 2003 (annual annexes to the TAC regulations) for the protection of the North Sea cod stock. In 2008, STECF indicated that overall effort (kW/days) by demersal trawls, seines and beam trawls had been substantially reduced since 2002. Fishing mortality declined between 2003 and 2007 concomitant with this effort reduction, but F increased again in 2008 despite a further nominal reduction in effort. Marked changes have also occurred in the use of the different mesh size categories by demersal trawlers. A sharp reduction has occurred in the use of mesh sizes between 100 mm and 119 mm, while a pronounced increase is apparent in the use of mesh sizes of 120 mm and greater. Furthermore, a general increase in effort has been observed in vessels using mesh sizes of 70–89 mm and 90–99 mm.

In 2009, the management program switched from a days at sea to a kW/day system (2009 Council Regulation (EC) N°43/2009), in which different amounts of kW/days are allocated within each area by Member State to different groups of vessels depending on gear and mesh size (see Section 1.2.1 for complete list). For 2010 Council Regulation (EC) N°53/2010 has updated Council Regulation (EC) N°43/2009 with new allocates, based on the same effort groups of vessels and areas as stipulated in Council Regulation (EC) N°43/2009.

Scotland implemented in February 2008 a national scheme known as the 'Conservation Credits Scheme'. The principle of this two-part scheme involves additional time at sea in return for the adoption of measures which aim to reduce mortality on cod and lead to a reduction in discard numbers. ICES has not yet been able to evaluate the consequences of these measures. ICES notes that during the initial year of operation (2008) cod discarding rates increased substantially to 62%. However, only 15 real-time closures were implemented in 2008 and involvement was voluntary. In 2009 there were 144 closures and involvement was mandatory for relevant Scottish vessels, and cod discarding rates have declined to 43%. Recent work tracking Scottish vessels in 2009 has concluded that vessels did indeed move from areas of higher to lower cod concentration following real-time closures during the first and third quarters (there was no significant effect during the second and fourth quarters). However, this is still a work in progress and further evaluation is required.

A rights-based regulation (FKA – Vessel Quota Share) was put in force in Denmark from the 1st January 2007. With the new system, individual vessels are allocated a yearly share of the Danish quota, which can be taken at any time of the year. There is also a possibility to trade it, exchange it, or pool it with other fishers. The old regulation had a system with 14-day quotas, which continuously adjusted to the amount of national quota left. The new system gives the industry a possibility to plan better and is expected to lead to a more efficient fishery with less discards. ICES has not yet been able to evaluate the consequences of these measures.

Changes in fishing technology and fishing patterns

ICES in 2009 (WGFTFB) note that the decline in fuel costs from 2008 to 2009 influenced the operational dynamics of some fleets that traditionally target mixed demersal species in the North Sea by lowering the costs associated with fishing in more distant areas. This has been further enhanced by the introduction of a more restrictive effort regime in IV, VIId and VIa and the absence of effort restrictions in other areas. These factors are thought to have contributed to a shift in effort away from IV towards fisheries in Rockall, the Celtic Sea and the Porcupine. The extent of the effort transfer cannot currently be quantified, but is likely to be significant and fishing patterns in 2009 may be very different to those observed in 2008.

The expected benefits from the increase in mesh size to 120 mm are not apparent from the available data. The effect of this increase is confounded by the transfer of effort from the fleets fishing with mesh sizes >120 mm to fleets fishing with mesh sizes between 70 and 99 mm, i.e. fishing for *Nephrops*. The regulation differentiated between the number of fishing days allowed when fishing for *Nephrops* or when fishing for other demersal species (>120 mm). Fishing for *Nephrops* with the smaller mesh allowed more days at sea than fishing with larger meshes.

The introduction of the one-net rule as part of the Scottish Conservation Credit Scheme is likely to improve the accuracy of reporting of metier-based landings. Scottish legislation implemented in January 2008, banning the use of multi-rigs (>2 rigs per trawl), could limit the potential of uncontrolled increase in effort.

A move from the Farn Deeps *Nephrops* fishery into other fisheries for whitefish because of poor *Nephrops* catch rates, implies increased effort in whitefish fisheries.

Environmental influence

The North Sea has seen a northerly shift in the mean latitudinal distribution of the stock. However, the evidence for this in the form of a migratory response is slight or non-existent. More likely, cod in the North Sea are composed of a complex of more or less isolated sub-stocks and the southern units have been subjected to disproportionately high rates of fishing mortality. The contracted range of the North Sea cod stock can be linked to reduced abundance as well as climate factors.

The consumption of cod in the North Sea in 2002 by grey seals has been estimated by Hammond and Grellier (2006). For the North Sea it was estimated that in 1985 grey seals consumed 4150 tonnes of cod (95% confidence intervals; 2484–5760 tonnes), and in 2002 the population tripled in size (21 000–68 000 individuals) and consumed 8344 tonnes (95% confidence intervals; 5028–14 941 tonnes). Inclusion of the new grey seal diet data and seal population abundance are expected to reduce slightly the historic estimates of cod consumption in the North Sea by seals, generated from a multispecies model previously used. This suggests that the new estimates of seal predation will not alter the current perception of North Sea cod stock dynamics.

Data and methods

The age-based assessment model (B-ADAPT) used landings and discards, calibrated with two survey indices (from IBTS quarter 1 and quarter 3 surveys). For ICES Subarea IV and Division VIId, discards were estimated from the Scottish discards sampling programme up until 2005 and raised to the total international fleet. For 2006 Denmark provided its own discard estimates. For 2007 to 2009 Scottish, Danish, German, and England and Wales discard estimates were combined and used to raise landings-at-age for remaining nations in Subarea IV. Discards in Division IIIa were based on observer estimates. For 2006–2009, Danish and Swedish discard estimates were combined to raise landings-at-age from the remaining nations in Division IIIa. The same input data are used in the alternative SAM model.

