

ICES COOPERATIVE RESEARCH REPORT

RAPPORT DES RECHERCHES COLLECTIVES

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**REPORT OF THE ICES ADVISORY COMMITTEE ON
FISHERY MANAGEMENT, 1996**

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ACFM REPORT 1996 PART 1

PREFACE

This Cooperative Research Report (Parts 1 and 2) contains the Report of the Advisory Committee on Fishery Management (ACFM) prepared and issued in 1996. The Report was prepared in response to requests from the North-East Atlantic Fisheries Commission (NEAFC), the International Baltic Sea Fishery Commission (IBSFC), the North Atlantic Salmon Conservation Organization (NASCO) the European Commission (EC) and the North Atlantic Marine Mammal Commission (NAMMCO). In addition, a number of requests were received from ICES Member Governments.

Shortly after the May meeting of ACFM, ICES issued extracts of the Report to the IBSFC, NEAFC, NASCO and the EC. Shortly after the October-November ACFM meeting, the remaining extracts were issued to NEAFC and the EC. Responses to the requests from ICES Member Governments were issued either as separate extracts, or embodied within the extracts prepared for the Commissions.

In this publication the extracts referred to above have, with the exception of the reports to NASCO and NAMMCO, which are placed at the end of Part 2, been edited into a single report in two volumes.

The requests for advice from each of the Commissions named above are given in the introductory section to the report.

In 1995 ACFM adopted a new format for its report. A revised description of the format is given in the introduction.

ICES Fishery Secretary and Secretary to ACFM
ICES Headquarters, Copenhagen
April 1997

**MEMBERS AND ALTERNATE MEMBERS OF
THE ADVISORY COMMITTEE ON FISHERY MANAGEMENT
IN 1996**

Affiliation	Member	Alternate
Chairman	Mr E. Kirkegaard Mr J.-J. Maguire ¹	
Chairman of Demersal Fish Committee	Mr F. A. van Beek	
Chairman of Pelagic Fish Committee	Dr R. L. Stephenson	
Chairman of Baltic Fish Committee	Mr E. Aro	
Belgium	Dr R. De Clerck	Mr W. Vanhee
Canada	Mr J.-J. Maguire Dr J. Rice ²	
Denmark	Mr P. Degnbol	Mr H. Lassen
Estonia	Dr A. Järvik	Dr E. Ojaveer
Finland	Mr E. Ikonen Mr T. Pakarinen ⁴	Mr R. Parmanne
France	Mr B. Mesnil	Mr A. Forest
Germany	Mr H.-P. Cornus	Dr O. Rechlin
Iceland	Dr G. Stefánsson	Dr S.A. Schopka
Ireland	Mr J. Browne	Mr J. Molloy Dr P. Connolly ⁴
Latvia	Mr M. Vitins	Mr M. Plikshs
Netherlands	Prof N. Daan	Dr H.J.L. Heessen
Norway	Dr A. Aglen	Mr A. Dommasnes
Poland	Dr J. Netzel	Dr J. Horbowy
Portugal	Dr C. Sousa Reis	Dr G. Pestana
Russia	Dr Y. Efimov	Dr V.N. Shleinik
Spain	Mr F.J. Pereiro	Ms C. Porteiro
Sweden	Mr B. Sjöstrand	Mr J. Modin
UK	Dr R.M. Cook	Dr J.W. Horwood
USA	Mr R. Mayo	Dr W. Gabriel

¹From 1 November 1996.

²From May 1996.

³From 1 November 1996

ADVISORY COMMITTEE ON FISHERY MANAGEMENT
PARTICIPANTS AT MEETINGS, SPRING AND AUTUMN 1996

Affiliation	16–23 May 1996
Chairman	Mr E. Kirkegaard
Chairman, Demersal Fish Committee	Mr F. A. Van Beek
Chairman, Pelagic Fish Committee	Dr R. L. Stephenson
Chairman, Baltic Fish Committee	Mr E. Aro
Belgium	Dr R. De Clerck
Canada	Dr J. Rice
Denmark	Mr P. Degnbol
Estonia	Dr T. Raid ²
Finland	Mr E. Ikonen
France	Mr B. Mesnil
Germany	Mr H.-P. Cornus
Iceland	Dr G. Stefánsson
Ireland	Mr J. Browne
Latvia	Mr M. Plikshs
Netherlands	Prof N. Daan
Norway	Dr A. Aglen
Poland	Dr J. Netzel
Portugal	Dr G. Pestana
Russia	Dr Y. Efimov ¹
	Dr V. N. Shleinik ¹
Spain	Mr F. J. Pereiro
Sweden	Mr B. Sjöstrand
UK	Dr R. M. Cook
USA	Dr W. Gabriel
Observer, European Commission of EU	Mr O. Hagström
Observers, Faroe Islands and Greenland	Mr J. Reinert ¹
	Mr J. Boje ¹
Chairmen of Assessment Working Groups ³	
Study Group on the Biology and Assessment of Deep-Sea Fisheries Resources	Dr J. D. M. Gordon
North Western Working Group	Mr J. Reinert
Northern Pelagic and Blue Whiting Fisheries Working Group	Mr I. Røttingen
Herring Assessment Working Group for the Area South of 62 °N	Mr R. Toresen
Baltic Fisheries Assessment Working Group	Dr J. Horbowy
Working Group on North Atlantic Salmon	Mr E. C. E. Potter
Baltic Salmon and Trout Assessment Working Group	Mr L. Karlsson
ICES Fishery Secretary, Secretary to ACFM	Dr R. S. Bailey
ICES Fisheries Assessment Scientist	Mr H. Sparholt
ICES System Analyst	Mr L. Pedersen ¹

¹Participated part time.

²Substitute for Dr A. Järvik.

³Attended Sub-group meetings 16–18 May.

Affiliation	24 October–1 November 1996
Chairman	Mr J.-J. Maguire
Chairman, Demersal Fish Committee	Mr F. A. van Beek
Chairman, Pelagic Fish Committee	Dr R. L. Stephenson
Chairman, Baltic Fish Committee	Mr E. Aro
Belgium	Mr W. Vanhee
Canada	Dr J. Rice
Denmark	Mr P. Degnbol
Estonia	Dr A. Järvik
Finland	Mr T. Pakarinen
France	Mr B. Mesnil
Germany	Mr H.-P. Cornus
Iceland	Dr S. Schopka
Ireland	Mr J. Browne
	Dr P. Connolly ²
Latvia	Mr M. Vitins
Netherlands	Dr H. J. L. Heessen
Norway	Dr A. Aglen
Poland	Dr J. Horbowy
Portugal	Dr G. Pestana
Russia	Dr Y. Efimov ¹
	Dr V. N. Shleinik ¹
Spain	Mr F. J. Pereiro
Sweden	Mr B. Sjöstrand
UK	Dr R. M. Cook
USA	Mr R. Mayo
Observer, European Commission of EU	Mr D. Armstrong
Observers, Faroe Islands and Greenland	Mr H. í. Jákupsstovu ¹
	Mr J. Boje ¹
Chairmen of Assessment Working Groups ²	
Working Group on the Assessment of Northern Shelf Demersal Stocks	Dr M. Armstrong
Working Group on the Assessment of Southern Shelf Demersal Stocks	Mr M. Pawson
Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy	Ms C. Porteiro
Arctic Fisheries Working Group	Mr K. Sunnanå
Working Group on the Assessment of Demersal Stocks in the North Sea	Mr P. Degnbol
ICES Fishery Secretary, Secretary to ACFM	Dr R. S. Bailey
ICES Fisheries Assessment Scientist	Mr H. Sparholt
ICES System Analyst	Mr L. Pedersen ¹

¹Participated part time.

²Attended Sub-group meetings 24-26 October

1 ACFM ADVICE

1.1 The Form of ACFM Advice

At its autumn 1991 meeting, ACFM redefined the basis and form of the advice which it would provide, and this was described in the introductory section "ACFM Advice" of the 1991 Reports of ACFM (ICES Cooperative Research Report No. 179).

1.2 Review of Advice for 1996

ACFM wishes to stress that its definitive advice on each stock is based on all the data available to ICES, and that the timing of the advice on each stock is determined by the need for that advice to be as accurate as possible.

While new information can be used to redefine the advice, ACFM considers that mid-year revisions are in general unnecessary. The precision of stock size estimates is such that there would need to be quite major changes before any revision in advice was justified. Minor changes would simply serve to create instability in advice.

ACFM nevertheless recognizes that it has a responsibility to draw the attention of managers, as early as possible, to any necessary alteration in scientific advice and to the need for a change in management action.

1.3 The Format of the ACFM Advice

Each summary sheet contains the essential information needed by managers. For each stock the following sections are included where relevant:

Catch data

This section gives a table summarising previous recommendations, the predicted catches corresponding to those recommendations, the agreed TACs and catches for the most recent years, in almost all cases in thousand tonne (t) units.

Catches are normally given as "ACFM catch", i.e. the catch used by ACFM in its assessments. In some cases the officially-reported landings ("off. Indgs") and quantities discarded are given. The ACFM catches often differ from the official catches which are in most cases given in the tables referred to in the Section heading. Where the areas to which the recommendations, agreed TACs and catches refer differ, the areas are given in the headings.

Historical development of the fishery

A brief account is given of the most important features and events in the development of the fishery, where possible from its early stages. Landings figures are

presented in the summary diagram of landings at the foot of each page and in the summary table under "Catch data".

State of the stock

A brief summary is given of the present state of the stock in terms of the spawning stock biomass (SSB), the level of fishing mortality (F) and the recruitment of new year classes with an indication of what has led up to the present situation. For those stocks where an analytical assessment has been carried out, a pictorial account of the development of the stock is given in the figures at the foot of the page. The same information is also given in the tables referred to in this section.

Forecast for 1997

Whenever possible, a range of forecasts of catch and SSB for the next year is given in a table, together with the assumptions about catch and/or F in the current year on which they are based. The estimated SSB in the current year is also given for reference. Following the table are given brief comments on the consequences to the stock of the alternative forecasts given.

In some cases diagrams are provided to show the level of uncertainty in the forecasts. These are in the form of "probability profiles".

For those stocks for which forecasts are made figures are included showing the short-term forecast and the long-term forecast in terms of yield per recruit and SSB per recruit at different levels of F.

Medium-term considerations

Where it is possible to make statements about the medium-term effects of exploiting the stock at different levels of F, these are given under a section dealing with "medium-term considerations". Graphs may also be included showing the probability of different results under different management scenarios.

Management advice

This section contains the advice for each stock. Recommendations are given in bold type.

Special comments

This section includes additional information about each stock.

Data and assessment

This section indicates the type of assessment carried out on each stock and lists the types of data used. It also provides a comment on the reliability of the basic catch and effort data and of the biological data used.

Source of information

This indicates the Working Group report or other source used by ACFM in framing the advice.

Additional headings may be introduced where required to deal with specific requests from Commissions or ICES Member Governments.

1.4 Requests for Advice

Listed below are the requests for advice received from NEAFC, IBSFC, NASCO and the EC addressed in this report. Additional requests from individual member countries of ICES are also included.

1.4.1 Request from the North-East Atlantic Fisheries Commission (NEAFC), Fourteenth Annual Meeting, November 1995

- 1 ICES is requested to provide information and advice on the management of all fish stocks in the NEAFC Convention area for which sufficient data are available to provide such advice.
- 2 For each stock for which data are available to make an age-based analytical assessment, ICES is requested to provide short-term predictions of catches in 1997 and spawning stock biomass in 1998 for a range of fishing mortality rates; yield per recruit curves; wherever the appropriate level of information is available medium-term predictions of trends in catches and stocks should be provided.
- 3 For other stocks, depending on the data available, ICES is requested to make either General Production-type assessments or provide yield per recruit curves, showing in each case the present level of exploitation.
- 4 Wherever the appropriate level of information is available ICES should include multispecies considerations in terms of TAC compatibility and biological interactions.
- 5 It is particularly requested to:
 - a) provide information on the relationship between pelagic "deep sea" *S. mentella* and the *Sebastes mentella* fished in demersal fisheries on the continental shelf and slope;
 - b) provide advice on the medium-term consequences of an adaptive harvesting strategy, based on a constant annual catch within each 5 year period, set at a level required to obtain sustainable yields of "Oceanic" *S. mentella* and "deep sea" *S.*

mentella;

- c) evaluate the scientific basis and data employed for the estimation of the temporal and quantitative distribution by areas of Norwegian Spring-spawning herring stock contained in the "Report of the Scientific Working Group on zonal attachment of Norwegian Spring Spawning Herring (Reykjavik 13-19 September 1995)";
- d) indicate possible new developments in the seasonal and areal distribution of the total Norwegian Spring-spawning herring stock;
- e) assess for Norwegian Spring Spawning herring the probability that the spawning stock biomass will fall in the medium-term below the MBAL level under the following management strategies;
 - i) constant fishing mortality rates of 0.05, 0.1, 0.15, 0.20
 - ii) constant TACS of 0.5, 1.0, 1.5, 2.0 million tonnes;
- f) for blue whiting, evaluate the development of catches, total stock biomass and spawning stock biomass in the short and medium term;
- g) update descriptions of deep water fisheries in waters inside and beyond coastal state jurisdiction south of 63° N, for species like grenadiers, scabbard fishes, orange roughy, fork beards, sharks, angler fish and crabs, especially catch statistics by species, fleets and gear; and if possible indicate the biological status of these stocks.

1.4.2 Request from the International Baltic Sea Fishery Commission, Twentyfirst Session, September 1995

The International Baltic Sea Fishery Commission requests ICES to provide to its Twentysecond Session the following:

- a) assessments of the state of the stocks of cod, herring, sprat and salmon by appropriate areas;
- b) advice on catch options for cod, herring and sprat for 1997 (including biological reference points) inside safe biological limits;
- c) guidance on medium term management strategies in terms of spawning stock biomass and mortality rates for cod, herring and sprat;

- d) identify and evaluate the interaction between cod, herring, sprat and salmon stocks in the Baltic Sea;
- e) evaluate the potential for multispecies and multi-annual catch options for herring and sprat;
- f) review and summarize the results of the experiments and studies made so far on the selection properties of gears used in fisheries for cod and on the survival rate of cod escaping through the meshes;
- g) for cod fisheries, advice on appropriate mesh sizes in different exit windows installed in cod-ends of trawls with 105 mm and in cod-ends with standard diamond meshes corresponding to a L-50 of 38 cm;
- h) an evaluation of the effects of a ban on the pelagic trawl fishery for cod in April-May on spawning stock biomass and yield;
- i) any new information on the state of the flatfish and sea trout stocks in the Baltic;
- j) advice on necessary management measures on Baltic salmon for 1997 including a TAC in numbers, which would prevent any decrease in the natural production of smolts from the average level in 1992-1994;
- k) advice on management measures for 1997 and subsequent years which would gradually increase the production of wild Baltic salmon to attain by 2010 at least 50% of the natural production capacity of each river with current or potential natural production of salmon. This advice should include consideration of the use of a TAC, of restricting fishing to areas where only reared salmon occur and of delaying opening the coastal fisheries until the homing wild salmon have passed through the respective fishing areas. All measures considered should be subject to the requirement of maintaining the catch at as high a level as possible;
- l) advice on the appropriateness of employing a fixed balance between reared and wild salmon smolts as a management objective and, if appropriate, on the level at which that balance should be set;
- m) advice on the relationship between the numbers of salmon smolts released and the TAC level;
- n) examine the possible effects of increased mesh sizes in drift net fisheries on the salmon stocks and fisheries, and in particular on the wild salmon component;
- o) examine the feasibility and usefulness of employing the delayed released technique as a means of achieving the objective stated in k);
- p) advice on the use of adipose fin-clipping of reared salmon smolts as a tool in the assessment of wild and reared stocks and in the development of management strategies.

1.4.3 Request from the North Atlantic Salmon Conservation Organization, Twelfth Annual Meeting, June 1995

- 1 With respect to Atlantic salmon in each Commission area:
 - a) describe the events of the 1995 fisheries;
 - b) describe the status of the stocks and, where appropriate, evaluate the causes for any changes in salmon abundance with special reference to changes in natural mortality;
 - c) identify data deficiencies and research requirements relevant to the management of salmon stocks.
- 2 Report on significant research developments which might assist NASCO with the management of salmon stocks, with special reference to:
 - a) possible explanations for changes in sea-age at maturity of Atlantic salmon;
 - b) the criteria for defining salmon stocks.
- 3 Update the evaluation of the effects of the following measures on the stocks and fisheries occurring in the respective Commission areas:
 - a) quota management and closures implemented after 1991 in the Canadian commercial salmon fisheries;
 - b) the suspension of commercial fishing activity at Faroes since 1991;
 - c) the suspension of commercial fishing activity during 1993 and 1994 at West Greenland.
- 4 With respect to the fishery in the West Greenland Commission area:
 - a) review the age specific target spawning levels in Canadian rivers;
 - b) provide catch options with an assessment of risks relative to the objective of achieving target spawning escapement.

- 5 With respect to fisheries and stocks in the North-East Atlantic Commission area:

- a) provide estimates of age specific spawning targets;
- b) provide catch options with an assessment of risks relative to the objective of achieving target spawning escapement.

- 6 With respect to Atlantic salmon in the NASCO area, provide a compilation of microtag, finclip and external tag releases by ICES Member Countries in 1995.

1.4.4 Request from the European Commission Directorate General for Fisheries, September 1995

As in former years, ICES is requested to review the state of the stocks of fish occurring in Community waters or straddling adjacent zones, and to provide advice for their management. The Commission is fully satisfied with the way the new form of ACFM advice is being discussed at present. However, I would like to stress the importance of receiving scientific advice in useful terms, taking into account the existing management tools and the constraints imposed by the current state of the art of fisheries management in the Union. Our officers are willing to collaborate in that regard.

In addition to this "traditional" request, the Commission would like to obtain from ICES (for additional background, see annex):

- i) a classification of the stocks according to their status and level of exploitation;
- ii) a summary of the observed changes in the status and level of exploitation that have occurred during the last decade;
- iii) a summary of any observed changes in exploitation pattern;
- iv) an inventory of stocks for which a decrease in fishing effort would entail a decrease in long-term yield;
- v) whenever serious biological risks exist for a stock, information on the nature and magnitude of these risks and advice on measures to prevent them before they become evident.

ANNEX

Explanatory notes on additional requests to ICES

- i) The state of exploitation of a stock can only be determined when reference points are given beforehand. The following are criteria that may be used by ICES and would satisfy the Commission:
 - a) possibility of increasing the yield per recruit and the total yield by a realistic modification of the exploitation rate or of the exploitation pattern;
 - b) risk of falling below MBAL, however this is defined;
 - c) criteria used by FAO (1994).
- ii) and iii) The aim of the exercise is to assess the actual effects of management for key stocks. In particular, we intend to detect changes and compare them with significant events related to structural policies, technical improvements, TAC and technical measures regulations, or any other identifiable human intervention.
- iv) The presumed occurrence of unexploited or lightly exploited stocks has been traditionally used as an excuse for refusing to accept constraining management measures. But that occurrence has seldom been scientifically well documented. ICES is requested to identify stocks for which decreases in fishing effort would result in significant decreases of yield per recruit, and to assess, wherever possible, the associated gains or losses for other stocks resulting from technical interactions.
- v) Given the relatively high number of stocks managed by the EU which are near or below MBAL, a management action affecting a number of them could imply high risks of some of the individual stocks falling below MBAL. The Commission would welcome risk analysis for as many stocks or groups of stocks as possible.

