

Indicator Fact Sheet

(FISH1b) The North Sea Cod (*Gadus morhua*) stock

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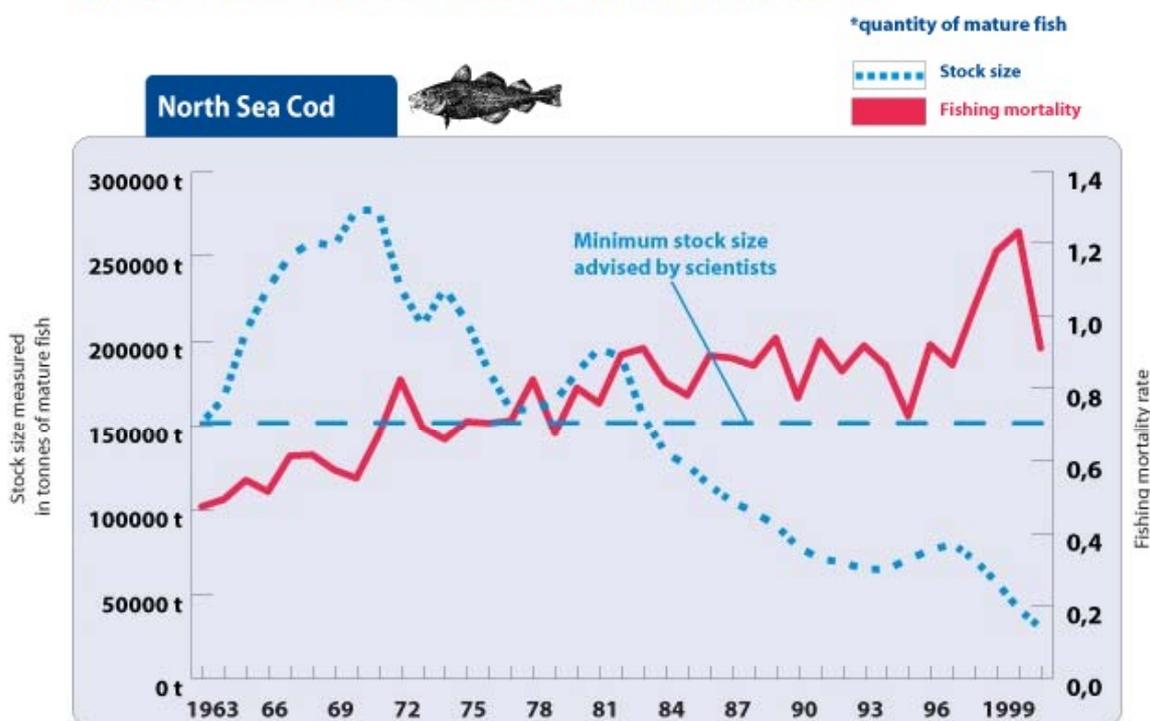
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Key message

⊕ The North Sea Cod stock is outside safe biological limits and in imminent stage of collapse. This situation is also true in all waters adjacent to the North Sea where this species is distributed. The spawning stock biomass (SSB) is calculated to have been below B_{pa} (Biomass precautionary approach reference point) for the last 18 years (since 1984).

Figure 1:

Trends in spawning cod biomass* and in fishing mortality



Source: DG Fisheries 2003

Results and assessment

Policy relevance:

A fish stock in itself is valid as an indicator only as long as parameters describing the stock are collected regularly. By being one of the key fish stocks of the North East Atlantic, and by being of interest to a number of member and non-member states, the North Sea cod stock is justified as an indicator of sustainability in multilateral fish resource exploitation and management. Unfortunately, the present situation clearly illustrates that the distance to target (a sustainable management scheme for fish stocks) is still a very long way off.

Policy context:

Sustainable exploitation of fish stocks is a target for the EU CFP. Fishing mortality is regulated by the Fisheries Council, through issues of TAC (Total Allowable Catch) for each stock. The TACs are based on advice from relevant ICES working groups issuing annual assessment reports based on catch statistics, surveys and calculations of a number of central parameters for each stock (see Figure 2). However socio economic considerations play a significant role and compromises have to be met in reaching a final decision for TAC allocation.