In 2009 Norway did not conduct its contribution to the IBTS quarter 3 survey. This results in substantial changes to the indices used for the assessment. The WGNSSK 2010 carried out some sensitivity analyses on the impact of this issue on assessment results; and further investigations will be conducted before the next meeting in 2011.

Information from the fishing industry

Comparison between the fishers North Sea Stock Survey (Napier, 2010) and the IBTS survey data has been shown in previous years the time series are broadly in agreement in recording a stable overall stock abundance until 2003 - 2005 followed by an increase more recently. The IBTS surveys have more variability, due to the inherent spatial variation, but exhibit similar trends in the same areas as the fishers survey, with significant increases in the north and west although less so in the south.

The majority of the Fishers stock survey respondents reported increased abundance (of all sizes) in 2009 especially in the northern and southern areas where catches of large size cod were reported. The main reports of catches of ‘mostly small’ cod were from the central North Sea. Reports on trends in discarding rates were mixed, with 43% of respondents reported ‘no change’ in 2009; 22% reported ‘less’ and 36% reported ‘more’ discarding (in the northern, eastern and southern North Sea).

In May 2008, French fishers targeting cuttlefish in the eastern Channel reported discards of several tonnes per haul of undersized cod in ICES rectangle 28F0, forcing them to leave their usual cuttlefish fishing area. They reported that this also occurred in 2007. Data collected in the Channel by French fishers and submitted to the ICES WGNSSK in 2009 indicate high rates of discards for lengths between 37 and 48cm (ages 2 and 3), confirming the information from previous years and indicate recent improved recruitment and survivorship in the southern North Sea and VIId.

Both the Danish REX and UK northeast coast cod surveys (collaborative research projects with the fishing industry) indicate that catch rates of cod are significantly greater on the hard ground compared to the soft ground. The Danish REX survey also indicates much higher catch rates of cod in the 1st quarter compared to the 3rd quarter for a trawler and flyshooter, but not for a gillnetter, possibly explained by the high water turbidity caused by the more frequent storm events in the 1st quarter (the gillnetter is not affected by this to the same extent as the other two vessels). A newly initiated UK whitefish survey indicates that catches of older cod are more frequent and less noisy in this survey than in the IBTS Q3 survey. This is supported by results from the Danish REX survey which shows good agreement with the IBTS Q3 survey for younger ages, but not for older ages.

Comparison with previous assessment and advice:

The assessment updated according to the benchmark procedure is considered more uncertain than last year, in particular for the estimation of the most recent year. This is due in particular to conflicting signals between the survey indices used in the assessment. The assessment is informative of general status of the stock with regards to reference points. This is corroborated by the comparison with an alternative assessment method. Additional work will be conducted to investigate further the issues encountered during WGNSSK 2010 and address the before the next WG meeting. Last year´s advice was based on the management plan. The basis for the advice is similar to last year, but extended by MSY considerations.

Sources

ICES. 2010. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, 5-11 May 2010 ICES CM 2010/ACOM13.

Napier, I. R. 2010. Fishers' North Sea stock survey 2009. NAFC Marine Centre, Shetland, Scotland.