1.4.5 Request from the Government of Norway and the European Commission, March 1996

ICES is requested to predict for the North Sea autumn spawning herring stock in 1997 to 2002 the development of:

SSB in 1997 to 2002

The catches of adult herring defined as mature herring

The catches of juvenile herring defined as immature herring

based on assumed recruitment of 0.1; 0.5 and 1.0 of average recruitment and with stochastic recruitment around the conventional stock-recruitment relationship for the stock;

and levels of exploitation of:

F(juv): 0.00; 0.02; 0.05; 0.1; 0.2; *status quo*
F(adult): 0.3

ICES is also requested to analyse various harvest strategies, including and excluding exploitation of juveniles, that will bring the SSB of the stock to 1.5 and 2.0 million tonnes in 2002 with a probability equal to or greater than 50% assuming stochastic recruitment around the conventional stock-recruitment relationship for the stock.

1.4.6 Request from the North Atlantic Marine Mammal Commission (NAMMCO), September 1992

ICES is requested to provide an assessment of the state of the pilot whale in the north eastern Atlantic, based on the information sampled from the Faroese drive fishery and the NASS sighting surveys.

1.4.7 Request from the Government of Finland, January 1996

According to Community legislation (Council Regulation No: 2115/77) herring fishery for other purposes than for human consumption is prohibited. This regulation covers also Baltic herring fishery in the Community waters.

However, in the connection of accession to the European Union, Finland and Sweden negotiated a derogation, which allows to continue industrial fishery for a transitional period of three years.

Before this period has elapsed the Council of European Communities will review the regulation concerned in order to decide whether the Baltic herring fishery may continue at its present extent.

In Finland Baltic herring is the most important species in commercial fishery. For decades most part of the catches has been used as fodder. It is important to know the effects of industrial fishery regarding fish stocks in the Baltic Sea.

Finland has extensive scientific data concerning both Baltic herring stocks and the Finnish Baltic herring fishery. These data cover the period from early 1970s.

Referring to the information above Finland requests ICES for scientific evaluation of the effects of the

present Baltic herring fishery to the Baltic herring stocks and possible effects to other fish stocks.

1.4.8 Request from the Government of the United Kingdom, February 1996

ICES is requested to undertake appropriate analyses of the Mackerel Box and provide updated advice as follows, on:

- a) whether juvenile mackerel still need protection;
- b) whether any protection needed is best provided through the Mackerel Box in its present location;
- c) whether a Mackerel Box or Boxes are required in other locations;
- d) and on the effectiveness of the Mackerel Box in the light of the impacts of all pelagic fishing including or excluding handlining.

1.4.9 Request from the Government of the United Kingdom, May 1996

There is public concern over the large-scale harvesting of fish species which constitute the prey of other fish, birds, and marine mammals. The UK considers it prudent to consider a wide range of management tools for the industrial fisheries. The UK welcomes the terms of reference given to the ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak to advise on management measures required to safeguard stocks of Norway Pout and sandeels.

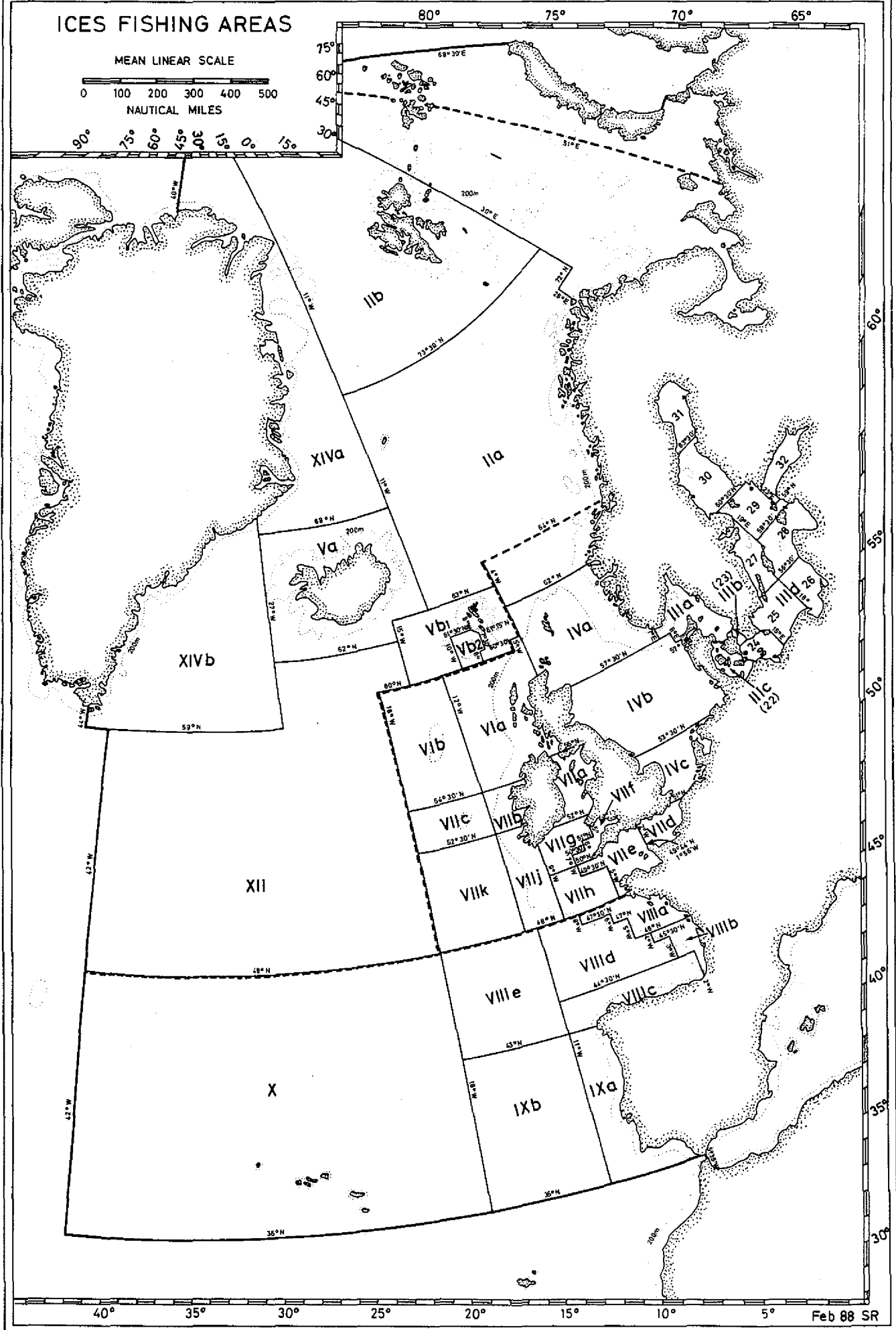
To give the widest possible scope for management decisions, the UK requests that ICES provides advice on appropriate levels for precautionary TACs for the sandeel stocks in the North Sea (IV), the Skagerrak (IIIa), and West of Scotland (VIa), and that advice be given on the practicality of providing annual estimates of TACs for sandeels based on the status of the stocks in that year.

The UK also requests that ICES should take account of the need to protect local aggregations of sandeels in sensitive areas close to important wildlife assemblages such as seabird colonies, by considering seasonal and localised catch regulations.

1.4.10 Request from the Government of Portugal, July 1996

ICES is requested to advise on possibilities to evaluate the effects of a sardine box in relation to the need to protect juvenile sardine taking into account different scenarios of recruitment and fishing mortality levels.

ICES FISHING AREAS



2. INTRODUCTORY ITEMS

2.1 Introduction

The assessments presented in this report are carried out using the best catch data available to ICES. These data are not necessarily identical with the official statistics but, where appropriate, include estimates of unreported landings as well as corrections for misallocation of catches by area and species. Despite considerable effort exerted on this problem, there is no guarantee that all instances of misreporting were discovered. Often the catch data used by ICES are collated on a stock rather than an area basis, and so straightforward comparisons between these figures and the official statistics, which are provided on an area basis, are not appropriate.

In the assessments, ICES tries to estimate the total catch taken, including slipped catches, discards, landings which are not officially reported, and the composition of the industrial by-catches. These amounts of different species, which have to be included in the estimates of what has been taken from a given stock in order for the assessments to be correct, thus appear in the tables and figures in this report. These levels of discards, slipped fish, unreported landings, and industrial by-catches vary considerably between different stocks and fisheries, being negligible in some cases and constituting important parts of the total removal from other stocks.

The catch data used in the assessments are given in the "table" section of this report. In cases where there might be doubt, it has been indicated if discards, by-catches, and estimates of unreported landings are included in the assessments. Estimates of catches landed as by-catches, especially from the industrial fisheries, are included in the assessments wherever data allow it and are included in the catch options.

It should be noted that, in general, catches in the industrial fisheries of protected species above the minimum landing size which are sorted and landed for human consumption, are included in the estimates of human consumption landings, both in the catch input data and in the projected catch options. Estimates of industrial by-catches cover, in most cases, that part of the by-catch which is used for reduction purposes.

In the past there have been problems associated with discrepancies between the official landing figures reported to ICES by member countries and corresponding catch data used by ICES. ICES recognizes the need for a clear identification of the categories of the catch data used for assessments and whenever possible specifies the composition of the catch data used to estimate fishing mortalities. ICES also attempts to identify factors contributing to the total fishing mortality in the various stocks, e.g.:

- recorded landings,
- discards at sea,
- slipping of unwanted catches,
- losses due to burst nets etc.,
- unreported landings,
- catch reported as other species,
- catch reported as taken in other areas,
- catch taken as by-catch in other fisheries.

It is recognized that it may not always be possible to reveal the sources of the data. It is, however, indicated whether the data originate from sampling programmes, field observations, interviews, etc., in order to allow ICES and other interested parties to evaluate the quality of the data, and hence the basis for the assessment.

The overall responsibility for obtaining reliable, adequate and timely fisheries statistics for publication in *ICES Fisheries Statistics* does not rest with ICES. It is the opinion of ICES that national offices for fisheries statistics are responsible for providing the catch data needed for assessments. These offices should ensure that catch statistics are collected on a gear basis and that the species composition of landings is determined in the case where landings are made unsorted by species.

2.2 Deterioration of Quality of Fishery Statistics

ICES expressed the greatest concern over the quality of catch and effort data from most of the important fisheries in the ICES area. Under-reporting and misreporting have increased dramatically in recent years. ICES stressed that the immediate consequences of this are that ICES will be unable to provide reliable estimates of current stock sizes and forecasts that have been used to set TACs. Trends in stock size and the overall status of the stock can sometimes be evaluated from research vessel surveys, but such information alone cannot be used to give the short-term TAC advice usually required.

2.3 Structure of the Report

At its meeting in May 1995, it was decided to restructure the ACFM report, providing information and advice on an area basis. Thus, all stocks belonging to a given area are placed in a separate section, together with an overview of the state of the stocks and fisheries in that area. This differs from the previous reports in that information and advice on a particular species, such as herring or *Nephrops* will not be found together, but dispersed over several sections. Where general comments applying to a particular species or group of species are required, these are included in a separate section under "Introductory Items" (see Section 2.4).

The only exception to the new structure in this report is that the report to the North Atlantic Salmon Conservation Organization is reprinted as a separate section at the end of the report.

2.4 *Nephrops* Stocks

Advice on stocks of Norway lobster *Nephrops norvegicus* for 1996 and 1997 was provided in the 1995 report of ACFM (ICES Cooperative Research Report, No. 214 published in March 1996).

3 REVIEW OF STOCKS

3.1 Stocks in the North-East Arctic (Sub-areas I and II)

3.1.1 Overview

Major Stocks and Landings

The total landings of fish and invertebrates in this area reported to ICES in 1995 were 2.2 million t. In addition 43,000 t are estimated to have been landed but not reported to ICES. These catches were taken from a variety of demersal and pelagic stocks.

The major demersal stocks in the North-East Arctic include cod, haddock, saithe and northern shrimp. In addition wolffish, redfish, Greenland halibut and flatfishes (e.g. long rough dab, plaice) occur demersally on the shelf and at the continental slope, with ling and tusk found also at the slope and in deeper waters. In 1995, landings of 1.1 million t were taken from the stocks of cod, haddock, saithe, redfish and Greenland halibut. An additional catch of 110,000 t was taken from demersal stocks, including crustaceans, not assessed at present.

The major pelagic stocks are capelin, herring and polar cod. Blue whiting and adult mackerel extend their feeding migrations seasonally into the southern parts of this region. The international fishery on herring which recommenced in 1994, with landings of 400,000 t, expanded in 1995 to landings of 900,000 t. No landings of capelin were reported in 1995, and landings of polar cod were 24,000 t. Landings of the highly migratory pelagic species, mackerel and blue whiting, amounted to 160,000 t.

Invertebrate species of krill, copepods and amphipods are considered to be important food resources for the fish stocks in this area. Marine mammals play an important role as predators on fish. Several stocks of other species of fish and invertebrates are found in the area. Small levels of landings include salmon, halibut, hake, pollack, whiting, Norway pout, anglerfish, wolffish, lumpsucker, argentinians, grenadiers, flatfishes, horse mackerel, dogfishes, skates, crustaceans and molluscs.

Fleets and Fisheries

The fleets operating in this area are:

1. Factory and freezer trawlers operating in the whole area all year round targeting mainly cod, haddock and saithe and taking other species as by-catch. The number of these vessels has been stable in recent years, at a lower level than previously.
2. Fresh fish trawlers operating in Sub-area I and Division IIa all year round targeting mainly cod and haddock, taking other species as by-catch. The number of these vessels has been reduced in recent years.

3. Freezer trawlers operating in Sub-area I and Division IIb fishing only shrimp. The number of these vessels has been stable.
4. Large purse seiners and pelagic trawlers targeting herring, mackerel, blue whiting, capelin and polar cod in seasonal fisheries in this region. These vessels fish some of the same species in other areas as well.
5. Small fresh fish trawlers targeting shrimp and capelin in near coast areas in Sub-area I. The size of this fleet has decreased in recent years.
6. A fleet of vessels using conventional gears (gillnet, longline, handline and Danish seine) mainly in near-shore fisheries targeting various demersal species all around the year. This fleet, together with fleets 7 and 8, accounts for approximately 30% of landings of demersal stocks. This share is maintained by quota allocation. When vessels in this fleet are modernised or replaced, there is a trend towards medium-sized (app. 15-20 m Loa) multi-gear vessels with crews of 3-5.
7. Small purse seiners targeting saithe in coastal waters in a seasonal fishery, being to a large extent vessels from the group using conventional gears.
8. Longliners operating offshore targeting non TAC-restricted species, mainly ling, blue ling and tusk. These vessels are generally larger and use technologically advanced auto-line systems.

With management restrictions and with the rather low abundance of other resources, the overall effort in the fisheries has stabilised. The only increase seen is in the fisheries in international waters for cod (Sub-area I) and herring (Division IIa).

Management Measures

The fisheries in Sub-areas I and II are managed by TAC constraints for the main stocks and allocation of TAC shares amongst states with established fishing interests in the sub-areas. These sub-areas consist mainly of waters within exclusive economic zones (EEZ) but also contain some international waters.

The fisheries in the EEZs for the main species are regulated by quotas at a variety of scales (vessels, fleets, species, season). Management measures also regulate minimum landing size, mesh size, and use of sorting grids. Minimum landing size is also a minimum catching size implying that vessels have to avoid fishing grounds with small-sized fish. Time and area closures may be implemented to protect small fish, and discarding is prohibited in some EEZs.

Sampling programmes of landings and catches have improved in recent years. However, there are still parts of the catches and landings that are not adequately sampled. Discards are not regarded as a major problem due to regulations and enforcement.

Compilation of effort data relevant to the different species is difficult when the fisheries are regulated by vessel quotas. In some cases the effort targeted at the main species, e.g.

cod, may be calculated but it is almost impossible to calculate effort for non-target species.

Recent conditions in the North-East Arctic

The recent developments in the stocks of cod, haddock, saithe, Greenland halibut, redfishes, herring and capelin are summarised in the following.

There have been changes in the evaluation of the status of some stocks with respect to F_{med} and minimum biologically acceptable levels (MBAL) of the spawning stock. These are at present the available criteria for assessing the status of the stocks in this area.

Cod is assessed to be within safe biological limits and is increasing due to recent good year classes.

Haddock is also increasing due to a strong year class.

The recruitment of saithe has been above average in four of the five most recent years, and the spawning stock has increased from the earlier low level, but is still close to MBAL.

The stocks of *Sebastes mentella* and Greenland halibut remain well outside safe biological limits. The stock of *Sebastes marinus* seems to remain stable but no estimate of absolute size of the stock can yet be given.

The capelin stock is currently at a very low level. The 1995 and possibly the 1996 year class is expected to give some increase in stock size.

Norwegian spring-spawning herring is subject to occasional periods of high recruitment and is increasing at present due to the recruitment of two strong year classes. The stock is considered to be inside safe biological limits.

Multispecies interactions are very important in this area and considerable effort has been devoted to investigating them. Some of these investigations have reached the stage where quantitative results are available for use in assessments. Growth of cod depends on availability of prey such as capelin, and variability in cod growth has had major impacts on the cod fishery. Cod are able to compensate only partially for low capelin abundance, by switching to other prey species. This may lead to periods of high cannibalism on young cod, and may result in impacts on other prey species which are greater than those estimated for periods when capelin are abundant. In a situation with low capelin abundance juvenile herring experience increased predation mortality by cod. The timing of cod spawning migrations is influenced by the presence of spawning herring in the relevant area. This type of prey could have a positive effect on the production of cod eggs.

The interaction between capelin and herring is illustrated by the recruitment failure of capelin coinciding with years of high abundance of young herring in the Barents Sea. Herring predating on capelin larvae seem to be the main reason for this.

The annual consumption of herring and capelin by marine mammals is estimated to be in the order of about 1.0 to 1.2 million t.

The composition and distribution of species in the Barents Sea depend considerably on the position of the polar front which separates warm and salty Atlantic waters from colder and fresher waters of arctic origin. At present this front is found further to the south and west and this is associated with a period of observed cooling. Changes in the influx of Atlantic waters to the large areas of the Barents Sea shelf have been associated with the variation in the recruitment of some species including cod and capelin.

3.1.2 Cod in Sub-areas I and II

3.1.2.a North-East Arctic cod

Catch data (Tables 3.1.2.a.1-2):

Year	ICES advice	Catch corresp. to advice ¹	Agreed TAC ¹	Off. Indgs.	ACFM catch ¹	Unreported catches
1987	Gradual reduction in F	595	560	552	523	
1988	F = 0.51; TAC	530	590	459	435	
1989	Large reduction in F	335	451	343	332	
1990	F at F _{low} ; TAC	172	160	187	212	25
1991	F at F _{low} ; TAC	215	215	269	319	50
1992	Within safe biological limits	250 ²	356	383	513	130
1993	Healthy stock	256 ²	500	532	582	50
1994	No long-term gains in increased F	649 ²	700	746	771	25
1995	No long-term gains in increased F	681 ²	700	740	740	
1996	No long-term gains in increased F	746 ²	700			

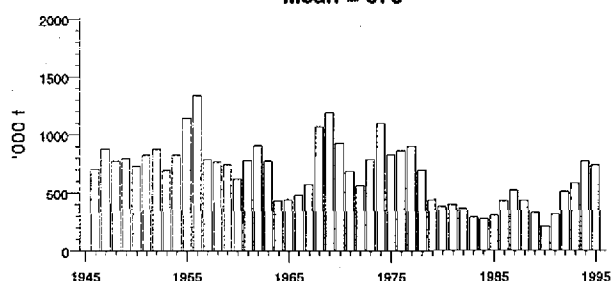
¹Norwegian coastal cod not included. ²Catch at *Status quo* F. Weights in '000 t.