Environmental context:

Defining the status of a fish stock as an indicator of fisheries policy and management requires a long term management strategy, not only for the actual fish stock, but also the entire ecological network of fish, birds and mammals stocks interacting with, in this context, the North Sea cod. This implies that a strategy for exploitation of cod has to be prepared together with a management strategy for exploiting its major prey species like herring and sand-eel, and interacting species (such as mackerel) and sea birds and mammals.

The North Sea cod stock spawns widespread in this sea, and high concentrations of cod-egg are found in the English Channel, at the Dogger Bank and along the Scottish coast. The main areas for growing once located at the German Bight at the south-eastern area of the North Sea are now found off northeast England, and in the northeastern part of the central North Sea. The cod become sexually mature at an age of 3-5 years.

Several countries participate in cod fisheries in the North Sea. Towed gears in mixed roundfish fisheries, which include haddock and whiting, capture cod. They are also captured in directed fisheries using fixed gears. By-catches of cod occur in flatfish and shrimp fisheries especially in the southern North Sea and in fisheries of Norway lobster. The total catch of cod in the North Sea (ICES region IV) has decreased from 300 000 t in 1981 to 41 000 t in 2000 (ICES 2002).

Assessment:

The North Sea cod stock is outside safe biological limits, despite the measures that have been put in place by the Commission over the past two years, the most drastic of which was the temporarily closure of selected nursery grounds in 2001. As long ago as 1992, ICES advised that *'recovery of the cod stock would require, at minimum, a marked and sustained reduction of effort or even a closure of the fishery'*. More recent advice in 2000 and 2001 suggested *'that fishing mortality on cod should be reduced to the lowest possible level'* and re-iterated the failure of TACs to bring about the necessary reduction. This advice was only one step short of a closure. Advice in 2002 asked for closure of the fisheries. This recommendation was based on the facts that a) **the 2002** death rate of cod, due to all factors, exceeded the rate at which recruits were being produced, and b) that the estimated increase in 2002 to 38 000t (from 30 000 in 2001) was still well below the previously calculated lowest value and there are fears that it too, may be over-optimistic (ICES, 2003). This advised moratorium was also supported by the Scientific, Technical, Economic Committee on Fisheries (STECF).

). However, because of the economic and social impact of such a measure on the fleets concerned and after consultation with scientists, the Commission proposed, as an alternative to a moratorium, substantially reduced fishing possibilities for cod and cod-related fisheries, fishing effort limitations and control measures to ensure their proper implementation. Reductions in TAC alone are not effective in regulating fishing mortality. In addition to effort limitations control measures, technical measures should be imposed towards increasing effective mesh size and reducing discard, by-catches and ameliorating under-reporting of catches.

The Commission had proposed to reduce fishing mortality by 80%, which would have resulted in a reduction in TAC of 66%. The Council only agreed on temporary recovery measures for cod and set TACs at levels generally higher than those proposed by the Commission. Thus it was finally agreed a reduction of 65% in fishing mortality, which translates into a cut of total allowable catches of 45%. The estimated time frame for achieving the recovery objectives through the long-term recovery and management plan is 5 to 10 years (DG Fisheries, 2002). The target level identified in the cod recovery plan stands at 150,000 tonnes.

The EU is aware of the potential socio-economic consequences of recovery measures on the fleets concerned. This is why a raft of measures have been put in place to provide financial support to the fisheries sector during this restructuring period.