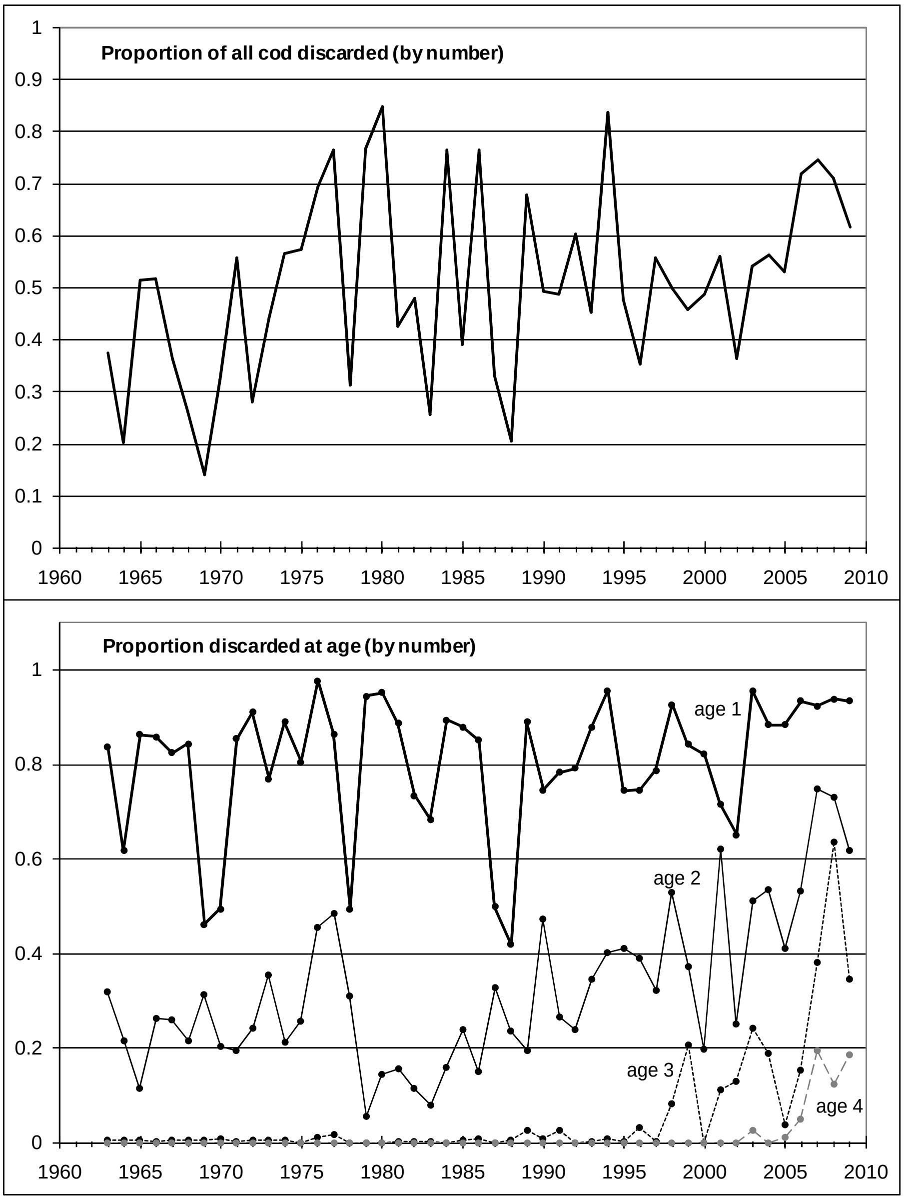

Figure 6.4.2.3 Cod in Subarea IV and Divisions IIIa (Skagerrak) and VIId: Proportion of total numbers caught that are discarded in total and at age. In 2009, 93% of 1 year old, 62% of 2 year old, 34% of 3 year old and 18% of 4 year old cod (the abundant 2005 year class), were discarded.

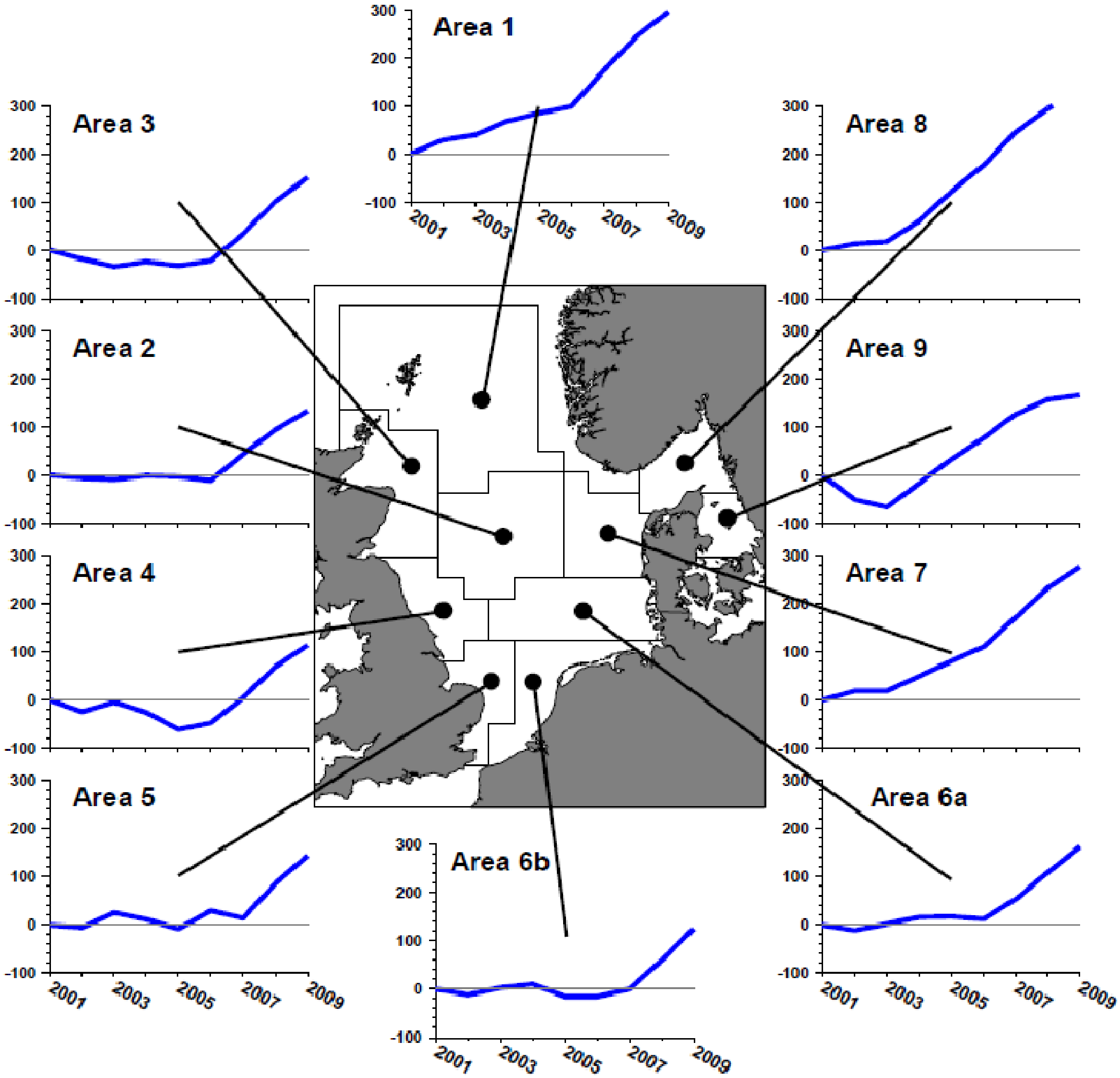

Figure 6.4.2.4 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak). Results of the North Sea Commission fishers' survey 2009.