Historical development of the fishery: The fishery is conducted both by an international trawler fleet and by coastal vessels using traditional fishing gears. Quotas were introduced in trawler fleets in 1978 and in the coastal fleets in

1989. In addition to quotas the fishery is regulated by mesh size (including sorting grids), a minimum catching size (see Section 3.1.1), a maximum by-catch of undersized fish, closure of areas with high density of juveniles and by seasonal and area restrictions.

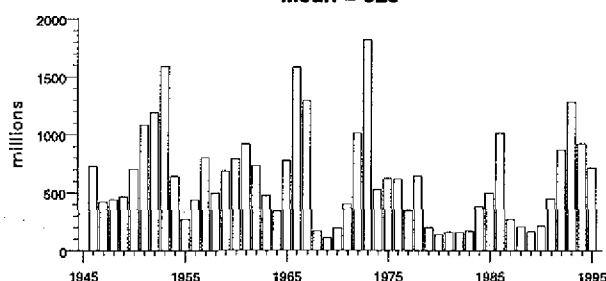
Landings

Mean = 678



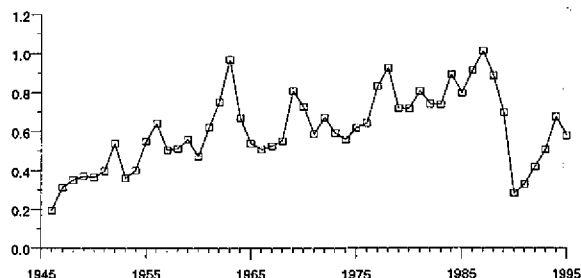
Recruitment (age 3)

Mean = 623



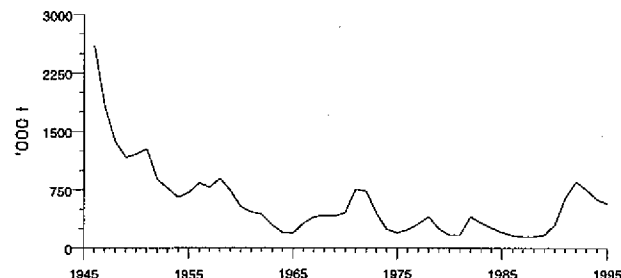
Fishing mortality (ages 5-10)

Mean = 0.607



Spawning stock biomass

Mean = 582



State of stock: The stock is considered to be within safe biological limits. The spawning stock biomass is above the Minimum Biologically Acceptable Level (MBAL, currently estimated at 500,000 t). Fishing mortality has doubled since 1990 and was in the years 1993-1995 above F_{med} (0.46). Recent year classes are at or above average, and the fishing mortality is expected to fall below F_{med} in 1996.

Details given in Table 3.1.2.a.3.

Forecast for 1997:

SSB(96) = 832, $F(96)$ = 0.41, Basis: Catch (96)= 750, Landings(96) = 750

Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	0.4 F_{95}	0.23	1277	555	1730
B	0.6 F_{95}	0.35		787	1527
C	0.8 $F_{95} = F_{med}$	0.46		994	1349
D	1.0 F_{95}	0.58		1178	1193
E	1.2 F_{95}	0.69		1342	1056

Weights in '000 t.

Relative to 1996 all options show increased SSB. Relative to 1997 options A-C will lead to an increase in spawning stock and options D-E to a reduction.

Management advice: Taking into account the uncertainties regarding predation mortality and mean weight at age, a fishing mortality well below F_{med} is advised.

Special comments: The present description of the stock situation is more optimistic than last year's assessment. Revised data on cannibalism indicate last year's assessment seriously overestimated the cannibalism of 3 year

old fish, thus underestimating the projected contribution from the large year classes 1990 and 1991. Moderate changes in mean weights at age and changes in the estimated exploitation pattern have also contributed to an upward revision in the present assessment.

The growth of cod is expected to be low in the near future due to expected low abundance of capelin. A low mean weight at age (1994-1996 average) has therefore been used in the forecast.

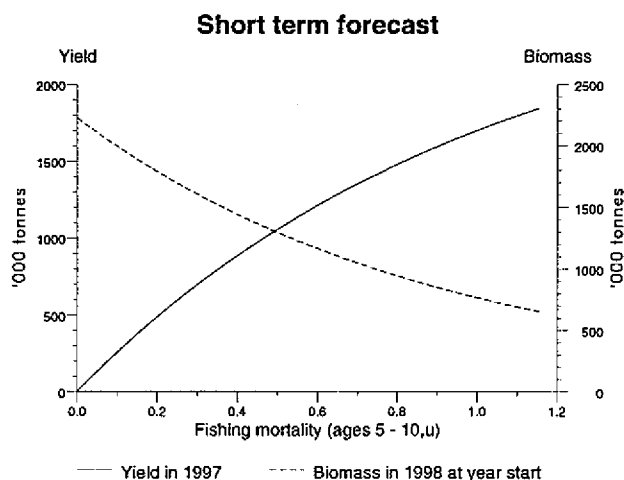
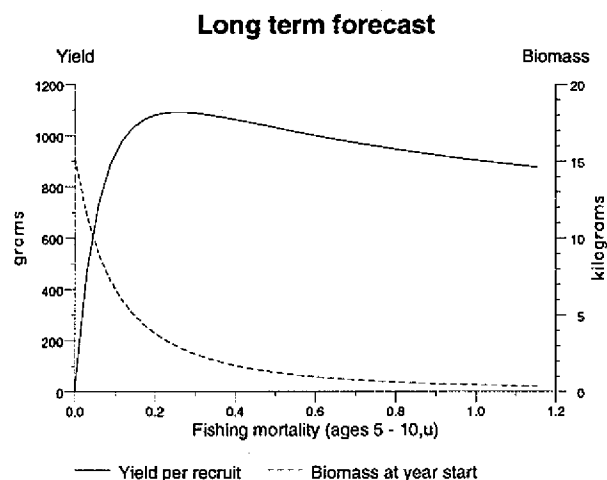
There are indications of lower maturity at age with increasing spawning stock size, but this has not been accounted for in the prediction of the spawning stock size. Thus the spawning stock might be overestimated in the predictions.

A high rate of cannibalism in 1993-1995 due to low abundance of capelin has been observed and is included in the assessment. Revised figures of cannibalism on the different age groups have shifted the level of some of the year classes considerably from last year's assessment. Based on the available data it is expected that the 1993 and later year classes may be severely reduced by cannibalism before they recruit to the fishery. The starting population for the prediction is thus corrected for cannibalism on age groups 3-5 but it is difficult to indicate the impact of cannibalism in the catch forecast, especially in the medium term. The forecasts are therefore considered to be uncertain.

Data and assessment: Analytical assessment based on catch-at-age data, surveys and CPUE data. The level of unreported catches has decreased from the very high level in the early 1990s. Cannibalism is estimated from annual stomach sampling.

Source of information: Report of the Arctic Fisheries Working Group, August 1996 (CM 1997/Assess: 4).

Yield and Spawning Stock Biomass



3.1.2.b Coastal cod

Catch data (Table 3.1.2.b.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Official landings	ACFM catch ²
1987	Not assessed		40	31	31
1988	Not assessed		40	22	22
1989	No advice		40	17	17
1990	No advice		40	24	24
1991	Included in TAC for I and II		40	25	25
1992	Shot forecast included in TAC for I and II		40	35	35
1993	Shot forecast included in TAC for I and II		40	43	44
1994	No advice		40	48	48
1995	No advice		40	40	40
1996	No advice		40		

¹Added to the agreed TAC of North-East Arctic cod. ²Norwegian landings from Division IIa (see also Table 3.1.2.b.1). Weights in '000 t.

In the figure below, landings up to 1974 include Russian/USSR data from Sub-area I and Norwegian data from Division IIa; the landings from 1980-1994 are Norwegian data from Division IIa only (see Table 3.1.2.b.1).

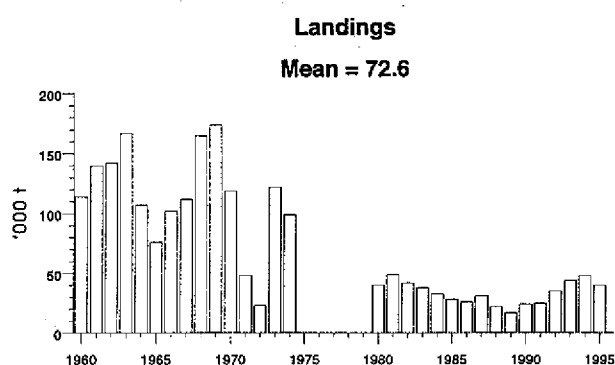
Historical development of the fishery: The distribution is found to be along the Norwegian coast from 62°N northwards. The fishery for coastal cod is a directed fishery using a variety of traditional gears except trawl. The management of the Coastal cod fishery is integrated into that for North-East Arctic cod and follows the same regulations and restrictions.

State of the stock: Uncertain. A joint acoustic/trawl survey in 1995 indicates a total Coastal cod stock of about 144,000t, including approximately 75,000t of spawning stock.

Special comments: The 1995 acoustic survey was the first survey covering the whole stock distribution. The result is considerably below the earlier estimate obtained by adding partial surveys performed over a 3 year period. It is not known whether this reduction reflects a real trend in the stock or whether it is caused by the change in survey strategy or by low precision of the estimates. If this stock is to be monitored, annual surveys are required.

Data and assessment: Catch-at-age data for coastal cod in Sub-areas I and II are not available. Joint acoustic/trawl surveys were conducted on parts of this stock in 1992-1994, and for the whole distribution area in 1995.

Source of information: Report of the Arctic Fisheries Working Group, August 1996 (CM 1997/Assess:4).



3.1.3 North-East Arctic haddock

Catch data (Tables 3.1.3.1-2):

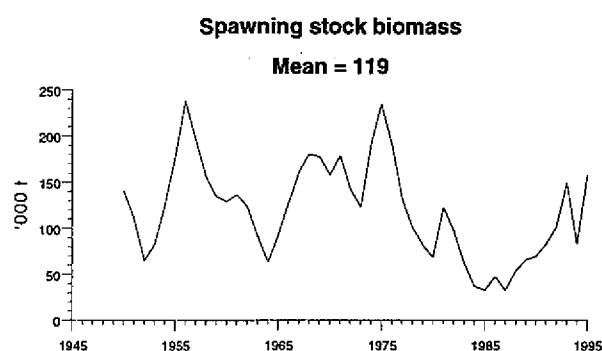
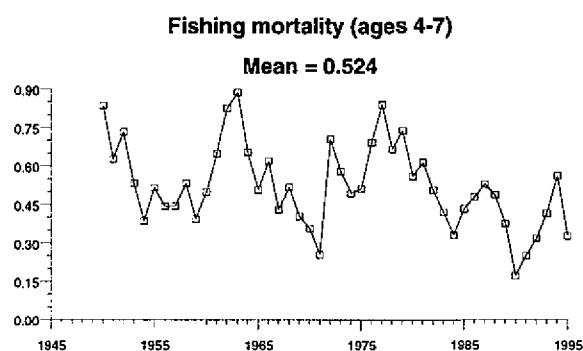
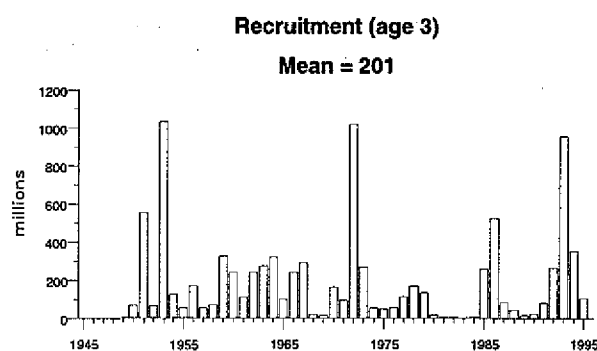
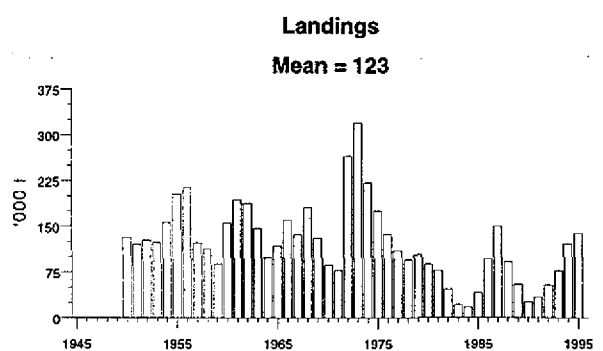
Year	ICES advice	Catch corresp. to advice ¹	Agreed TAC ¹	Official landings	ACFM catch ¹
1987	No increase in F; TAC	160	250	155	151
1988	No increase in F	<240	240	95	92
1989	Large reduction in F	69	83	60	55
1990	No directed fishery	-	25	27	26
1991	No directed fishery	-	28	34	34
1992	Within safe biological limits	35 ²	63	58	54
1993	No long-term gains in increasing F	56 ²	72	83	77
1994	No long-term gains in F>F _{med}	97 ³	120	125	121
1995	No long-term gains in F>F _{med}	122 ³	130	138	138
1996	No long-term gains in F>F _{med}	169 ³	170		

¹Haddock in Norwegian coastal areas not included. ²Predicted catch at *status quo*. ³Predicted catch at F_{med}. Weights in '000 t.

Historical development of the fishery: The fishery is mainly a trawl fishery, in periods only as by-catch in the fishery for cod. The fishery is also restricted by quotas for the traditional gears. The fishery is regulated by a minimum catching size (see Section 3.1.1), a minimum mesh size in trawls and Danish seines, a maximum by-catch of undersized fish, closure of areas with high density of juveniles and other seasonal and area restrictions.

State of stock: The stock is currently considered to be within safe biological limits. Due to improved recent recruitment the spawning stock biomass has increased and is well above the historical low levels observed in the mid 1980s. However, the fishing mortality has doubled since 1990.

Details in Table 3.1.3.3.



Forecast for 1997:

SSB(96) = 242, $F(96) = 0.27$; Basis: Catch (96) = 170;
Landings (96) = 170.

Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	$0.4F_{95}$	0.13	419	110	453
B	$0.6F_{95}$	0.20		158	412
C	$0.8F_{95}$	0.27		202	374
D	$1.0F_{95} - F_{med}$	0.33		242	341
E	$1.2F_{95}$	0.40		279	311

Weights in '000 t.

All options show increased SSB in 1998 relative to 1996, while relative to 1997, options B-E all show decreasing spawning stock.

Management advice: To extend the yield and spawners from the 1990 year class and to take into account the uncertainty in the stock assessment, it is advised not to increase the effort and to keep the fishing mortality well below F_{med} .

Special comments: The perception of the state of the stock has changed compared to the previous assessment. The upward revision was mainly caused by changes in assessment

calibration method and by inclusion of predation estimates by cod on haddock. The present assessment is quite sensitive to the calibration method applied and has to be regarded as rather uncertain.

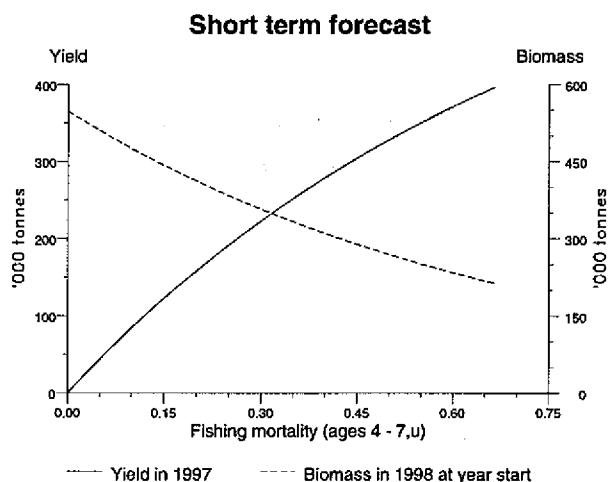
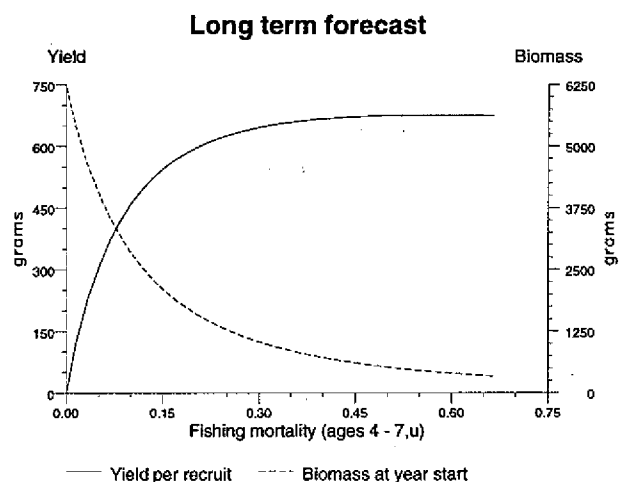
A common feature of haddock stocks is the occurrence of occasional strong year classes which gives a temporary stock increase. North-East Arctic haddock is mostly taken as by-catch in the cod fisheries, but in the past the appearance of abundant haddock year classes had also led to a directed fishery causing high exploitation rates. This may recur due to an increased directed fishery on the strong 1990 year class if higher fishing mortality is allowed in 1997.

The maturity at age is believed to be reduced when the spawning stock size increases. However, in predicting the spawning stock size for 1997, no reduction in the maturity at age compared to 1996 has been made. The present perception of the increase in the spawning stock may therefore be too optimistic.

Data and assessment: Analytical assessment based on catch-at-age, surveys and commercial CPUE. Predation mortalities estimated from annual stomach samples of cod.

Source of information: Report of the Arctic Fisheries Working Group, August 1996 (CM 1997/Assess:4).