Sub-indicator – Assessment of the North Sea Cod

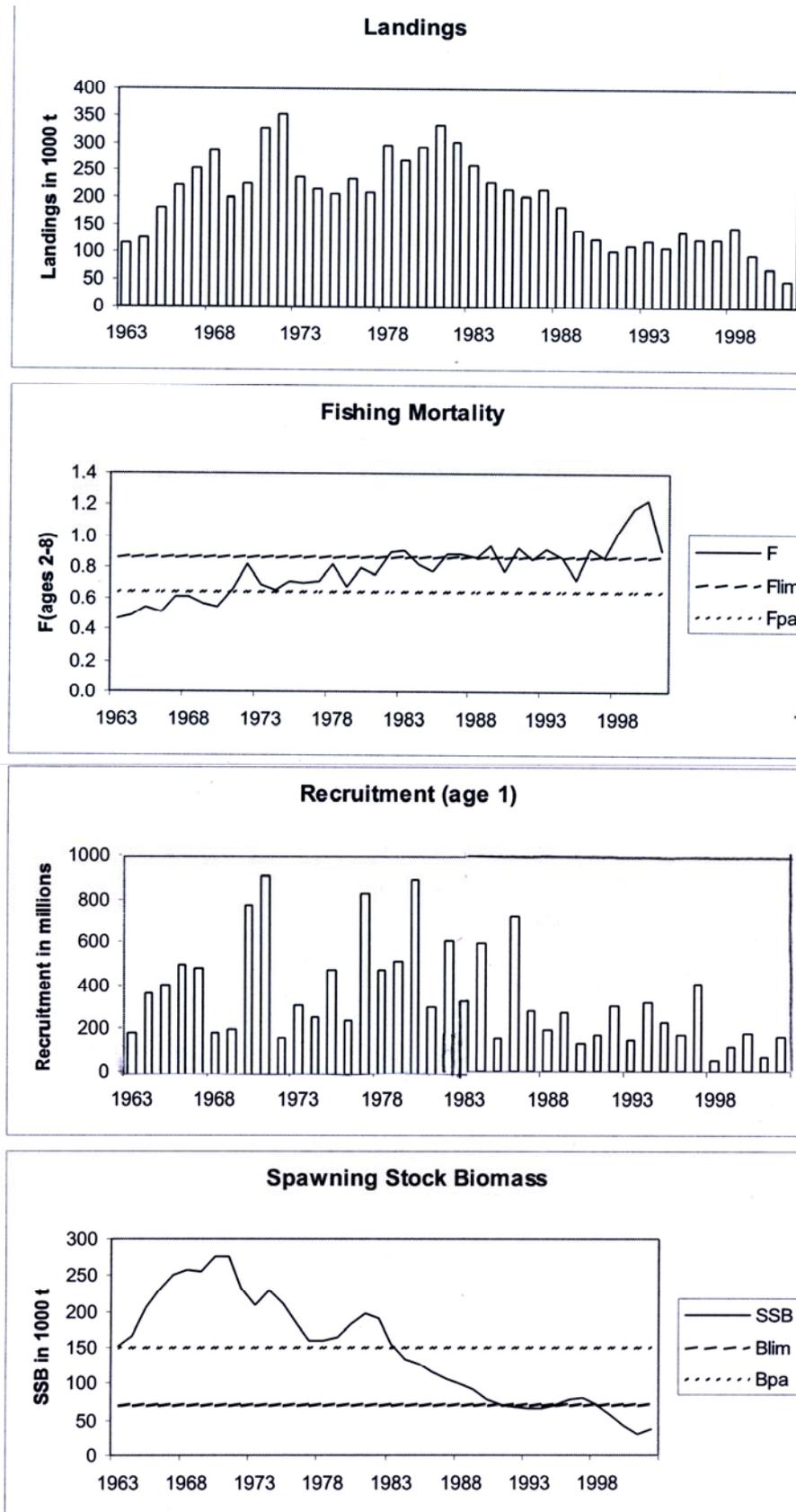
Key message

⊖ The spawning stock biomass estimated at 38000 tonnes in 2002 has somewhat increased from the historic low of 2001, but the risk of stock collapse remains high (ICES 2002). The seriousness of the condition is underlined by a current ICES (International Council for Exploration of the Seas) recommendation for a closure of all fisheries of cod as targeted species and by-catch in addition to the 2001 moratorium on cod fishing in greater parts of the North Sea, issued by the European Commission after advice from the ICES and in agreement with Norwegian Fisheries Authorities.

● The status of the North Sea cod stock indicates that a sustainable EU CFP still is some distance from its target to achieve sustainable fish resource management.

⊕ A multi-annual cod recovery scheme was adopted by the Council in December 2002, involving the setting of low catch limits for 2003 backed by interim fishing effort limitations as an alternative to a moratorium on a number of cod fisheries, in a long term effort to help the stocks recover.

Figure 2: Assessment parameters for the North Sea Cod Stock 1963 – 2001. (ICES 2002)



Source: ICES 2002

Assessment of the sub-indicator

Annual landings of cod from the North Sea and some adjacent waters in the period 1963 to 2000 are shown in Figure 2 (ICES 2002), together with the assessment parameters for the same period.

Fishing mortality has increased gradually and has been above the precautionary limit since 1980. With the exception of the 1996-year class, recruitment to the North Sea cod stock has been below average since 1987. The year classes 1997 and 2000 are the poorest ever recorded (Norwegian Institute of Marine Research 2002).