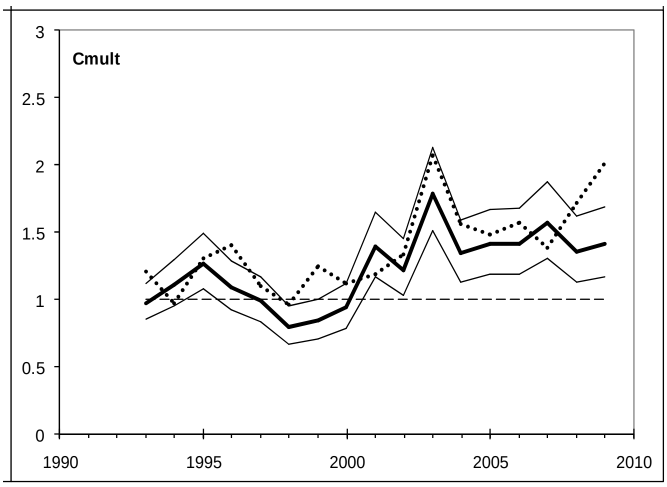

Figure 6.4.2.5 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak). Estimates of factor for unallocated removals from B-Adapt (dotted line) and SAM (bold line with 95% confidence limits)

Table 6.4.2.1 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak). ICES advice, management, and catch/landings. Landings for each of the three parts of this combined-area assessment, and for all areas combined are given in Table 6.4.2.2.

North Sea (Subarea IV)

Year	ICES Advice	Predicted catch corresponding to advice	Agreed TAC	Official landings	ICES landings
1987	SSB recovery; TAC	100–125	175	167	182
1988	70% of F(86); TAC	148	160	142	157
1989	Halt SSB decline; protect juveniles; TAC	124	124	110	116
1990	80% of F (88); TAC	113	105	99	105
1991	70% of effort (89)		100	87	89
1992	70% of effort (89)		100	98	97
1993	70% of effort (89)		101	94	105
1994	Significant effort reduction		102	87	95
1995	Significant effort reduction		120	112	120
1996	80% of F(94) = 0.7	141	130	104	107
1997	80% of F(95) = 0.65	135	115	100	102
1998	F(98) should not exceed F(96)	153	140	114	122
1999	F = 0.60 to rebuild SSB	125	132	80	78
2000	F less than 0.55	< 79	81	62	59
2001	lowest possible catch	0	48.6	42.3	41
2002	lowest possible catch	0	49.3	44.2	44.3
2003	Closure	0	27.3	27.4	NA
2004	Zero catch	0	27.3	23.4	NA
2005	Zero catch	0	27.3	23.9	NA
2006	Zero catch	0	23.2	22.2	NA
2007	Zero catch	0	20.0	19.7	NA
2008	Exploitation boundaries in relation to precautionary limits Total removals < 22 000 t	< 22	22.2	22.2	NA
2009	Zero catch	0	28.8	25.7	NA
2010	Management plan F (65% of F2008)	< 40.3[1)]	33.6		
2011	See scenarios	-			

Weights in '000 t.

[1)] For Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak)

Table 6.4.2.1 Continued

Skagerrak (Division IIIa)

Year	ICES Advice	Predicted catch corresponding to advice	Agreed TAC[1]	Official landings	ICES landings[1]
1987	$F = F_{max}$	<21	22.5	19.9	20.9
1988	Reduce F		21.5	17.0	16.9
1989	F at F_{med}	<23	20.5	18.7	19.6
1990	F at F_{med}; TAC	21.0	21.0	17.8	18.6
1991	TAC	15.0	15.0	12.1	12.4
1992	70% of F(90)		15.0	14.0	14.8
1993	Precautionary TAC		15.0	14.7	15.3
1994	No long-term gain in increased F + precautionary TAC		15.5	13.3	13.9
1995	If required precautionary TAC; link to North Sea		20.0	12.1	12.1
1996	If required precautionary TAC; link to North Sea		23.0	16.2	16.4
1997	If required precautionary TAC; link to North Sea		16.1	14.9	14.9
1998	If required precautionary TAC; link to North Sea	21.9	20.0	15.3	15.3
1999	F = 0.60 to rebuild SSB	17.9	19.0	11.0	11.0
2000	F less than 0.55	<11.3	11.6	9.3	9.3
2001	lowest possible catch	0	7.0	7.1	7.1
2002	lowest possible catch	0	7.1	7.5	7.5
2003	Closure	0	3.9	3.8	NA
2004	Zero catch	0	3.9	3.8	NA
2005	Zero catch	0	3.9	3.8	NA
2006	Zero catch	0	3.3	3.4	NA
2007	Zero catch	0	2.9	2.9	NA
2008	Exploitation boundaries in relation to precautionary limits Total removals less than 22 000 t	< 22	3.2	3.3	NA
2009	Zero catch	0	4.1	3.9	NA
2010	Management plan F (65% of F2008)	< 40.3[2)]	4.8		
2011	See scenarios	-			

Weights in ‘000 t.
[1)] Norwegian fjords not included.
[2)] For Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak)

Table 6.4.2.1 Continued

Eastern Channel (Division VIId)

Year	ICES Advice	Predicted catch corresponding to advice	Agreed TAC [1]	Official landings	ICES landings
1987	Not assessed	-	-	9.4	14.2
1988	Precautionary TAC	-	-	10.1	10.7
1989	No increase in F; TAC	10.0 [2]	-	n/a	5.5
1990	No increase in F; TAC	9.0 [2]	-	n/a	2.8
1991	Precautionary TAC	3.0 [2]	-	n/a	1.9
1992	If required, precautionary TAC	5.5 [2]	-	2.7	2.7
1993	If TAC required, consider SSB decline	-	-	2.5	2.4
1994	Reduce F+ precautionary TAC		-	2.9	2.9
1995	Significant effort reduction; link to North Sea		-	4.0	4.0
1996	Reference made to North Sea advice		-	3.5	3.5
1997	No advice		-	7.2	7.0
1998	Link to North Sea	4.9	-	8.7	8.6
1999	F = 0.60 to rebuild SSB	4.0	-	n/a	6.9
2000	F less than 0.55	< 2.5	-	3.6	2.3
2001	lowest possible catch	0	-	2.0	1.6
2002	lowest possible catch	0	-	1.6	3.1
2003	Closure	0	-	1.3	NA
2004	Zero catch	0	-	0.2	NA
2005	Zero catch	0	-	0.7	NA
2006	Zero catch	0	-	1.1	NA
2007	Zero catch	0	-	1.7	NA
2008	Exploitation boundaries in relation to precautionary limits Total removals less than 22 000 t	< 22	-	1.4	NA
2009	Zero catch	0	1.7	1.2	NA
2010	Management plan F (65% of F2008)	< 40.3 [3]	2.0		
2011	See scenarios	-			