Yield and Spawning Stock Biomass



3.1.4 North-East Arctic saithe

Catch data (Table 3.1.4.1):

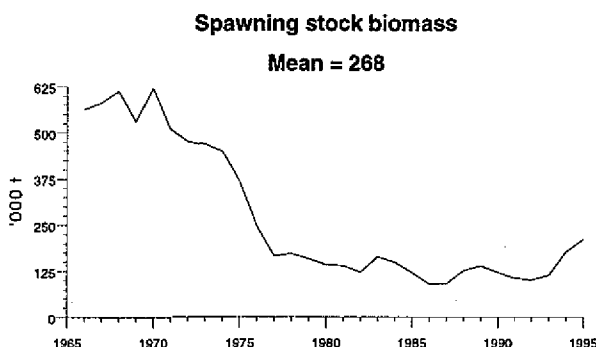
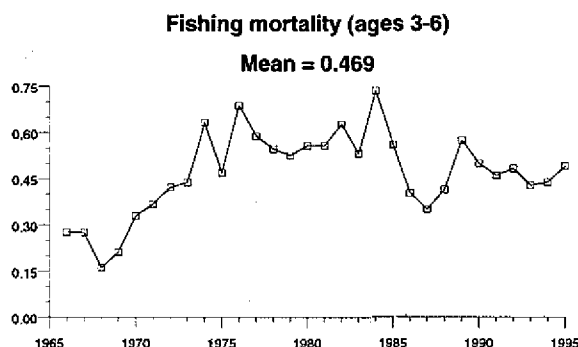
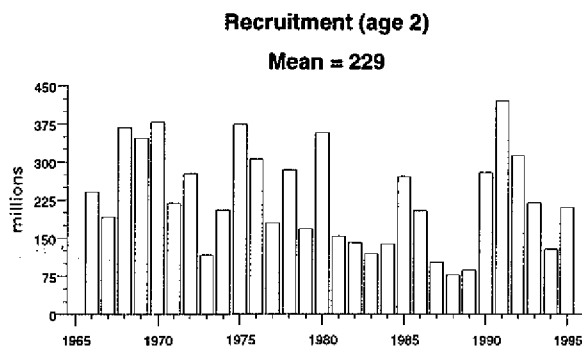
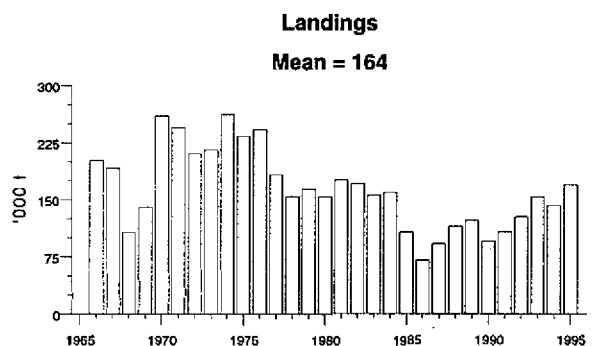
Year	ICES advice	Catch corresp. to advice	Agreed TAC ²	Official landings	ACFM catch
1987	No increase in F; TAC; protect juveniles	90	-	92	92
1988	No increase in F	<83	-	114	115
1989	Status quo F; TAC	120	120	122	123
1990	$F \leq F_{med}$; TAC	93	103	96	95
1991	F at F_{low} ; TAC	90	100	107	107
1992	Within safe biological limits	115	115	128	128
1993	Within safe biological limits	132 ¹	132	154	154
1994	No increase in F	158 ¹	145	142	142
1995	No increase in F	221 ¹	165	169	169
1996	No increase in F	158 ¹	163		

¹ Predicted catch at status quo F. ² Set by Norwegian authorities. Weights in '000 t.

Historical development of the fishery: Since the early 1960s, the fishery has been dominated by purse seine and trawl fisheries, with a traditional gill net fishery for spawning saithe as the third major component. The purse seine fishery is conducted in coastal areas and fjords and typically exploits somewhat smaller fish than the trawlers. Historically, purse seiners and trawlers have taken roughly equal shares of the catches. Since 1992, purse seine catches have decreased substantially and the trawl catches increased

correspondingly such that they now account for more than half of the catches.

Based on target catch and estimated catches of other gears, quotas are set for purse seine and trawl fisheries. In the Norwegian fishery, quotas can be transferred between purse seine and trawl if it becomes clear that the quota allocated to one of the gears will not be taken.



State of the stock: The stock is considered to be close to safe biological limits. Although the spawning stock biomass has increased after almost 20 years at low levels and is now above MBAL (currently estimated at about 170,000 t), it will fall below MBAL in the short term at present levels of fishing mortality. There was a declining trend in fishing mortality from 1989 to 1993 and then an increase in 1995 almost to the 1990 level (0.5), bringing F well above F_{med} (0.33). Recruitment has been above average in four of the five last years.

Details in Table 3.1.4.2

Forecast for 1997:

SSB(96) = 211, $F(96)$ = 0.50, Basis: Expected Catch(96) = 163(target for management based on quotas for major fleets), Landings (96) = 163.

Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	$0.4F_{95}$	0.20	167	69	225
B	$0.6F_{95}$	0.30		98	196
C	F_{med}	0.33		107	187
D	$0.8F_{95}$	0.39		123	171
E	$1.0F_{95}$	0.49		145	150
F	$1.2F_{95}$	0.59		164	132

Weights in '000 t.

Option A shows an increase in SSB, while Options C to F show a decline in SSB in the short term. A 20% or greater reduction in fishing mortality is required to have the spawning stock at or above MBAL in 1998.

Medium-term considerations: At *status quo* fishing mortality (0.49) the probability that the spawning stock will be below MBAL (170,000 t) in year 2000 is estimated to be 75%. This probability is reduced to 22% when fishing mortality is kept at 0.39 and to less than 3% when fishing mortality is kept at 0.33 (F_{med}) or lower. The probability that the catch in 2000 will be below the expected 1996 catch (163,000 t) is about 80% at any of the above constant fishing mortality rates.

Trajectories of SSB and catch for three levels of F are given in the graphs on the next two pages.

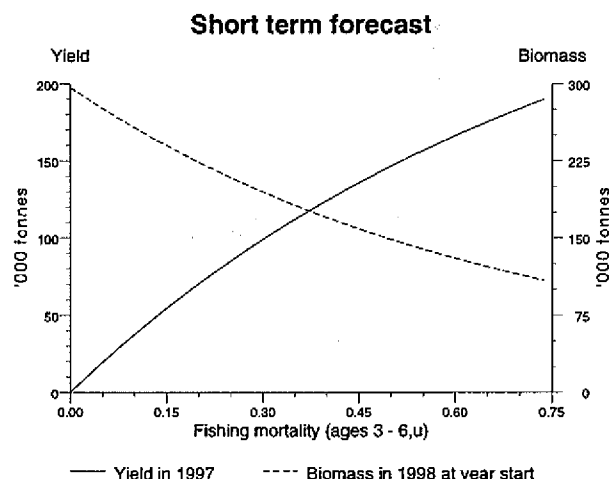
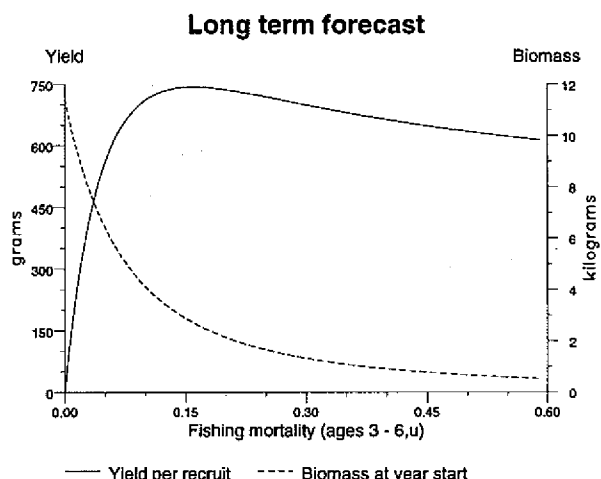
Management advice: In order to prevent the spawning stock from decreasing below MBAL in the medium term a reduction of fishing mortality in 1997 to the F_{med} level or below is required.

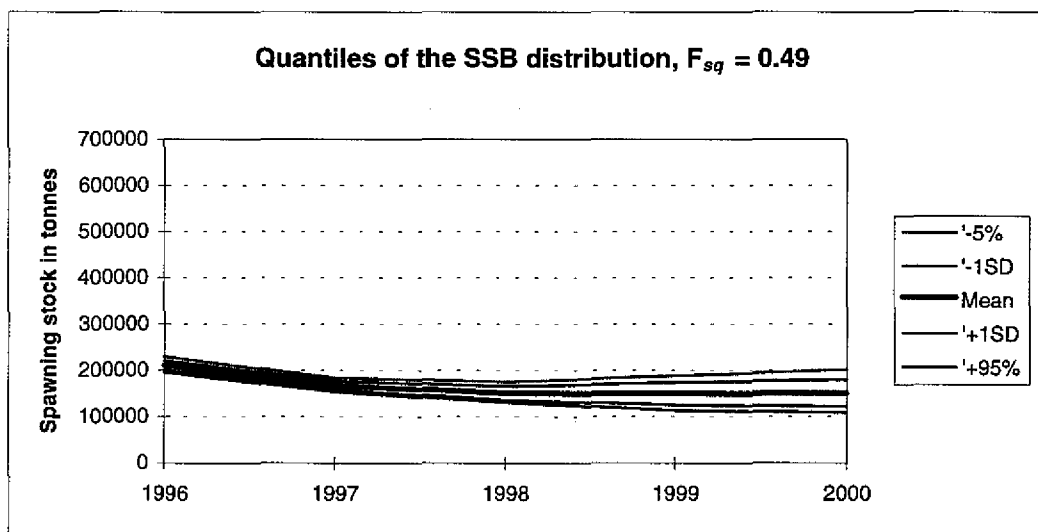
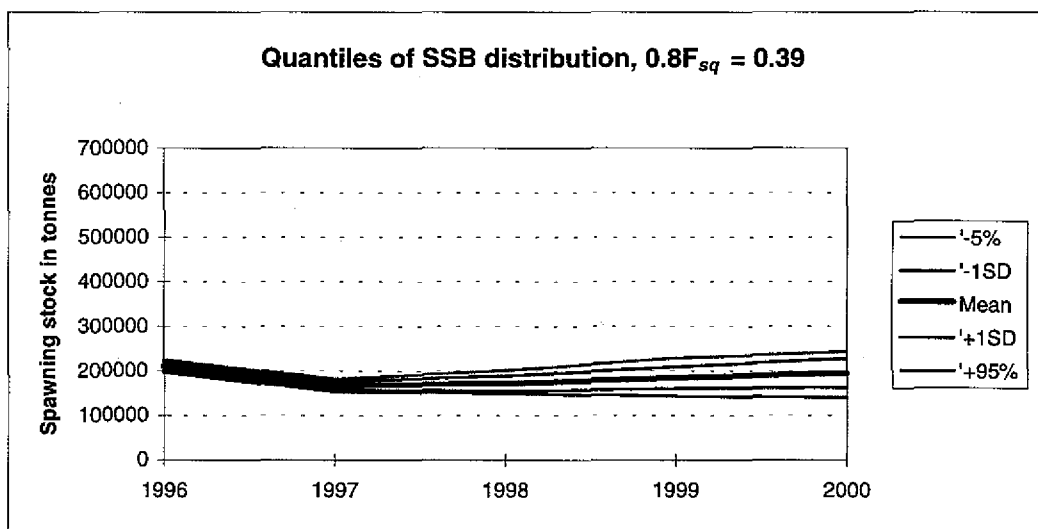
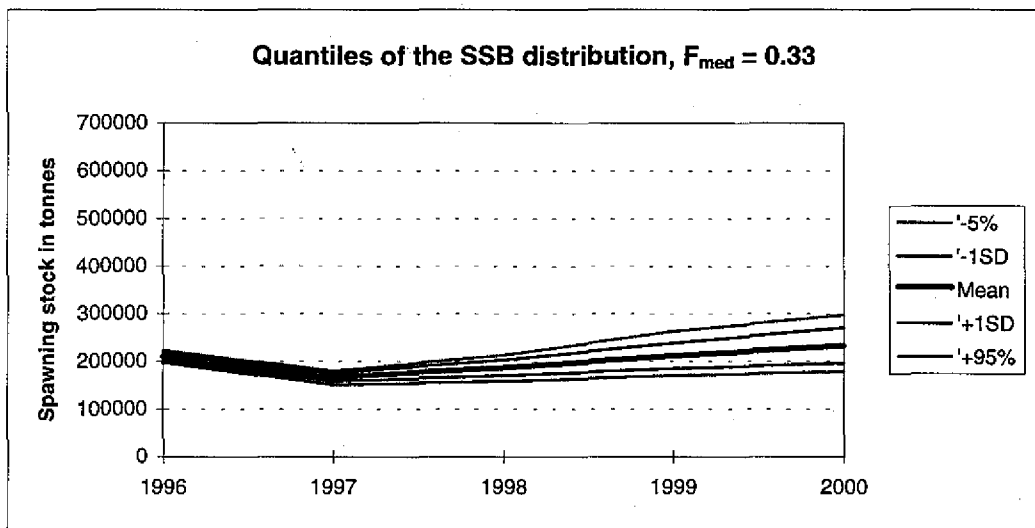
Special comments: The present assessment of the stock is somewhat less optimistic than the previous one. The 1992 year class is reduced by about 40% partly due to revision of the age composition of the 1994 catches. In addition the mean weights at age of the dominating age groups in 1995 have been observed to be lower than expected.

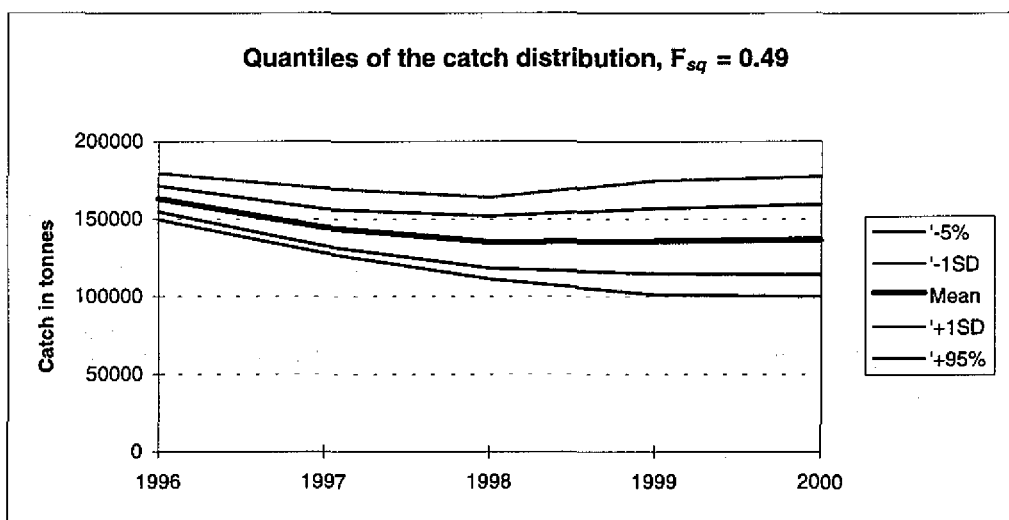
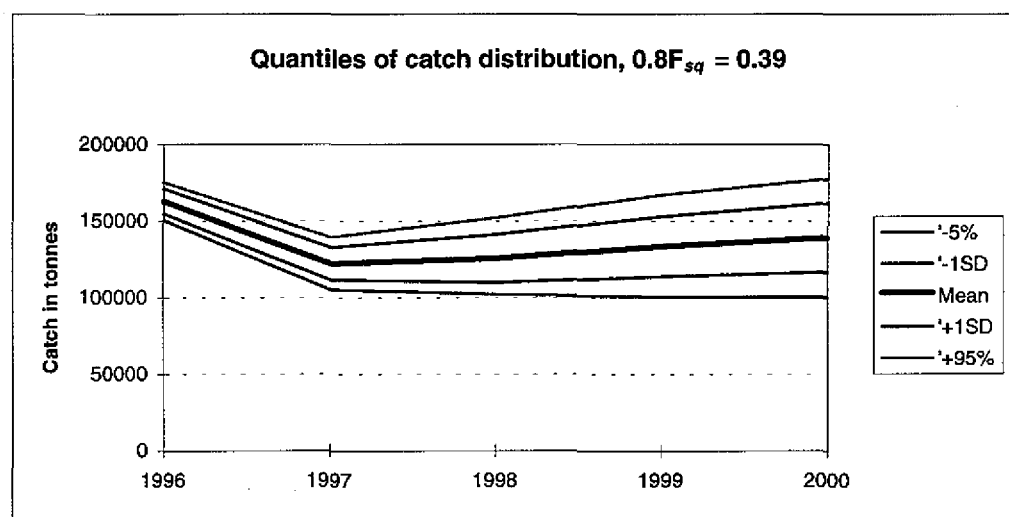
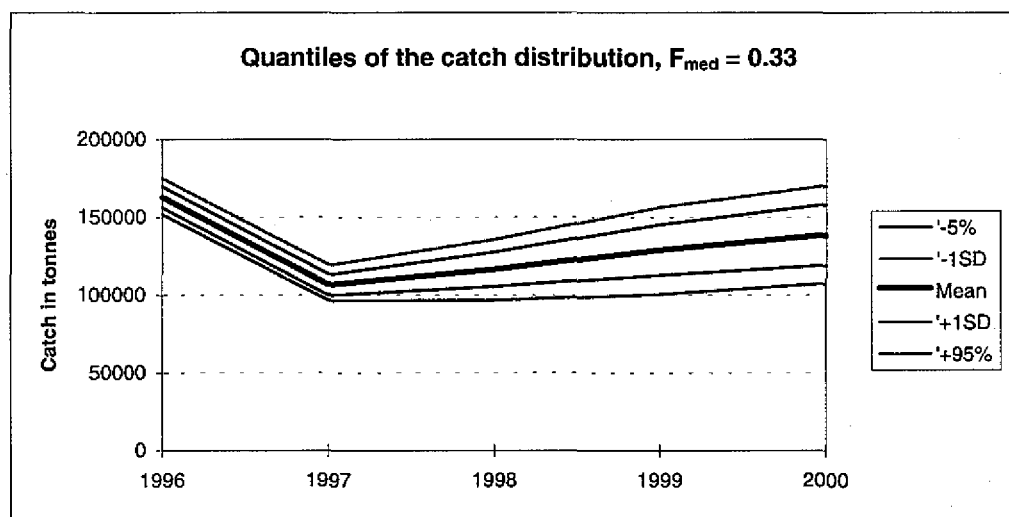
Data and assessment: The analytical assessment was based on catch-at-age and survey data. Catch per unit effort data were taken from Norwegian purse seiners and trawlers and the abundance indices from an acoustic trawl survey.

Source of information: Report of the Arctic Fisheries Working Group, August 1996 (CM 1997/Assess:4).

Yield and Spawning Stock Biomass







3.1.5 Redfish in Sub-areas I and II

(Table 3.1.5.1)

3.1.5.a *Sebastes mentella* in Sub-areas I and II

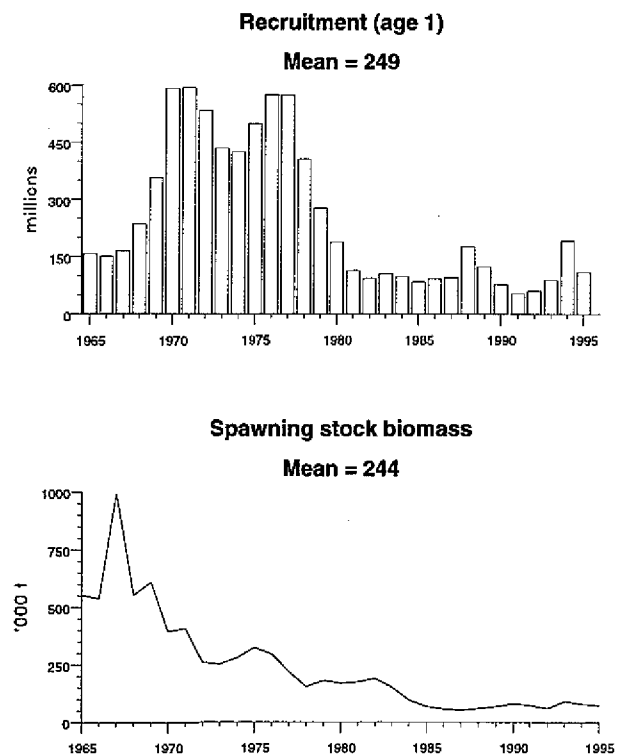
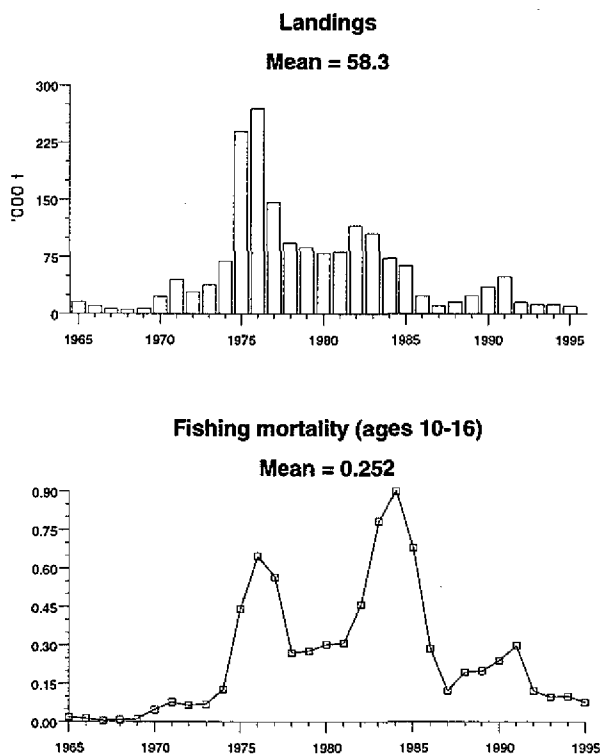
Catch data (Tables 3.1.5.a.1-5):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings ¹	ACFM catch of <i>S. mentella</i>
1987	Precautionary TAC	70 ¹	85	35	11
1988	$F \leq F_{0.1}$; TAC	11	-	41	16
1989	Status quo F; TAC	12	-	47	23
1990	Status quo F; TAC	18	-	63	35
1991	F at F_{med} ; TAC	12	-	68	49
1992	If required, precautionary TAC	22	-	32	16
1993	If required, precautionary TAC	18	18	29	12
1994	If required, precautionary TAC	-	-	28	12
1995	Lowest possible F	-	-	25	10
1996	Catch at lowest possible level	-	-	-	7 ²

¹Includes both *S. mentella* and *S. marinus*. ²Expected catch. Weights in '000 t.