References

DG Fisheries 2003 European Commission Fisheries Directorate General
Press Releases 2003 First application of the reformed Common Fisheries Policy: Commission proposes long-term recovery plan for cod

http://europa.eu.int/comm/fisheries/news_corner/press/inf03_14_en.htm

DG Fisheries 2002 European Commission Fisheries Directorate General
Press Release 2002 1 Outcome of the Fisheries Council of 16-20 December 2002
http://europa.eu.int/comm/fisheries/news_corner/press/inf02_61_en.htm

Garrod, D.J. & B.W. Jones 1974. Stock and recruitment relationship in the north east atlantic cod stock and the implications for management of the stock. *J. Cons. Int. Explor. Mer* 36:35-41.

ICES 2002: 2002 Cod in Sub-area IV (North Sea), Division VIIId (Eastern English Channel) and Division IIIa (Skagerrak) <http://www.ices.dk/committe/acfm/comwork/report/2002/oct/cod-347d.pdf>

ICES 2003 Hot Articles: Cod stocks in trouble
<http://www.ices.dk/marineworld/coddecline.asp>

Norwegian Institute of Marine Research 2002. Internet homepage 05. February 2002

Data

Graphs were copied from ICES, ACFM 2002 report and DG Fisheries Press release 6.5.
See **References**

Meta data

Web presentation information

1. Abstract / description / teaser:

The North Sea cod stock is presented as an indicator of sustainability in multilateral fish resource exploitation and management.

2. Policy issue / question:

Is the use of commercial fish stocks sustainable?

3. EEA dissemination themes:

Fisheries

4. DPSIR (one value only): S

Technical information

5. Data source: ICES and DG Fisheries.

6. Description of data: Graphs copied from the sources mentioned above.

7. Geographical coverage: The entire distribution area for the North Sea cod is covered.

8. Temporal coverage: Long time data series available.

9. Methodology and frequency of data collection: Yearly reports ported continuously, surveys are (as far as possible) carried out at the same time each year.
10. Methodology of data manipulation, including making 'early estimates': Different models are applied, including single species and multi-species assessments. XSA (Extended Survivor Analysis) is currently the basis assessment model by ICES, but methods are continuously being revised and upgraded.

Quality information

11. Strength and weakness (at data level): ICES quality. Inaccuracy in landing data will always occur. However, the most serious cause of uncertainty lies within information and types of data not being reported (discard, unrecorded landings, fraudulent reporting).
12. Reliability, accuracy, robustness, uncertainty (at data level): Accuracy could, of course be better, but effort is probably best used on revealing the magnitude of impact on the cod stock caused by "other" impact factors (e.g. climate changes, predation and/or food availability, pollution) compared to the inaccuracy caused by the above mentioned causes.
13. Overall scoring (give 1 to 3 points: 1=no major problems, 3=major reservations): 1

Relevancy: As a prominent fish stock of the North Sea, and being one of the most intensively studied, monitored (and exploited) fish stocks at all, the North Sea Cod stock is considered a highly relevant indicator of the implementation and performance of a sustainable CFP within the EU. This resource is shared with non- EU countries, (The Faeroes, Norway) and proper management also requires co-operation outside EU internal structures. This is both a challenge and a benefit, but in the end, a necessity.

Accuracy: 2

Comparability over time: 3

Comparability over space: 3

Further work required

Research and management actions towards maintaining the cod stock at a level where traditional exploitation level can be maintained is a biologically and socio-economic necessity. However, as an indicator of the performance of the CFP, where the North Sea cod is a key fish stock, a necessary and profound change in attitude is suggested, implying stronger emphasis on data quality, reliability and coverage (both topical, temporal and geographic). A clear-cut target for the indicator, and enough strength to enforce necessary steps, also seem to emerge as a necessity.

To specifically ascertain that the observed low recruitment is caused by the low SSB (a linear correlation between SSB and Recruitment is hardly documented – Figure 3) should be investigated. As a precautionary action, the desire for scientifically accurate data must not lead to the stock being depleted while research is in progress.

Rresearch on quantifying factors affecting the recruitment of North Sea cod seems appropriate (contamination, climate changes, predator-prey interactions on egg-larvae etc) as part of a multi-species-ecosystem management regime.