Weights in '000 t.
[1] Until 2008 this area was included in TAC for Subarea VII (except Division VIIa), from 2009 a separate TAC is set.
[2] Including Division VIIe.
[3] For Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak)

Table 6.4.2.2 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak). Nominal landings (in tonnes) of COD, 1991–2009, as officially reported to ICES, and as used by the Working Group.

Sub-area IV									
Country	1991	1992	1993	1994	1995	1996	1997	1998	1999
Belgium	2,331	3,356	3,374	2,648	4,827	3,458	4,642	5,799	3,882
Denmark	18,997	18,479	19,547	19,243	24,067	23,573	21,870	23,002	19,697
Faroe Islands	23	109	46	80	219	44	40	102	96
France	975	2,146	1,868	1,868	3,040	1,934	3,451	2,934	.
Germany	7,278	8,446	6,800	5,974	9,457	8,344	5,179	8,045	3,386
Greenland	-	-	-	-	-	-	-	-	-
Netherlands	6,831	11,133	10,220	6,512	11,199	9,271	11,807	14,676	9,068
Norway	6,022	10,476	8,742	7,707	7,111	5,869	5,814	5,823	7,432
Poland	15	-	-	-	-	18	31	25	19
Sweden	784	823	646	630	709	617	832	540	625
UK (E/W/NI)	14,249	14,462	14,940	13,941	14,991	15,930	13,413	17,745	10,344
UK (Scotland)	29,060	28,677	28,197	28,854	35,848	35,349	32,344	35,633	23,017
Total Nominal Catch	86,565	98,107	94,380	87,457	111,468	104,407	99,423	114,324	77,566
Unallocated landings	1,968	-758	10,200	7,066	8,555	2,161	2,746	7,779	826
WG estimate of total landings	**88,533**	**97,349**	**104,580**	**94,523**	**120,023**	**106,568**	**102,169**	**122,103**	**78,392**
Agreed TAC	**100,000**	**100,000**	**101,000**	**102,000**	**120,000**	**130,000**	**115,000**	**140,000**	**132,400**

Division VIId									
Country	1991	1992	1993	1994	1995	1996	1997	1998	1999
Belgium	182	187	157	228	377	321	310	239	172
Denmark	-	1	-	9	-	-	-	-	-
France	.	2,079	1,771	2,338	3,261	2,808	6,387	7,788	.
Netherlands	-	2	-	-	-	-	-	19	3
UK (E/W/NI)	341	443	530	312	336	414	478	618	454
UK (Scotland)	2	22	2	<0.5	<0.5	4	3	1	-
Total Nominal Catch	525	2,734	2,460	2,887	3,974	3,547	7,178	8,665	629
Unallocated landings	1,361	-65	-28	-37	-10	-44	-135	-85	6,229
WG estimate of total landings	**1,886**	**2,669**	**2,432**	**2,850**	**3,964**	**3,503**	**7,043**	**8,580**	**6,858**

Division IIIa (Skagerrak)**									
Country	1991	1992	1993	1994	1995	1996	1997	1998	1999
Denmark	10,294	11,187	11,994	11,921	15,888	14,573	12,159	12,339	8,682
Germany	3	-	530	399	285	259	81	54	54
Norway	924	1,208	1,043	850	1,039	1,046	1,323	1,293	1,146
Sweden	3,846	2,523	2,575	1,834	2,483	1,986	2,173	1,900	1,909
Others	38	102	88	71	134	-	-	-	-
Norwegian coast *	854	923	909	760	846	748	911	976	788
Danish industrial by-catch *	953	1,360	511	666	749	676	205	97	62
Total Nominal Catch	15,105	15,020	16,230	15,075	19,829	17,864	15,736	15,586	11,791
Unallocated landings	-3,046	-1,018	-1,493	-1,814	-7,720	-1,615	-790	-255	-817
WG estimate of total landings	**12,059**	**14,002**	**14,737**	**13,261**	**12,109**	**16,249**	**14,946**	**15,331**	**10,974**
Agreed TAC	**15,000**	**15,000**	**15,000**	**15,500**	**20,000**	**23,000**	**16,100**	**20,000**	**19,000**

Sub-area IV, Divisions VIId and IIIa (Skagerrak) combined									
	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total Nominal Catch	102,195	115,861	113,070	105,419	135,271	125,818	122,337	138,575	89,986
Unallocated landings	283	-1,841	8,679	5,215	825	502	1,821	7,439	6,239
WG estimate of total landings	**102,478**	**114,020**	**121,749**	**110,634**	**136,096**	**126,320**	**124,158**	**146,014**	**96,225**

** Skaggerak/Kattegat split derived from national statistics
* The Danish industrial by-catch and the Norwegian coast catches are not included in the (WG estimate of) total landings of Division IIIa
. Magnitude not available - Magnitude known to be nil <0.5 Magnitude less than half the unit used in the table n/a Not applicable

Division IIIa (Skagerrak) landings not included in the assessment									
Country	1991	1992	1993	1994	1995	1996	1997	1998	1999
Norwegian coast *	854	923	909	760	846	748	911	976	788
Danish industrial by-catch *	953	1,360	511	666	749	676	205	97	62
Total	**1,807**	**2,283**	**1,420**	**1,426**	**1,595**	**1,424**	**1,116**	**1,073**	**850**

Table 6.4.2.2.cont Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak). Nominal landings (in tonnes) of COD, 1991–2009, as officially reported to ICES, and as used by the Working Group.