Historical development of the fishery: The only directed fishery for *S. mentella* is a trawl fishery. In addition, by-catches are taken in shrimp-trawl fisheries. Traditionally this fishery was conducted by Russia and other East-European countries on grounds from south of Bear Island towards

Spitsbergen. From the mid-1980s Norwegian trawlers started fishing along the continental slope (around 500 m depth) further south, on grounds never harvested before, and inhabited primarily by mature fish. After a decrease in the landings from 1982 to 1987, this fishery on new grounds



resulted in a temporary increase in the landings until 1991, after which the landings have declined (Table 3.1.5.a.5).

State of stock: The stock is considered to be outside safe biological limits. The assessment is not considered to be precise but is indicative of the relative trends in stock size. It shows that the spawning stock is close to its historically low level. The 1989 - 1992 year classes are indicated to be the lowest on record.

Details in Table 3.1.5.a.5

Management advice: ICES recommends that catches should be reduced to the lowest level possible until a significant increase in spawning stock biomass has been detected.

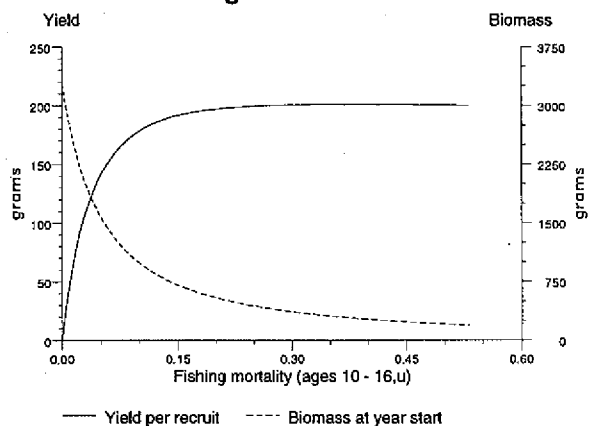
Special comments: The assessment is not considered reliable for catch forecasts, due to uncertainty regarding the absolute level of the present stock size. Recent improvements in the assessment confirm the usefulness of survey data and it is not possible to monitor the stock without continuing surveys.

Data and assessment: The analytical assessment was based on catch-at-age data, CPUE and survey data.

Source of information: Report of the Arctic Fisheries Working Group, August 1996 (CM 1997/Assess:4).

Yield and Spawning Stock Biomass

Long term forecast



3.1.5.b *Sebastes marinus* in Sub-areas I and II

Catch data (Tables 3.1.5.b.1-5):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings ¹	ACFM catch of <i>S. marinus</i>
1987	Precautionary TAC	-	-	35	24
1988	Reduction in F; TAC	15	-	41	26
1989	Status quo F; TAC	24	-	47	23
1990	Status quo F; TAC	23	-	63	28
1991	Precautionary TAC	24	-	68	19
1992	If required, precautionary TAC	25	-	32	16
1993	Precautionary TAC	12	12	29	17
1994	If required, precautionary TAC	-	-	28	17
1995	If required, precautionary TAC	-	-	25	15
1996	If required, precautionary TAC	-	-	-	19 ²

¹Includes both *S. mentella* and *S. marinus*. ²Expected catch. Weights in '000 t.

Historical development of the fishery: The fishery is mainly conducted by Norway accounting for 80-90% of the total catch. Germany also has long traditions in a trawl fishery for this species. The fish are mainly caught by trawl and gillnet, and to a lesser extent by longline and handline. Some of the catches are taken in mixed fisheries together with saithe and cod. Important fishing grounds are the Møre area (Svingøy), Halten Bank, outside Lofoten and Vesterålen, and at Sleppen outside Finnmark. Traditionally this is the most popular and highly priced redfish species.

Landings since 1965 are given in Table 3.1.5.b.5.

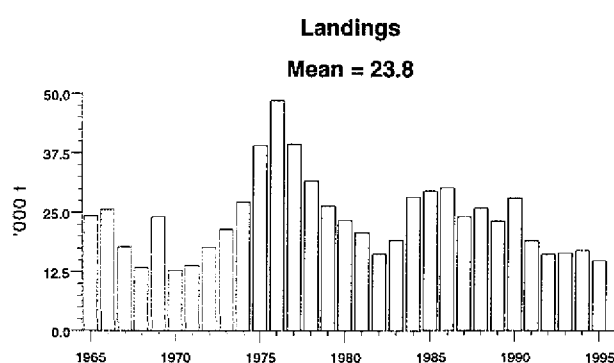
State of stock: An assessment of the state of the stock is not available. Indices from surveys in young fish areas in the Barents Sea and Svalbard waters and CPUE data do not

indicate any large recent changes in the stock situation, but the variability in the data is too large to detect moderate changes (see figure on next page).

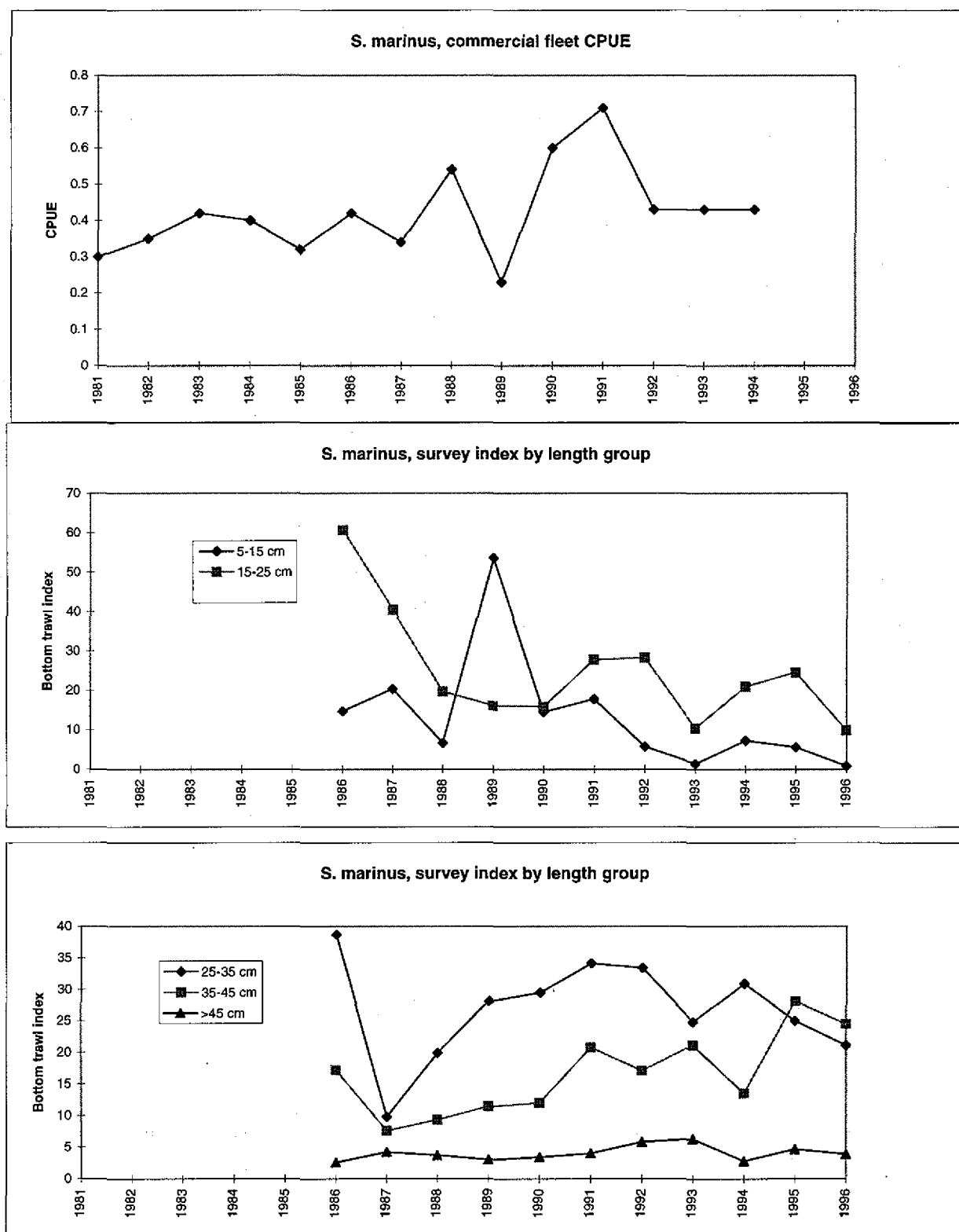
Management advice: If a TAC is to be implemented for this stock, it should be set on the basis of recent catch levels in 1993-1995.

Data and assessment: Catch-at-age and survey data are available for this stock.

Source of information: Report of the Arctic Fisheries Working Group, August 1996 (CM 1997/Assess:4).



Sebastes marinus. Stock size indices from commercial catch per unit effort data and from research vessel surveys.



3.1.6 Greenland halibut in Sub-areas I and II

Catch data (Tables 3.1.6.1-4):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	ACFM catch
1987	Precautionary TAC	-	-	19	19
1988	No decrease in SSB	19	-	20	20
1989	$F = F(87)$; TAC	21	-	20	20
1990	$F = F(89)$; TAC	15	-	23	23
1991	F at F_{med} ; TAC; improved expl. pattern	9	-	33	33
1992	Rebuild SSB(1991)	6	7 ¹	8	9
1993	TAC	7	7 ¹	12	12
1994	$F < 0.1$	<12	11 ¹	9	9
1995	No fishing	0	2.5 ²	11	11
1996	No fishing	0	2.5 ²		

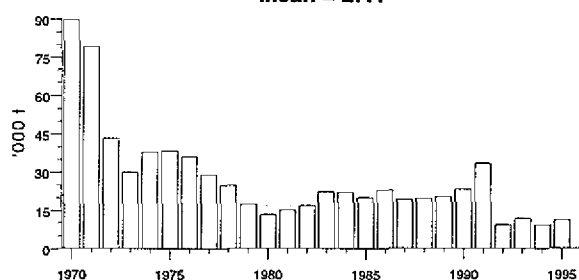
¹Set by Norwegian authorities. ²Set by Norwegian authorities for the non-trawl fishery. Unavoidable by-catch in the trawl fishery is additional to this. Weights in '000 t.

Historical development of the fishery: Following the introduction of trawlers in the fishery in the late 1960s the landings increased to about 90,000 t in the early 1970s. However, landings decreased in the late 1970s. The fishery from 1992 has been regulated by allowing a directed fishery

only by small coastal long line and gill net vessels. By-catches in the trawl fishery for other species have been limited. The by-catch of juvenile Greenland halibut in the shrimp fishery is reduced by mandatory use of a sorting grid.

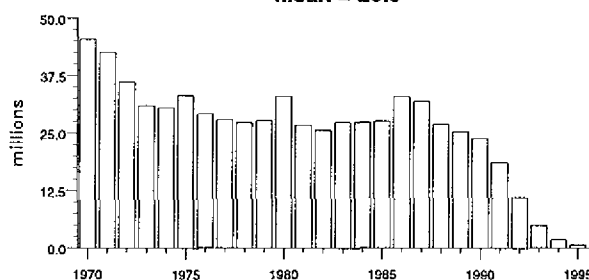
Landings

Mean = 27.4



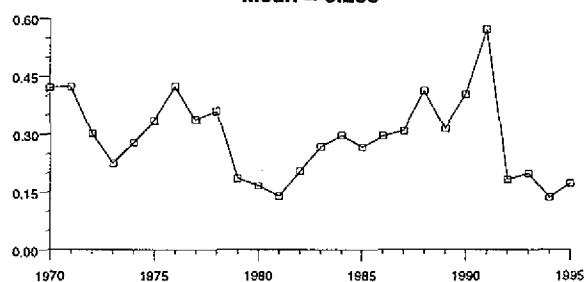
Recruitment (age 3)

Mean = 26.0



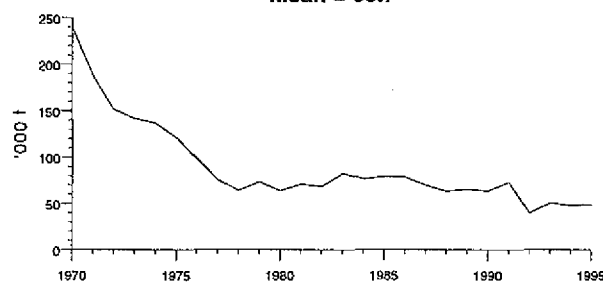
Fishing mortality (ages 6-10)

Mean = 0.293



Spawning stock biomass

Mean = 89.7



State of stock: The stock is at present outside safe biological limits. The spawning stock biomass is about the lowest on record and well below the MBAL of 65,000 t. The recruitment failure seen in the surveys in recent years is reflected in the assessment, although not to the same extent as in the surveys. Survey indices indicate that the 1995 year class is considerably larger than the previous ones, but it will not enter the spawning stock before 2001.

Details in Table 3.1.6.5.

Forecast for 1997: At *status quo* fishing mortality ($F_{97} = F_{95} = 0.17$) the catch in 1997 is predicted to be 11,600 t.

Management advice: In order to allow an increase of the spawning stock biomass, **ICES recommends that no fishing should take place in 1997.**

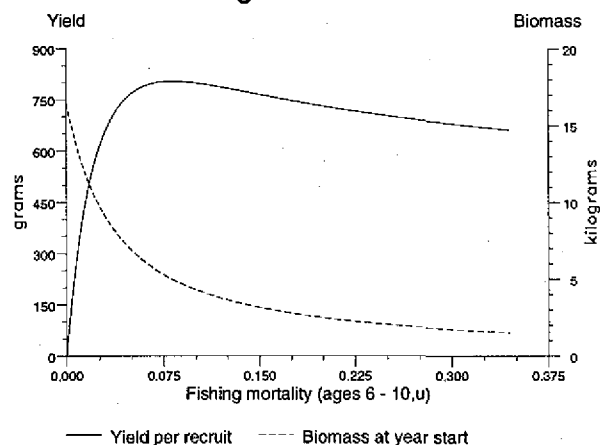
Special comments: Improved protection of juvenile Greenland halibut by use of sorting grids in the shrimp trawl fishery has apparently allowed some contribution to the spawning stock from year classes which were expected to be very poor. Continued protection should enhance the survival of the somewhat promising 1995 year class.

Data and assessment: Analytical assessment based on catch-at-age data. Four survey data series used for assessment. The assessment is very dependent on the estimated recruitment from the surveys.

Source of information: Report of the Arctic Fisheries Working Group, August 1996 (CM 1997/ Assess:4).

Yield and Spawning Stock Biomass

Long term forecast



3.1.7 Norwegian spring-spawning herring

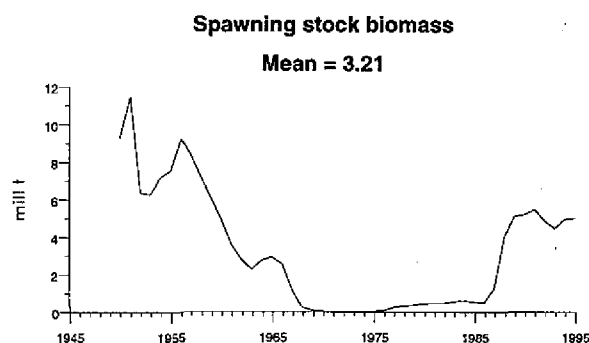
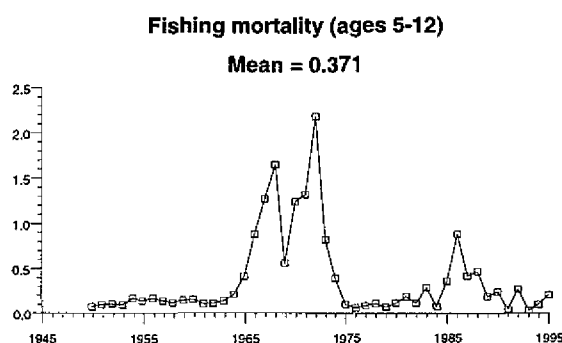
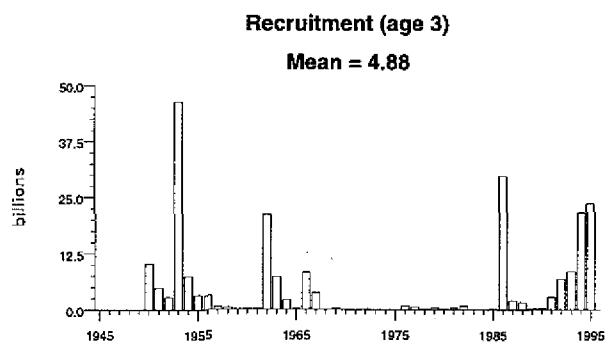
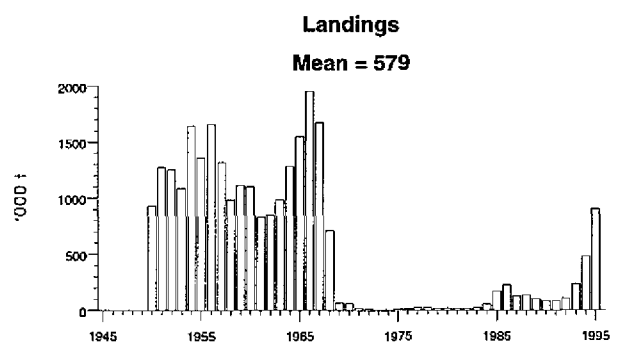
Catch data (Tables: 3.1.7.1- 3.1.7.2):

Year	ICES advice	Catch Corresponding to advice	Agreed TAC	ACFM catch
1987	TAC	150	115	127
1988	TAC	120-150	120	135
1989	TAC	100	100	104
1990	TAC	80	80	86
1991	No fishing from a biological point of view	0	76	85
1992	No fishing from a biological point of view	0	98	104
1993	No increase in F	119	200	232
1994	Gradual increase in F towards $F_{0.1}$; TAC suggested	334	450	479
1995	No increase in F	513	None ¹	902
1996	Keep SSB above 2.5 million t	-	None ²	

¹Autonomous TACs totalling 900,000 t; ²Autonomous TACs totalling 1,425,000 t were set by April 1996. Weights in 000 t.

Historical development of the fishery: A large increase in fishing effort and new technology led to the collapse of this stock around 1970. Recruitment failed when the SSB was reduced below 2.5 million tonnes. Since the collapse the aim has been to rebuild the spawning stock above this minimum level. In order to reach the goal, after a period of almost no fishing, the management of the stock has since 1985 aimed at restricting the fishing mortality to 0.05. Up to 1994, the

fishery was almost entirely confined to Norwegian coastal waters. Since 1992 the coastal fishery has increased sharply. During the summer of 1994 there were also catches in the offshore areas of the Norwegian Sea for the first time in 26 years. The geographical extent of this fishery increased in 1995, with nine nations participating and a total catch exceeding 900 thousand t. The fishery is expanding further in 1996.



State of the stock: The stock is considered to be within safe biological limits. The assessment of this stock is not considered to be precise but is indicative of the trends in stock size. The fishing mortality has increased in recent years but is still low and at the level of the estimated natural mortality. The 1989 to 1990 year classes are above average and the 1991 and 1992 year classes are very strong.

(Details in Table 3.1.7.3)

Forecast for 1997: Due to uncertainty about the outcome of the present management regime for this stock, which is based solely on autonomous TACs, a precise catch forecast cannot be given for 1996.

Furthermore, the management of this stock should be based on medium-term considerations. A standard short-term forecast is therefore not provided.

If catches in the order of 1.5 million t are taken in 1996 and 1997, a spawning stock biomass around 8 million t is forecast in 1998.

Medium-term considerations: The 1991 and 1992 year classes, which will recruit to the spawning stock in 1996-1998, are very strong. However, the 1993 year class is weak and the indices of the 1994 and 1995 year classes so far obtained indicate that these year classes are very weak. Due to the weak year classes the spawning stock is expected to decrease in the medium term. The development indicated by medium-term simulations strongly depends on the stock-recruitment model chosen for the simulations and the management regime implemented. It is difficult to construct appropriate recruitment models for this stock, which is characterised by occasional very large year classes and extended periods of low recruitment. Preliminary medium-term simulations indicate that a management regime implementing a combination of a maximum fishing mortality level of 0.15 and a catch ceiling of 1,500,000 t will lead to a low probability of the stock falling below the minimum biologically acceptable level (MBAL) before the year 2006, while either of these measures in isolation will lead to a considerable risk of SSB falling below MBAL.

Management advice: ICES advises that the fishery on this stock should be managed to ensure that the SSB is kept above the MBAL of 2.5 million t.

Special comments: Although there has been good recruitment recently, and although the short-term prognosis indicates an increasing stock size, it should be realised that the probability of such good recruitment recurring in the near future is low and that this stock has demonstrated vulnerability to collapse at high levels of exploitation. The choice of harvesting strategy should therefore not be made on the basis of a short-term prognosis but on the basis of medium-term considerations.

There is considerable uncertainty regarding the actual level of the stock and especially regarding the possible future development of the stock under different management

strategies. Preliminary medium-term analysis indicates that there is a high probability of SSB falling below MBAL within 10 years with management regimes implementing fishing mortalities above 0.15 or catch levels above 1,500,000 t. This is the result of the low probability of several years of strong recruitment within a 10-year period for this stock. There are no accumulated long-term gains from increasing the fishing mortality above the level of 1995. The utilisation of the strong year classes, which are currently present in the population, can be extended over a considerable time period without overall losses in which case they would also contribute to the spawning stock over a longer period.

Considering the above characteristics of the stock it seems prudent to implement a cautious management approach to achieve the objective of preventing SSB from falling below 2.5 million t. A cautionary approach could be implemented through a combination of a maximum fishing mortality level and a maximum catch as discussed in relation to medium-term analysis.

The recruitment pattern of this stock over this century shows that there is a high probability of reduced recruitment after one or two good year classes. It is therefore likely that a series of poor recruitment will follow the strong 1991 and 1992 year classes. This is also indicated from the current estimates of the 1993 to 1995 year classes.

Multispecies Dimension: The juveniles and adults of this stock form an important part of the ecosystem in the Barents Sea and Norwegian Sea. The herring has an important role as transformer of the plankton production to higher trophic levels (cod, seabirds and marine mammals). It is therefore important to secure a high production of the herring stock by allowing the stock to be kept at a level above MBAL. In the 1950s and 1960s the spawning stock was in the order of 5-10 million t.

The interaction between cod, capelin and herring in the Barents Sea has been demonstrated to be important for the survival of juvenile herring. At present the capelin stock in this area is very depleted and an improvement is not expected before 1999 at the earliest.

Data and assessment: Analytical assessment based on catch and survey data (acoustic estimates of adults and recruits, tagging estimates).

Information on *Ichthyophonus hoferi*: Norwegian data from the wintering and spawning areas indicate that virtually no disease was present in the stock. Russian data from the spawning areas may show higher percentages, but the basic data were not available to the Working Group. There is, however, no evidence indicating any increase in the disease prevalence, and hence no need to apply an increased natural mortality for 1996.

Spatial and temporal distribution of the Norwegian spring-spawning herring stock.

The emigration of the major part of the large 1991 and 1992 year classes from the nursery areas in the Barents Sea to the Norwegian Sea in 1995 was an important factor in relation to the development in the spatial and temporal distribution of this stock.

Up to (late April) 1996 the distribution and migration of adult herring seems to be comparable to the corresponding time period in 1995.

Evaluation of the Report of the Scientific Working Group on Zonal Attachment of Norwegian spring spawning Herring, Reykjavik, September 1995.

The working group was established by the governments of the Faroe Islands, Iceland, Norway and Russia 'with the objective of evaluating the zonal attachment of Norwegian spring spawning herring to exclusive EEZs of the parties and to international waters between the EEZs of the coastal states concerned'.

The resulting report cannot be evaluated in the same way as an ICES working group report : the working group was not established as a part of the ICES working group system, and did not conform to the normal requirement for ICES working groups or to scientific documents, to make a full presentation of the data and methods used. It is therefore not possible to make a full evaluation of the report.

The main concerns in relation to an evaluation of the report regard the documentation and the nature of the model :

The report describes the historical distribution of the 1950, 1959 and 1983 year classes each of which had a different migration pattern. The distribution of each of these year classes has been distributed on EEZs for each quarter of their lifetime on the basis of available distribution maps from

surveys. The 'zonal attachment' by zone over the lifetime of the year class is then calculated as the total biomass per zone and quarter accumulated over the lifetime of the year class.

The model for assignment to zones requires a large number of input parameters, but it is not clear from the report how such parameters have been derived from data and in which cases they have been assigned values on the basis of judgement and experience. What has been done may be perfectly valid and the best possible with the data available, but this can only be evaluated on the basis of a full documentation of data and methodology.

The model used is a reasonable way to describe the historical distribution of the three year classes concerned. The model, however, only describes what happened in the time periods investigated. It does not include any modelling of migration patterns or distribution as a function of abundance, and there is no model for interaction between age groups or year classes. The model can therefore not be used as a predictive model, for instance to make a prognosis of the distribution of the strong year classes which are currently present in the population or to predict expected changes in distribution as a result of different harvesting strategies.

The report may thus represent a valid description of the historical distribution of three specific year classes (each with its own migration pattern) on EEZs (this is subject to an evaluation of the full documentation), but cannot be used as a basis for evaluation of future distributions.

NEAFC request for medium-term projections

No further information was available to respond to this request in 1996.

Source of information: Report of the Northern Pelagic and Blue Whiting Fisheries Working Group, April 1996 (CM 1996/Assess:14).

3.1.8 Barents Sea capelin (Sub-areas I and II, excluding Division IIa west of 5°W)

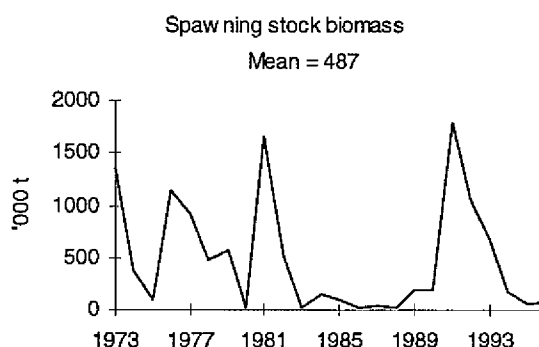
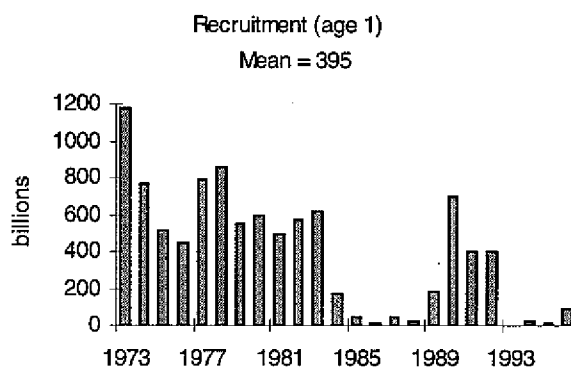
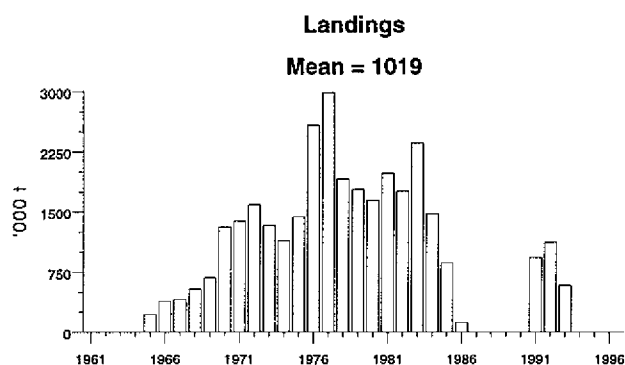
Catch data (Table 3.1.8.1):

Year	ICES advice	Rec. TAC	Agreed TAC	ACFM catch
1987	Catches at lowest practical level	0	0	0
1988	No catch	0	0	0
1989	No catch	0	0	0
1990	No catch	0	0	0
1991	TAC	1000 ¹	900	933
1992	SSB >4-500,000 t.	834-1030	1100	1123
1993	A cautious approach, SSB >4-500,000	600	630	586
1994	No fishing	0	0	0
1995	No fishing	0	0	0
1996	No fishing	0	0	0 ²

¹Winter-spring fishery. ²Expected catch. Weights in '000 t.

Historical development of the fishery: Capelin is mainly fished by purse seine and midwater trawl. Since 1979 the fishery has been regulated by a bilateral fishery management agreement between Norway and Russia (formerly USSR). TACs have been set separately for the winter fishery and the autumn fishery. In managing this

stock the main goal has been to allow a target spawning stock of 500,000 t to spawn. From the autumn of 1986 to the winter of 1991, no fishery took place. The fishery was re-opened in the winter season in 1991, on a recovered stock, but from the autumn of 1993 the fishery was again closed. There has been no fishing for Barents Sea capelin since 1993.



State of stock: The spawning stock is well below the target level of 500,000 t. The maturing component in autumn 1996 was estimated to be 250,000 t. SSB has been at a low level since 1993 and this level is comparable to that in the period 1985 to 1988. All year classes from 1992 to 1995 are far below average. The 1995 year class is more numerous than the previous year classes, but far below average recruitment for this stock. Observations during an international 0-group survey in August 1996 indicate that the 1996 year class is larger than the 1995 year class. Age groups 2-4 now have a historically high individual growth.

Details in Table 3.1.8.2

Medium-term considerations: Capelin is an important food component in the Barents Sea ecosystem. The cod stock is currently relatively large and has produced strong year classes in recent years. The annual predation by cod on capelin is estimated to have varied between 0.6 and 3.7 million t in the period 1989-95. Young herring have been found to consume capelin larvae, and this predation pressure is thought to be the major cause of the present recruitment failure of the capelin stock. The high predation pressure by cod and herring and the low capelin SSB are reflected in the current estimates of the poor recruiting year classes 1992 to 1994. The amount of young herring in the

Barents Sea has decreased in 1994 and 1995 giving perspectives for better larval survival and enhanced recruitment. Due to the present high individual growth the 1995 and 1996 year classes are likely to mature and die early, thereby causing a rapid but short-lived increase in stock biomass. The succeeding three or four year classes of capelin might be strongly reduced by the 1996 year class of herring, which is observed to be reasonably abundant in the Barents Sea. In that case there will be poor prospects of the spawning stock reaching the target level required for reopening the fishery before year 2000.

Management advice: ICES recommends that no fishing should take place on this stock in 1997.

Data and assessment: Analytical assessment based on acoustic surveys.

Source of information: Report of the Northern Pelagic and Blue Whiting Fisheries Working Group, April 1996 (CM 1996/Assess:14), and report from a meeting between scientists from IMR and PINRO after the acoustic survey September 1996.

3.2 Stocks in north-western areas (Division Va and Sub-areas XII and XIV)

3.2.1 Overview

The fisheries

Stocks in the north-western areas have mainly been exploited by Icelandic vessels since the mid seventies. However, vessels of other nationalities have also been operating in Sub-areas XII and XIV during this period. In the most recent years freezer and factory trawlers of various nationalities have been increasing in number in the pelagic deep-water fishery on oceanic redfish in Sub-areas XII and XIV. Norwegian vessels have also taken part in the capelin fishery, mainly in the Jan Mayen area.

The fisheries for the main pelagic species, Icelandic summer-spawning herring and capelin in the Iceland-East Greenland-Jan Mayen area, are almost exclusively carried out by purse seiners. The demersal species are mainly exploited by stern trawlers but considerable fisheries for cod are also carried out by gill nets, longline and handline. In general, effort is considered to be increasing or to have stabilised at medium or high levels (corresponding to F_{med} or higher) in recent years. Notable exceptions to this include the cod in Division Va, the herring and capelin. These stocks have been managed using harvesting strategies and, in particular, there was a marked decrease in the fishing mortality of cod in 1994.

Fisheries in these areas are characterised by the most sophisticated technological equipment available in this field. This goes for navigational techniques and fish-detection instruments as well as for the development of more effective fishing gears, not least pelagic trawls. There have also been substantial improvements with respect to technological aspects of other gears, such as bottom trawl, longline and handline, as well.

Management measures

The demersal fisheries (excluding oceanic redfish) have been managed by TACs since 1984 and the pelagic fisheries since the seventies. Fisheries in these areas are managed on a transferable quota system basis which is considered to lead to economic benefits in the long term. In such a system each vessel (or factory) is allocated a proportion of the TAC of a fish stock. The holder of this proportion of a TAC has the right to sell or buy quota to or from other holders in a free-market system. All fisheries are subject to a range of other management measures such as fishing gear regulations, closed areas and closed seasons. Efforts have been undertaken to prohibit discards through the introduction of minimum catching size instead of minimum landing size. These measures, however, are partly counterbalanced by other constraints on the fisheries such as limited quotas.

The state of stocks

The fish stocks considered in this report include the largest stocks in these areas. The stocks of capelin, cod and redfish are most outstanding in this respect. These and other species spawn in the warmer regions of Atlantic water but they differ substantially in their distribution patterns during other periods of their life cycle. The Greenland halibut is the only demersal deep-water species among the stocks. The saithe is characterized by highly migratory behaviour and migrations between Norway and Iceland have been observed. Oceanic redfish constitutes a vast resource although rapidly increasing effort is directed towards the stock. A number of other demersal commercial stocks inhabit both the continental shelf, e.g. flatfish species, and deeper waters, e.g. ling, blue ling and tusk. Most of these stocks are not regulated by TACs.

The three largest stocks have been subject to unfavourable trends during the last decades. The stocks of cod and redfish (traditional stocks) have been declining and are considered to be at low levels of spawning stock size. However, the capelin stock is considered to be at a relatively high level of stock biomass. The Greenland halibut has been declining rapidly during the most recent years and is considered to be at a low level. The saithe is considered to be at a low level. The Icelandic summer-spawning herring has been increasing steadily during the last two decades and is at a higher level of stock size than observed in previous periods. Further information on the demersal stocks at Greenland and Iceland are given in a later section of this overview.

In a boreal marine system, as in these areas, most life-history features of fishes tend to fluctuate substantially. During the last 10 years, however, the recruitment of cod has been at very low levels and has only occasionally come close to average values. During this period environmental conditions have been variable. On the other hand, the spawning stock has been at a historically low level. Thus, it might be concluded that the spawning stock of cod is outside biologically acceptable limits.

Other issues

The resources in the area have generally been managed on the basis of fairly extensive time series of data. Well known difficulties, such as age readings of redfish, are the same in these areas as elsewhere. The most apparent need for improvements in data analysis and in the gathering of auxiliary information, such as trawling or acoustic stock indices, is probably for Greenland halibut and for the deep-water and oceanic redfish stocks in the Irminger Sea (Sub-areas XII and XIV). The comprehensive assessment of these large and widely distributed stocks is a challenging task, which requires full scale international cooperation.

Interaction between commercially valuable species is frequently observed but appears to be most pronounced for few species. The most important predator-prey relationships are the cod-capelin and cod-*Pandalus* interactions through the growth dependence of cod on capelin and the

effect of cod predation on the recruitment of *Pandalus*. The high catches of deep-water *Pandalus* in Icelandic waters in recent years are considered to be a derivative of this interaction through the decline of the cod stock.

Demersal stocks at Greenland and Iceland

The cod at Greenland and Iceland can be considered as being composed of four components spawning in different areas: a West Greenland offshore component spawning off Southwest Greenland, inshore components found in various fjords, a component spawning off East Greenland and a component spawning off Iceland. Larvae and 0-group fish from the East Greenland-Iceland components are carried by the Irminger current to West Greenland. The inflow of larvae varies from year to year but for some year classes, such as those of 1973 and 1984, it was very important.

Tagging studies off West Greenland showed that inshore cod remained mainly within the area where they were tagged whereas recaptures of Greenland offshore cod were taken at Iceland. The emigration from West Greenland was most evident for year classes which were earlier observed as 0-group drifting from Iceland to Greenland.

The fishery off West Greenland has traditionally consisted of an offshore trawl fishery and an inshore fishery mostly using poundnets. Over the last decade, the fisheries have fluctuated substantially, but after 1989 the catches declined dramatically.

Catches off East Greenland have also fluctuated widely, but they decreased sharply in 1993 when the directed cod fishery failed totally due to very low catch rates.

All available information confirms the severely depleted state of the cod stock off Greenland. The offshore stock may be considered to be almost non-existent at the present time, and no substantial recruitment is expected in the foreseeable future.

The inshore stock component has historically been small and available information indicates that recruitment will be at a low level during the next few years.

For cod stocks off Greenland ICES recommends that no fishery should take place until a substantial increase in biomass and recruitment is evident.

With the extension of fisheries jurisdiction to 200 miles in 1975, Iceland introduced new measures to protect juvenile fish. In the trawl fisheries for cod, saithe and haddock the mesh size was increased from 120mm to 135mm in 1976 and to 155mm the following year. A mesh size of 135mm was allowed only in the fishery for redfish. In addition, fishing can be prohibited immediately in areas where the number of small fish exceeds a certain percentage. A limitation of the number of fishing days was set up from 1977 to 1983 and in 1984 a quota system was introduced.