Sub-area IV									
Country	2001	2002	2003	2004	2005	2006	2007	2008	2009
Belgium	2,470	2,616	1,482	1,627	1,722	1,309	1,009	894	924
Denmark	8,358	9,022	4,676	5,889	6,291	5,105	3,430	3,831	4,406
Faroe Islands	9	34	36	37	34	3	-	16	.
France	717	1,777	620	294	664	354	659	573	.
Germany	1,810	2,018	2,048	2,213	2,648	2,537	1,899	1,736	2,374
Greenland	-	-	-	-	35	23	17	.	.
Netherlands	3,574	4,707	2,305	1,726	1,660	1,585	1,523	1,896	3,297
Norway	4,369	5,217	4,417	3,223	2,900	2,749	3,057	4,128	4,234
Poland	18	39	35	-	-	-	1	2	3
Sweden	661	463	252	240	319	309	387	439	378
UK (E/W/NI)	4,087	3,112	2,213	1,890	1,270	1,491	1,587	1,546	.
UK (Scotland)	15,640	15,416	7,852	6,650	4,936	6,857	6,511	7,185	.
UK (combined)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	11,403
Others	-	-	-	-	-	786	.	.	.
Norwegian indust by-catch *	.	.	.	.	.	48	101	22	4
Danish industrial by-catch *	.	.	.	.	.	34	18	46	76
Total Nominal Catch	41,713	44,421	25,936	23,789	22,479	23,108	20,080	22,246	27,019
Unallocated landings	-740	-121	-89	-240	1,391	-915	-397	-51	-1,361
WG estimate of total landings	**40,973**	**44,300**	**25,847**	**23,549**	**23,870**	**22,193**	**19,683**	**22,195**	**25,658**
Agreed TAC	**48,600**	**49,300**	**27,300**	**27,300**	**27,300**	**23,205**	**19,957**	**22,152**	**28,798**

Division VIId									
Country	2001	2002	2003	2004	2005	2006	2007	2008	2009
Belgium	93	51	54	47	51	80	84	154	71
Denmark	-	-	-	-	-	-	-	.	.
France	1,677	1,361	1,730	810	986	1,124	1,743	1,326	.
Netherlands	17	6	36	14	9	9	59	30	44
UK (E/W/NI)	249	145	121	103	184	267	175	144	.
UK (Scotland)	-	-	-	-	-	1	12	7	.
UK (conbined)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	134
Total Nominal Catch	2,036	1,563	1,941	974	1,230	1,481	2,073	1,661	250
Unallocated landings	-463	1,534	-707	-167	-197	-354	-333	-307	996
WG estimate of total landings	**1,573**	**3,097**	**1,234**	**807**	**1,033**	**1,127**	**1,740**	**1,354**	**1,246**
Agreed TAC									**1,678**

Division IIIa (Skagerrak)**									
Country	2001	2002	2003	2004	2005	2006	2007	2008	2009
Denmark	5,870	5,511	3,054	3,009	2,984	2,478	2,228	2,534	3,018
Germany	32	83	49	99	86	84	67	52	44
Norway	762	645	825	856	759	628	681	779	440
Sweden	1,035	897	510	495	488	372	370	365	459
Others	-	-	27	24	21	373	385	13	2
Norwegian coast *	846	.	.	720	759	524	494	498	342
Danish industrial by-catch *	687	.	.	10	18	9	.	-	1
Total Nominal Catch	7,699	7,136	4,465	4,483	4,338	3,935	3,731	3,743	3,963
Unallocated landings	-613	332	-674	-696	-533	-569	-785	-445	-85
WG estimate of total landings	**7,086**	**7,468**	**3,791**	**3,787**	**3,805**	**3,366**	**2,946**	**3,298**	**3,878**
Agreed TAC	**7,000**	**7,100**	**3,900**	**3,900**	**3,900**	**3,315**	**2,851**	**3,165**	**4,114**

Sub-area IV, Divisions VIId and IIIa (Skagerrak) combined									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total Nominal Catch	51,448	53,120	32,342	29,246	28,047	28,524	25,884	27,650	31,232
Unallocated landings	-1,816	1,745	-1,470	-1,103	661	-1,838	-1,515	-803	-450
WG estimate of total landings	**49,632**	**54,865**	**30,872**	**28,143**	**28,708**	**26,686**	**24,369**	**26,847**	**30,781**

** Skaggerak/Kattegat split derived from national statistics
* The Danish and Norwegian industrial by-catch and the Norwegian coast catches are not included in the (WG estimate of) total landings
. Magnitude not available - Magnitude known to be nil <0.5 Magnitude less than half the unit used in the table n/a Not applicable

Division IV and IIIa (Skagerrak) landings not included in the assessment									
Country	2001	2002	2002	2004	2003	2006	2007	2008	2009
Norwegian coast *	846	.	.	720	759	524	494	498	342
Norwegian indust by-catch *	.	.	.	.	.	48	101	22	4
Danish industrial by-catch *	687	.	.	10	18	43	18	46	77
Total	**1,533**	**.**	**.**	**730**	**777**	**615**	**613**	**566**	**423**

Table 6.4.2.3 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak). Reported landings and estimated discards, in tonnes. Estimated removals from B-Adapt.

	Landings	Discards	Catch (L+D)	Total estimated removals
1985	214.6	31.5	246.1	247.0
1986	204.1	139.1	343.1	341.0
1987	216.2	27.8	244.1	244.8
1988	184.2	10.7	195.0	194.8
1989	139.9	62.1	202.1	202.6
1990	125.3	27.0	152.3	153.0
1991	102.5	18.6	121.0	121.2
1992	114.0	36.9	150.9	151.8
1993	121.7	21.9	143.6	174.2
1994	110.6	99.6	210.2	203.8
1995	136.1	32.2	168.3	222.2
1996	126.3	14.3	140.6	197.8
1997	124.2	33.6	157.8	173.9
1998	146.0	40.5	186.5	180.0
1999	96.2	14.2	110.4	137.0
2000	71.4	13.7	85.1	95.1
2001	49.7	13.9	63.6	75.7
2002	54.9	5.7	60.6	80.8
2003	30.9	6.4	37.2	75.8
2004	28.2	5.8	34.0	53.0
2005	28.7	6.3	35.0	51.5
2006	26.6	8.1	34.6	52.7
2007	24.4	23.6	48.1	66.4
2008	26.8	21.8	48.7	84.1
2009	30.8	14.6	45.4	91.4

Table 6.4.2.4 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and Division IIIa (Skagerrak). Summary of the assessment

B-ADAPT median values

	RECRUITS Age 1 ('000)	TSB (tons)	SSB (tons)	CATCH (tons)	YIELD/SSB	FBAR 2-4
1963	249718	443856	164821	128686	0.781	0.499
1964	462750	530389	166809	130740	0.784	0.477
1965	687286	695016	193421	210237	1.087	0.570
1966	835166	846628	225100	259416	1.152	0.581
1967	748976	900304	249059	276387	1.110	0.589
1968	329855	797607	254722	305911	1.201	0.704
1969	295479	654250	252744	205510	0.813	0.543
1970	1143743	993899	260553	243867	0.936	0.620
1971	1687701	1201678	264800	412264	1.557	0.781
1972	329293	863226	243532	387737	1.592	0.823
1973	561402	683266	205762	269139	1.308	0.797
1974	550554	650496	233150	253989	1.089	0.705
1975	1030925	728266	211890	242349	1.144	0.749
1976	769399	644409	180579	307102	1.701	0.948
1977	1898803	946599	163815	349038	2.131	0.837
1978	638410	817810	150864	328585	2.178	0.953
1979	1502822	964889	158450	430688	2.718	0.758
1980	2807522	1255362	179034	590678	3.299	0.873
1981	609627	844173	190515	393451	2.065	0.916
1982	983478	834918	184954	359372	1.943	1.009
1983	470856	638926	148887	281696	1.892	1.031
1984	1485857	825394	131990	379974	2.879	0.917
1985	272216	505132	124377	247031	1.986	0.918
1986	1668790	761629	115131	341047	2.962	0.957
1987	363028	563628	107497	244809	2.277	0.947
1988	238095	432248	98891	194798	1.970	0.992
1989	630948	469624	92916	202639	2.181	0.961
1990	199507	323785	81366	153021	1.881	0.973
1991	260126	301442	78101	121204	1.552	0.818
1992	546515	428467	77358	151755	1.962	0.776
1993	253683	372434	78840	174247	2.210	0.997
1994	933220	516805	75188	203846	2.711	0.724
1995	410258	528397	95221	222222	2.334	0.925
1996	233787	441378	103559	197824	1.910	0.978
1997	734884	537270	91452	173884	1.901	0.867
1998	96056	348556	76291	179993	2.359	0.992
1999	176681	254411	73461	137037	1.865	1.167
2000	298594	240251	48706	95119	1.953	1.075
2001	85979	181377	38605	75718	1.961	0.806
2002	153946	216204	46580	80830	1.735	0.790
2003	72800	150116	43109	75801	1.758	0.936
2004	106957	127624	39534	53023	1.341	0.898
2005	86305	131687	36347	51482	1.416	0.719
2006	209886	143726	34889	52674	1.510	0.681
2007	100583	184861	42853	66398	1.549	0.584
2008	104946	205398	58458	84110	1.439	0.709
2009	97958	212321	68560	91428	1.334	0.853
2010			55789			

Annex 6.4.2

EU – Norway management plan

In 2008 the EU and Norway renewed their initial agreement from 2004 and *"agreed to implement a long-term management plan for the cod stock, which is consistent with the precautionary approach and is intended to provide for sustainable fisheries and high yield.*

Transitional arrangement:

F will be reduced as follows: 75 % of F in 2008 for the TACs in 2009, 65 % of F in 2008 for the TACs in 2010, and applying successive decrements of 10 % for the following years.

The transitional phase ends as from the first year in which the long-term management arrangement (paragraphs 3 – 5) leads to a higher TAC than the transitional arrangement.

Long-term management

1. If the size of the stock on 1 January of the year prior to the year of application of the TACs is:

    a. Above the precautionary spawning biomass level, the TACs shall correspond to a fishing mortality rate of 0.4 on appropriate age groups;
    b. Between the minimum spawning biomass level and the precautionary spawning biomass level, the TACs shall not exceed a level corresponding to a fishing mortality rate on appropriate age groups equal to the following formula:

       0.4 - (0.2 * (Precautionary spawning biomass level - spawning biomass) / (Precautionary spawning biomass level - minimum spawning biomass level))

    c. At or below the limit spawning biomass level, the TAC shall not exceed a level corresponding to a fishing mortality rate of 0.2 on appropriate age groups.