In Icelandic waters, although the cod stock has shown some sign of recovery, it is still at a very low level. The present situation can be explained by poor recruitment since the mid 1980's and by high fishing pressure. In such conditions the prospect of recovery is uncertain, but the management regime adopted of harvesting 25% of the available biomass is likely to ensure the rebuilding of the stock.

The Icelandic saithe stock is considered to be within safe biological limits and the SSB is close to the highest level observed in the past decade. ICES notes that there are no long-term benefits in yield from increasing fishing mortalities above the present level.

The fishery for Greenland halibut in Sub-areas V and XIV is mainly conducted by Icelandic trawlers in Division Va. As no surveys are carried out for Greenland halibut, there are a number of uncertainties concerning the state of the stock of this species in Greenland and Icelandic waters. The low catch rates experienced by Icelandic trawlers and the results of the assessment of the stock, however, are in agreement and indicate that the stock has been declining since the mid-1980s. Fishing mortality has reached a very high level in recent years and might not be sustainable in the medium term. To halt the decline in the SSB **ICES recommends a significant reduction in fishing mortality in 1997 by 60% from the present level in 1995.** This corresponds to a TAC of 13,000t in 1997.

3.2.2 Cod

3.2.2 a Greenland cod (ICES Sub-area XIV and NAFO Sub-area 1)

Catch data: (Tables 3.2.2.a1 - a2)

Year	ICES advice for Sub-area XIV ¹	Catch Corresp. to advice	Agreed TAC			ACFM inshore catch	ACFM total catch inshore + offshore		
			East	West	Total		East	West	Total
1987	TAC	5	11.5	12.5		8	7	12	19
1988	No increase in F	10 ²	11.5	53		23	9	60	69
1989	TAC	5	15	90		39	15	112	126
1990	No specific recommendation	-	15	110	125	30	33	69	130
1991	No advice	-	25	90	115	19	22	20	42
1992	No advice	-	17.25	66	83.25	6	11	6	17
1993	No fishing	0	17.25	66	83.25	2	1	2	3
1994	No fishing on offshore stock complex	0	17.25	66	83.25	2	<1	2	3
1995	No fishing on offshore stock complex	0	17.25	66	83.25	2	<1	2	2
1996	No fishing on offshore stock complex	0	17.25	66	83.25				

¹Advice for NAFO Sub-area 1 provided by NAFO Scientific Council; ²Preliminary catch corresponding to advice. Weights in '000 t.

Historical development of the fishery: The fishery was mainly targeted at cod with some redfish as a by-catch. The fishery was international until the declaration of EEZs in the 1970s. During the 1980s the offshore fishery was dominated by EU vessels, mainly freezer trawlers. Catches in the 1970s remained stable off West and East Greenland. During the 1980s the offshore fishery was based almost exclusively on the 1984 and 1985 year classes. Thereafter a total failure of the directed cod fishery indicated a stock collapse. Cod are now taken as by-catch in the redfish fishery off East Greenland and as by-catch in the shrimp fishery off West and East Greenland.

State of stock: The stock remains outside safe biological limits. The offshore component is severely depleted without any signs of recovery since the collapse in 1990 (see figure on following page and Table 3.2.2.a4). The dramatic decrease in stock abundance was associated with changes in environmental conditions, emigration and very high fishing mortalities. The inshore component has never been assessed separately, but inshore catches are presently at a low level.

Management advice: ACFM recommends that no fishery should take place until a substantial increase in biomass and recruitment is evident.

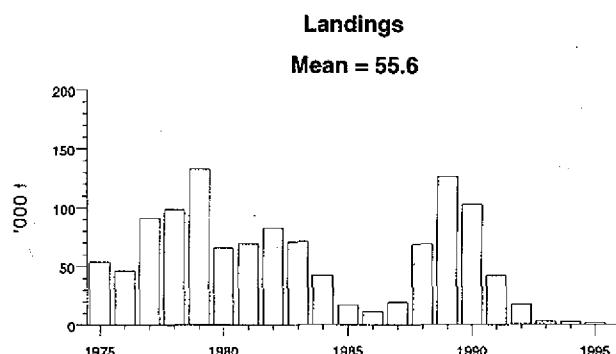
Special comments: A TAC of 83,250t has been fixed until 1999.

In Greenland waters there are inshore fjord stocks and offshore stocks. Given suitable climatic conditions (water temperature) and prudent management, sustained production of offshore cod in this area is possible. However, interaction between the East Greenland and Irminger currents since the mid-1980s has apparently rendered climatic conditions unsuitable for offshore cod. Combined with high fishing mortality, this has caused the offshore cod stock to be severely depleted. In order to take advantage of suitable climatic conditions, when they occur, it is necessary to protect the remaining biomass of offshore cod.

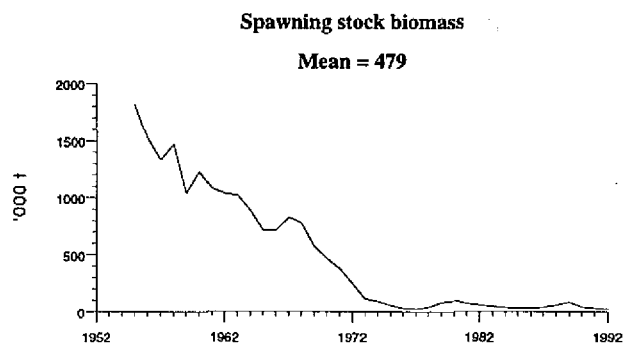
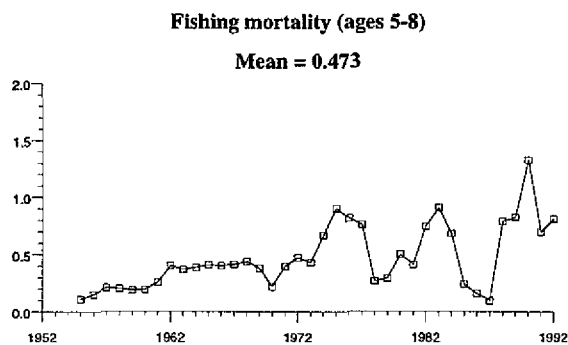
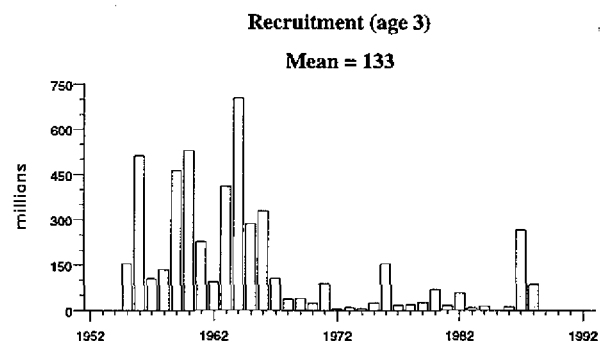
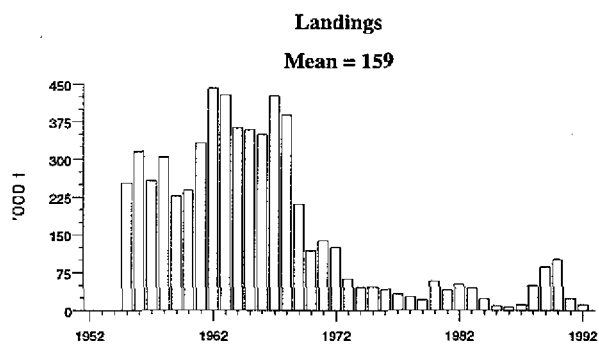
Data and assessment: For the first time, an analytical assessment was performed covering the offshore component only for the period 1955 to 1992. Most recent information available is based on a German groundfish survey, a Greenland trawl survey directed towards shrimp and a Greenland inshore gillnet survey.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Landings of the inshore and offshore stocks combined are shown below (details in Table 3.2.2.a3).



Offshore stock (Details in Table 3.2.2.a4)



3.2.2 b Icelandic cod (Division Va)

Catch data (Table 3.2.2.b1):

Year	ICES advice	Catch corresp. to advice	Agreed ¹ TAC	ACFM ² catch
1987	National advice	300	330	392
1988	National advice	300	350	378
1989	National advice	300	325	356
1990	National advice	250	300	335
1991	National advice	240	245	309
1992	National advice	250	265	268
1993	TAC	154	205	252
1994	TAC	150	165	179
1995	TAC	130	155	170
1996	TAC	162	155	

¹National TAC for year ending 31 August; ²Calendar year. (Weights in '000 t).

Historical development of the fishery: Iceland extended its fisheries jurisdiction to 200 miles in 1975. In the demersal fisheries, the mesh size in trawls was increased from 120mm to 135mm in 1976 and to 155mm the following year.

In order to protect juvenile fish, fishing is prohibited in areas where the number of small cod in the catches exceeds a certain percentage.

From 1977 to 1983, demersal fishing was limited to a certain number of days each year, but this system, as implemented, failed to meet the objective of limiting fishing mortality and a transferable boat quota system was introduced in 1984. TACs are set for each fishing year which runs from September 1 through August 31 in the following year.

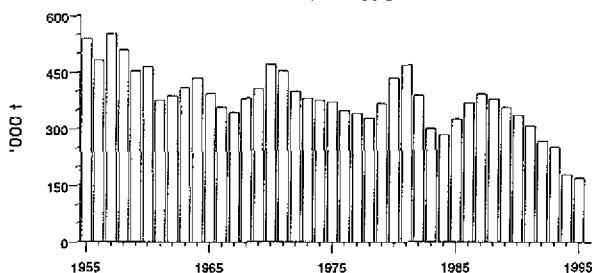
Catches have exceeded national advice and national TAC levels considerably for the past decade. ACFM's catch advice on this stock, first given for 1993, has also been exceeded.

A formal harvesting strategy was implemented for this stock in 1995. The TAC for a fishing year is set as a fraction (25%) of the available biomass which is computed as the biomass of age 4 and older fish, averaged over the two adjacent calendar years.

State of stock: This stock is considered to be at or outside safe biological limits.

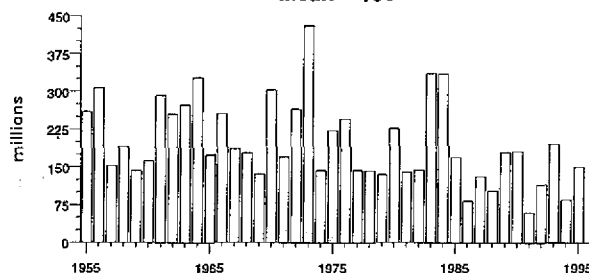
Landings

Mean = 379



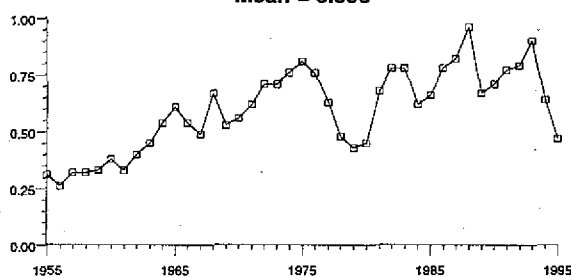
Recruitment (age 3)

Mean = 198



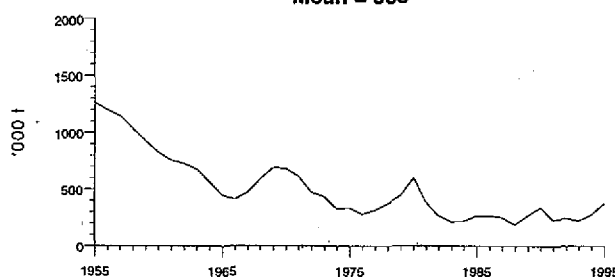
Fishing mortality (ages 5-10)

Mean = 0.596



Spawning stock biomass

Mean = 505



SSB has shown a declining trend since 1955, reaching record low levels in the late 1980s. It has increased since, but is still at a relatively low level. Recruitment has been poor since the 1985 year class, but the 1993 year class may be around the average level.

(Details in Table 3.2.2.b2)

Forecast for 1997: Assuming a catch in 1996 of 170,000 t (TAC-based), corresponding to a 20% reduction in fishing mortality from the 1995 level, the following catch options were derived for 1997 (assuming catch=landings in all years):

$F(96) = 0.40$, Basis: $Catch(96) = 170$, $SSB(96) = 379$, $B(4+,96) = 675$, $B(4+,97) = 814$.

Optn	Basis	F (97)	SSB (97)	Catch (97)	B (4+,98)	SSB (98)
A	0.4F(96)	0.16	401	82	909	461
B	0.6F(96)	0.24	390	119	867	421
C	0.8F(96)	0.32	380	154	828	385
D	1.0F(96)	0.40	370	186	792	353
E	1.2F(96)	0.48	360	217	759	327

(Weights in '000 t).

A and B result in an increase in SSB; a 20 % restriction in fishing mortality (C) leaves SSB stable; D corresponds to the 25% catch rule; a 20% increase in fishing mortality (E) is predicted to result in a 16% decrease in SSB in 1998 compared to the 1996 level.

Management advice: ICES recommends that fishing mortality should not increase above 0.4. The corresponding TAC in 1997 is 186,000 t.

Special comments: Fishing mortality has been high since the beginning of the 1980s. Since 1993 it has declined sharply due to considerable reductions in TAC levels and is in 1996 approaching the level recommended by ACFM.

The 25% catch rule established by the management authorities is likely to lead to a rebuilding of the stock and is consistent with the above advice.

The TAC was set so as to aim for a catch of 155,000 t in 1996. However, the TAC has not been completely binding since there have been certain exceptions in terms of, e.g., transferring part of the TAC between years and jiggers were not completely included in the system. Taking these exceptions into account leads to an expected catch of 170,000 t in 1996.

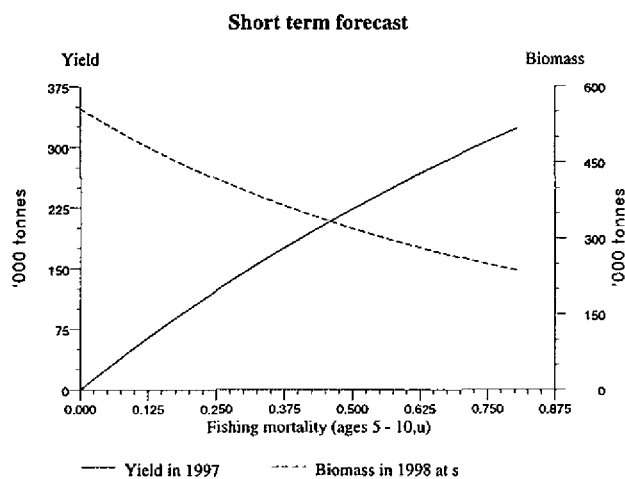
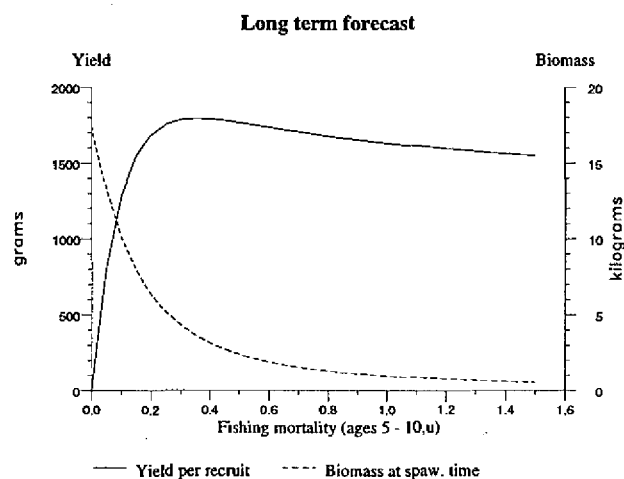
All short-term results concerning the development of the SSB depend heavily on the assumed development in maturity at age which is difficult to estimate and predict accurately. There is a considerable change in the present assessment of the SSB in 1996 compared to the prediction based on the 1995 assessment. This is due to the continued record high proportion mature at age.

The catch rule was evaluated in the 1995 ACFM report with the conclusion that its use was likely to reverse the trend in the continued decline in catches and biomass. The present estimates of stock size and fishing mortalities seem to confirm this.

Data and assessment: Analytical assessment based on catch, survey and CPUE data. Catch-at-age data considered reliable.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Yield and Spawning Stock Biomass



3.2.3 Icelandic saithe (Division Va)

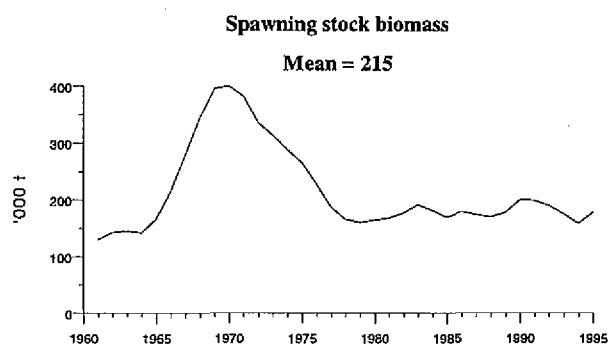
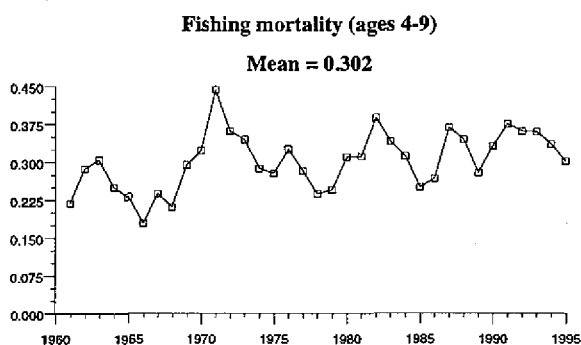
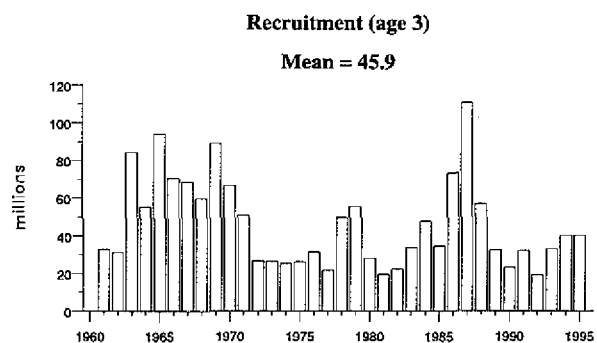
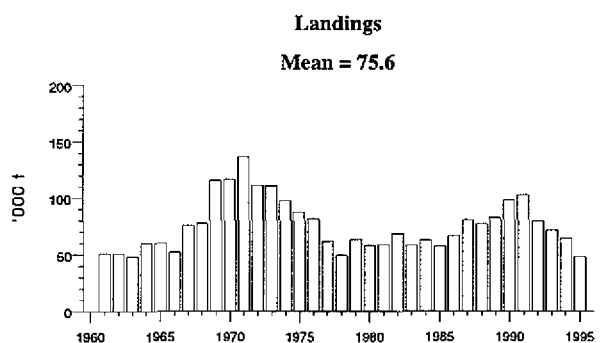
Catch data: (Table 3.2.3.1)

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	TAC	64	70	81
1988	TAC	64	80	77
1989	TAC	80	80	82
1990	TAC	80	90	98
1991	TAC	87	65	103
1992	TAC	70	75 ²	80
1993	Marginal gains from increase in F	75 ¹	95 ²	72
1994	No measurable gains from increase in F	84 ¹	85 ²	64
1995	No measurable gains from increase in F	72 ¹	75 ²	49
1996	No measurable gains from increase in F	65 ¹	70 ²	46 ³

¹Catch at *status quo* F. ²For year ending 31 August; ³Estimated. Weights in '000 t

Historical development of the fishery: Saithe form part of a mixed demersal fishery although they may be targeted at certain times. Iceland extended its fisheries jurisdiction to 200 miles in 1975 and the mesh size in trawls was increased from 120 mm to 135 mm in 1976 and to 155 mm the following year. In order to protect juvenile fish, fishing is prohibited in areas where the number of small saithe in the catches exceeds a given percentage. From 1977 to 1983, demersal fishing was limited to a certain number of days each year, but this system, as implemented, failed to meet the objective of limiting fishing mortality and a transferable boat quota system was introduced in 1984.