2. Notwithstanding paragraphs 2 and 3, the TAC for 2010 and subsequent years shall not be set at a level that is more than 20 % below or above the TACs established in the previous year.
3. Where the stock has been exploited at a fishing mortality rate close to 0.4 during three successive years, the parameters of this plan shall be reviewed on the basis of advice from ICES in order to ensure exploitation at maximum sustainable yield.
4. The TAC shall be calculated by deducting the following quantities from the total removals of cod that are advised by ICES as corresponding to the fishing mortality rates consistent with the management plan:

    a. A quantity of fish equivalent to the expected discards of cod from the stock concerned;
    b. A quantity corresponding to other relevant sources of cod mortality.
5. The Parties agree to adopt values for the minimum spawning biomass level (70,000 tonnes), the precautionary biomass level (150,000 tonnes) and to review these quantities as appropriate in the light of ICES advice.

Procedure for setting TACs in data-poor circumstances

6. If, due to a lack of sufficiently precise and representative information, it is not possible to implement the provisions in paragraphs 3 to 6, the TAC will be set according to the following procedure.

    a. If the scientific advice recommends that the catches of cod should be reduced to the lowest possible level the TAC shall be reduced by 25 % with respect to the TAC for the preceding year.
    b. In all other cases the TAC shall be reduced by 15 % with respect to the TAC for the previous year, unless the scientific advice recommends otherwise.

This plan shall be subject to triennial review, the first of which will take place before 31 December 2011. It enters into force on 1 January 2009.

The main changes between this and the plan of 2004 is the phasing (transitional and long-term phase) and the inclusion of an F reduction fraction,

EU management plan

In December 2008 the European Council agreed on a new cod management plan implementing the new system of effort management and a target fishing mortality of 0.4 (EC 1342/2008). The HCR for setting TAC for the North Sea cod stock are as follows:

Article 7 1.(a) and 1.(b) are required for interpretation of Article 8.

Article 7: Procedure for setting TACs for cod stocks in the Kattegat the west of Scotland and the Irish Sea

1.Each year, the Council shall decide on the TAC for the following year for each of the cod stocks in the Kattegat, the west of Scotland and the Irish Sea. The TAC shall be calculated by deducting the following quantities from the total removals of cod that are forecast by STECF as corresponding to the fishing mortality rates referred to in paragraphs 2 and 3:

(a) a quantity of fish equivalent to the expected discards of cod from the stock concerned;
(b) as appropriate a quantity corresponding to other sources of cod mortality caused by fishing to be fixed on the basis of a proposal from the Commission. […]

Article 8: Procedure for setting TACs for the cod stock in the North Sea, the Skagerrak and the eastern Channel

1. Each year, the Council shall decide on the TACs for the cod stock in the North Sea, the Skagerrak and the eastern Channel. The TACs shall be calculated by applying the reduction rules set out in Article 7 paragraph 1(a) and (b).
2. The TACs shall initially be calculated in accordance with paragraphs 3 and 5. From the year where the TACs resulting from the application of paragraphs 3 and 5 would be lower than the TACs resulting from the application of paragraphs 4 and 5, the TACs shall be calculated according to the paragraphs 4 and 5.
3. Initially, the TACs shall not exceed a level corresponding to a fishing mortality which is a fraction of the estimate of fishing mortality on appropriate age groups in 2008 as follows: 75 % for the TACs in 2009, 65 % for the TACs in 2010, and applying successive decrements of 10 % for the following years.
4. Subsequently, if the size of the stock on 1 January of the year prior to the year of application of the TACs is:

(a) above the precautionary spawning biomass level, the TACs shall correspond to a fishing mortality rate of 0,4 on appropriate age groups;
*(b) between the minimum spawning biomass level and the precautionary spawning biomass level, the TACs shall not exceed a level corresponding to a fishing mortality rate on appropriate age groups equal to the following formula: 0,4 – (0,2 * (Precautionary spawning biomass level – spawning biomass) / (Precautionary spawning biomass level – minimum spawning biomass level))*
(c) at or below the limit spawning biomass level, the TACs shall not exceed a level corresponding to a fishing mortality rate of 0,2 on appropriate age groups.

5. Notwithstanding paragraphs 3 and 4, the Council shall not set the TACs for 2010 and subsequent years at a level that is more than 20 % below or above the TACs established in the previous year.
6. Where the cod stock referred to in paragraph 1 has been exploited at a fishing mortality rate close to 0,4 during three successive years, the Commission shall evaluate the application of this Article and, where appropriate, propose relevant measures to amend it in order to ensure exploitation at maximum sustainable yield.

Article 9: Procedure for setting TACs in poor data conditions

Where, due to lack of sufficiently accurate and representative information, STECF is not able to give advice allowing the Council to set the TACs in accordance with Articles 7 or 8, the Council shall decide as follows:

(a) where STECF advises that the catches of cod should be reduced to the lowest possible level, the TACs shall be set according to a 25 % reduction compared to the TAC in the previous year;
(b) in all other cases the TACs shall be set according to a 15 % reduction compared to the TAC in the previous year, unless STECF advises that this is not appropriate.

Article 10: Adaptation of measures

1. When the target fishing mortality rate in Article 5(2) has been reached or in the event that STECF advises that this target, or the minimum and precautionary spawning biomass levels in Article 6 or the levels of fishing *mortality rates given in Article 7(2) are no longer appropriate in order to maintain a low risk of stock depletion and a maximum sustainable yield, the Council shall decide on new values for these levels.*

2. In the event that STECF advises that any of the cod stocks is failing to recover properly, the Council shall take a decision which:

(a) sets the TAC for the relevant stock at a level lower than that provided for in Articles 7, 8 and 9;
(b) sets the maximum allowable fishing effort at a level lower than that provided for in Article 12;
(c) establishes associated conditions as appropriate.