State of stock: The stock is considered to be within safe biological limits. The fishing mortality has been below F_{max} in recent years. Recruitment has been below the long-term average since 1989; the 1984 year class was the highest on record. SSB is about 10% lower than the long-term average but about the same size as the last 20 years' average. (Details in Table 3.2.3.2).



Forecast for 1997:

$F(96) = 0.26$, Basis: expected landings (96) = 46, $SSB(96) = 147$.

Option	Basis	F(97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4F(96)	0.10	162	22	22	201
B	0.6F(96)	0.15	162	32	32	193
C	0.8F(96)	0.21	162	42	42	185
D	1.0F(96)	0.26	162	52	52	176
E	1.2F(96)	0.31	162	60	60	169

Weights in '000 t.

An increase in SSB will be observed if fishing mortality is not allowed to increase from the 1996 level.

Management advice: ICES notes that there are no measurable long-term benefits in yield from increasing fishing mortality above the present level.

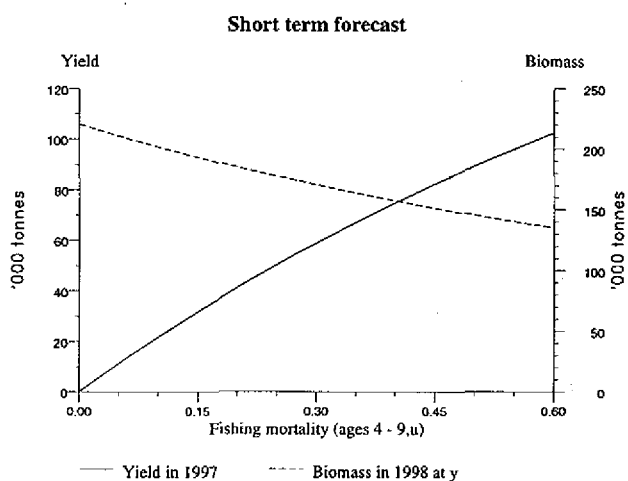
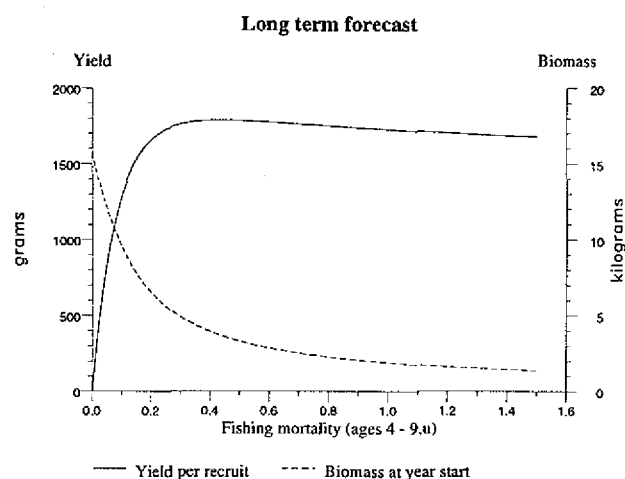
Data and assessment: Time series analysis using only catch at age data was used to estimate fishing mortalities. No recruitment indices are available for this stock, and average recruitment was assumed for the more recent year classes.

Special comments: The allocated TAC has not been caught in recent years. This is partly due to restrictions in the cod fishery which imply limitations on the saithe catches, and partly due to the fishery not being able to find saithe.

The catches in 1996 are predicted from the outlook in 1996. If the stock size in 1996 is overestimated then this may lead to a further inflation of the stock estimate in 1997 compared to using a *status quo* prediction.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Yield and Spawning Stock Biomass



3.2.4 Greenland halibut in Sub-areas V and XIV

Catch data (Tables 3.2.4.1 - 3.2.4.4)

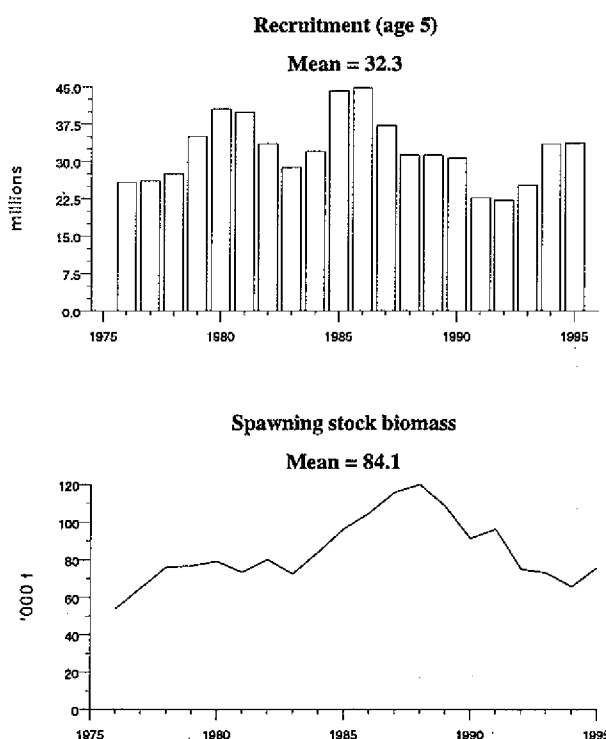
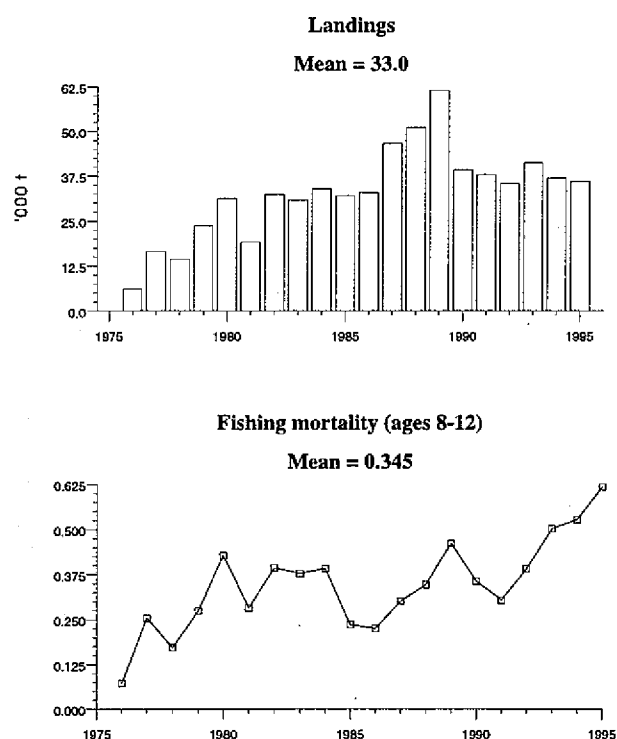
Year	ICES Advice	Catch corresp. to advice	Agreed TAC Va	Catch in Va	ACFM catch V,XIV
1987	No increase in F	28	30	45	47
1988	No increase in F	28	30	49	51
1989	TAC	33	30	59	62
1990	No advice	-	45	37	39
1991	TAC	40	30	35	38
1992	TAC	30	25	32	35
1993	No increase in effort	28 ¹	30 ²	34	41
1994	No increase in effort	34 ¹	30 ²	29	37
1995	TAC	32	30 ²	27	36
1996	TAC	21	20 ²		

¹Catch at *status quo* F. ²Year ending 31 August. Weights in '000 t

Historical development of the fishery: Traditionally, Greenland halibut were caught by demersal trawl with most of the fishery taking place in Division Va. In recent years gillnet fisheries have developed in Divisions Vb and longline fisheries have developed in Division Va, in addition to an increasing trawl fishery in Division XIVb. The fisheries in Division Vb and Sub-area XIV are not

subject to any catch limits. These presently account for about 25% of the catch.

State of stock: The stock is considered to be outside safe biological limits. The SSB is close to a record low with fishing mortality at a record high. (Details in Table 3.2.4.5).



Forecast for 1997:

F(96)= 0.62, Basis: F(96)=F(95), Catch(96) = Landings (96) = 31, SSB(96) = 51

Option	Basis	F(97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.2F(95)	0.12	46	7	7	58
B	0.4F(95)	0.25	46	13	13	54
C	0.6F(95)	0.37	46	18	18	50
D	0.8F(95)	0.49	46	24	24	47
E	1.0F(95)	0.62	46	28	28	43
F	1.2F(95)	0.74	46	32	32	41

(Weights in '000 t).

- A-B Fishing at or below 0.4F(95) will reduce catches considerably and result in an increase in SSB in 1998
- C-E Fishing between 0.6 and 1.2 F(95) will result in reduced or *status quo* catches and reduce SSB in 1998.

Management advice: ICES recommends a significant reduction in fishing mortality in 1997 by 60% from the present level in 1995. This is the minimum action required to increase the SSB from the 1996 level and corresponds to limiting the total catch in all areas to below 13,000 t in 1997.

Special comments: The increase in effort in recent years is not fully reflected as proportional increases in fishing

mortality estimates. This, in addition to earlier redistribution of fishing effort to unexploited areas, indicates that the fishing mortality might be underestimated. There is a strong need for survey data, for monitoring both the adult stock and recruitment. In recent years recruitment to the fishery seems to have been poor and the stock is at a low level. If recruitment failure occurs then this will only be detected in the fishery some 5-10 years after it occurs.

There is considerable uncertainty in the estimates of SSB due to difficulty in maturity determination, but there is no doubt that the stock is at a low level.

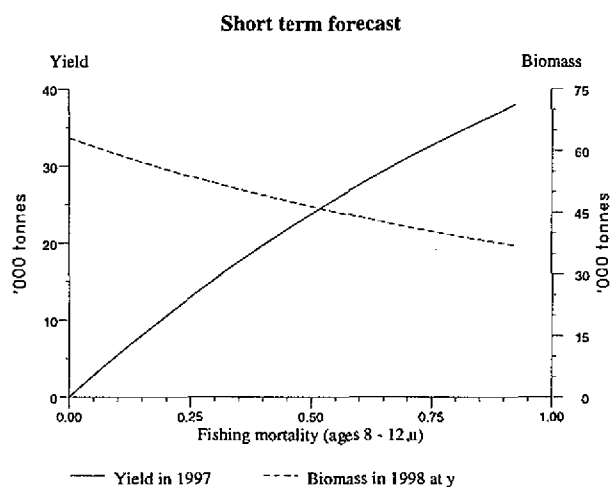
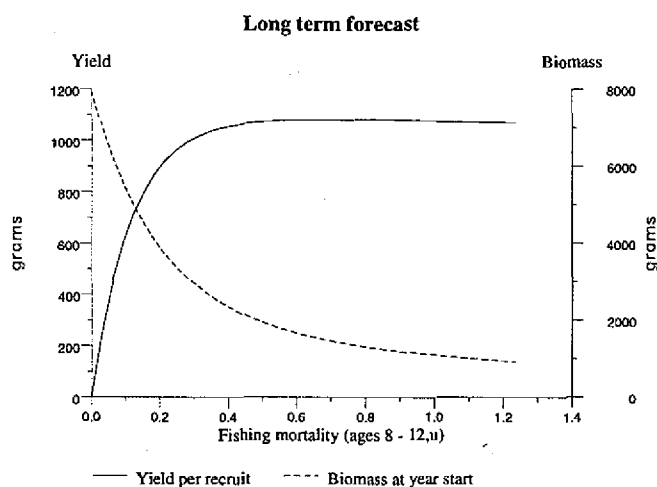
There is at present no limitation on catches in Division Vb or Sub-area XIV. The agreed TAC in Division Va has been close to the recommended TAC for the entire area.

If the stock situation is to improve, total catches need to be limited.

Data and assessment: Analytical assessment based on catch at age data and one tuning fleet. Data on biological parameters (age, length, weight etc.) are recently available in Sub-areas V and XIV. This is an improvement from former assessments. Better information on maturity by age and recruitment is required.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Yield and Spawning Stock Biomass



3.2.5 Redfish in Sub-areas V, VI, XII and XIV

3.2.5.a Overview

Stocks: There are two main commercial species of redfish in Sub-areas V, XII and XIV, *Sebastes marinus* and *Sebastes mentella*. The species *S. mentella* is considered to consist of at least two stocks, deep-sea *S. mentella* and oceanic *S. mentella*. Thus, the fisheries in Sub-areas V, XII and XIV operate on three stocks of redfish.

Of the three stocks, *S. marinus* is mainly distributed in the shallower shelf areas down to about 500m depth.

The oceanic *S. mentella* occur pelagically in the open Irminger Sea from the surface down to 500m depth.

The deep-sea *S. mentella* tends to occur in deeper waters than the other two stocks. Thus the deep-sea *S. mentella* is found in the open Irminger Sea at depths below 500m, i.e. below the oceanic *S. mentella*. The distribution of the deep-sea *S. mentella* also includes the deeper parts of the slopes up to the distribution area of the *S. marinus*.

Historical development of the fishery: Redfish in Division Va are mainly caught by trawlers using demersal and pelagic trawl. *S. marinus* is the predominant species down to depths of about 500m whereas deep-sea *S. mentella* contributes most to the catches at greater depths. The Icelandic fleet takes more than 90% of the total catches but vessels from Belgium and the Faroes also fish in Division Va. In recent years the Icelandic fleet has also caught oceanic *S. mentella* in the deeper parts of Division Va using pelagic trawl.

Faroes trawlers using otter trawl in Division Vb target *S. marinus* and deep-sea *S. mentella*. These catches constitute more than 90% of the redfish catches in this division. Small trawlers from Germany occasionally target these stocks. The remainder of the total catches is mainly by-catch in other demersal fisheries by other countries.

Redfish catches taken by several countries in Sub-area VI are considered to be mainly by-catch in demersal fisheries. These catches are negligible in comparison with redfish catches in Sub-areas V, XII and XIV.

Catches in Sub-area XII are mainly oceanic *S. mentella* and are taken by trawlers using pelagic trawls. At least 13 fleets have joined this fishery, but the main fleets are from Russia, Germany, Iceland and Norway.

In Sub-area XIV, as in Division Va, all three redfish stocks are exploited. On the Greenland shelf and slopes, *S. marinus*

dominates the trawl catches above 500m whereas deep-sea *S. mentella* dominates below 500m. Most of the catches are taken by German freezer trawlers. In 1982 a pelagic trawl fishery started exploiting the oceanic *S. mentella* in the deeper parts of Sub-area XIV. Since 1990 the main fleets are from Russia, Norway, Iceland and Germany. In recent years, vessels from several other countries have joined this fishery, mainly outside the EEZs of Iceland and Greenland.

In Sub-areas XII and XIV, the technology for fishing with large pelagic trawls at depths greater than 500m has recently developed. This particular fishery targets deep-sea *S. mentella*, which is observed in summer at the same geographic locations but below the oceanic *S. mentella*, because it is less infested by parasites.

Landings: The total landings from this redfish stock complex (i.e. redfish in all sub-areas) reached their highest level on record in 1982. (Tables 3.2.5a.1–3.2.5a.10).

Stock Distribution with Respect to National Fisheries Zones: The distribution of the *S. marinus* and deep-sea *S. mentella* catches in the national fisheries zones is reflected in the catch statistics. Likewise, catches reported in Divisions Va and Vb are taken within the national fisheries zones of Iceland and the Faroes, respectively. In Sub-area VI the catches could be taken within the fisheries zones of the EU or the Faroe Islands, or in international waters.

The distribution of deep-sea *S. mentella* extends into international waters in the Irminger Sea.

Catches from the oceanic *S. mentella* stock have so far all been taken in Sub-areas XII and XIV, and recently also in Division Va. In Sub-areas XII and XIV they are taken almost exclusively in international waters, i.e. outside the national fisheries zones of the neighbouring countries with the exception of some catches within the national fisheries zone of Greenland.

From distribution information available it is obvious that a substantial part of the adult oceanic *S. mentella* stock is, at least at times, to be found within the national fisheries zones of Iceland and Greenland. In the present state of knowledge, ICES has difficulties in quantifying the proportion of the adult stock occurring in the respective national zones.

Relationship between deep-sea *S. mentella* in the Irminger Sea and along the coasts: At the present time there is no conclusive evidence on the stock structure of the deep-sea *S. mentella*.

3.2.5 b *Sebastes marinus* in Sub-areas V, VI and XIV

Catch data (Table 3.2.5.b1):

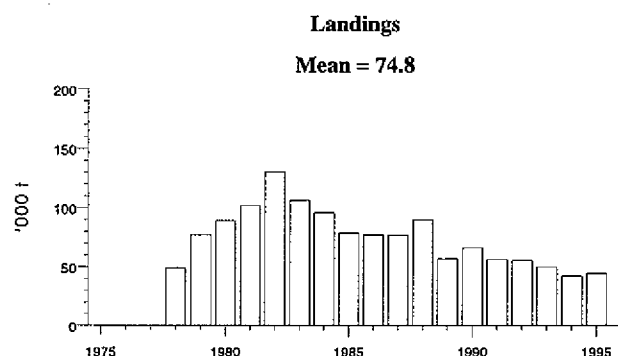
Year	ICES advice	Catch corresp. to advice	<i>S. marinus</i> ACFM catch	Combined ACFM catch ¹
1987	No increase in F	83	77	115
1988	No increase in F	84	90	121
1989	TAC ¹	117 ¹	57	111
1990	TAC ¹	116 ¹	67	111
1991	Precautionary TAC	77(117 ¹)	56	123
1992	Precautionary TAC	76(116 ¹)	56	118
1993	Precautionary TAC ¹	120 ¹	50	124
1994	Precautionary TAC, if required	100 ¹	43	125
1995	TAC	90 ¹	45	99
1996	TAC for Va (28); precautionary TAC for Vb and XIV (4)	32 ²		

¹ Deep-sea *S. mentella* and *S. marinus* combined. ² *S. marinus* only. Weights in '000 t.

Historical development of the fishery: *S. marinus* are mainly taken by trawlers in depths down to 500m. In Division Va the catch is mainly taken by Icelandic vessels while in Division Vb Faroese vessels predominate. In Sub-area XIV the catches are made mainly by German freezer

trawlers. Total catches have decreased almost continuously. This decline occurred in all sub-areas. In order to reduce the catches of *S. marinus* in Division Va an area closure was imposed in 1994. There has in recent years been a reduction of effort in Sub-area XIV but an increase in Division Va.

(Details in Table 3.2.5.b1).



State of stock: The stock is considered to be at a very low level and may be outside safe biological limits. The CPUE from the fishery shows a slight increase in 1995 but is still at a very low level (see figure below). There is, however, no indication of recruitment failure in recent years. The assessment suggests that the fishable biomass in Division Va is at a low level, indicating a decrease to about 30% of the 1985 level.

In Sub-area XIV the German groundfish survey has shown an almost continuous decrease in biomass indices by more than 90% since 1986 (see figure below).

Little is known about the state of that part of the stock in Division Vb.

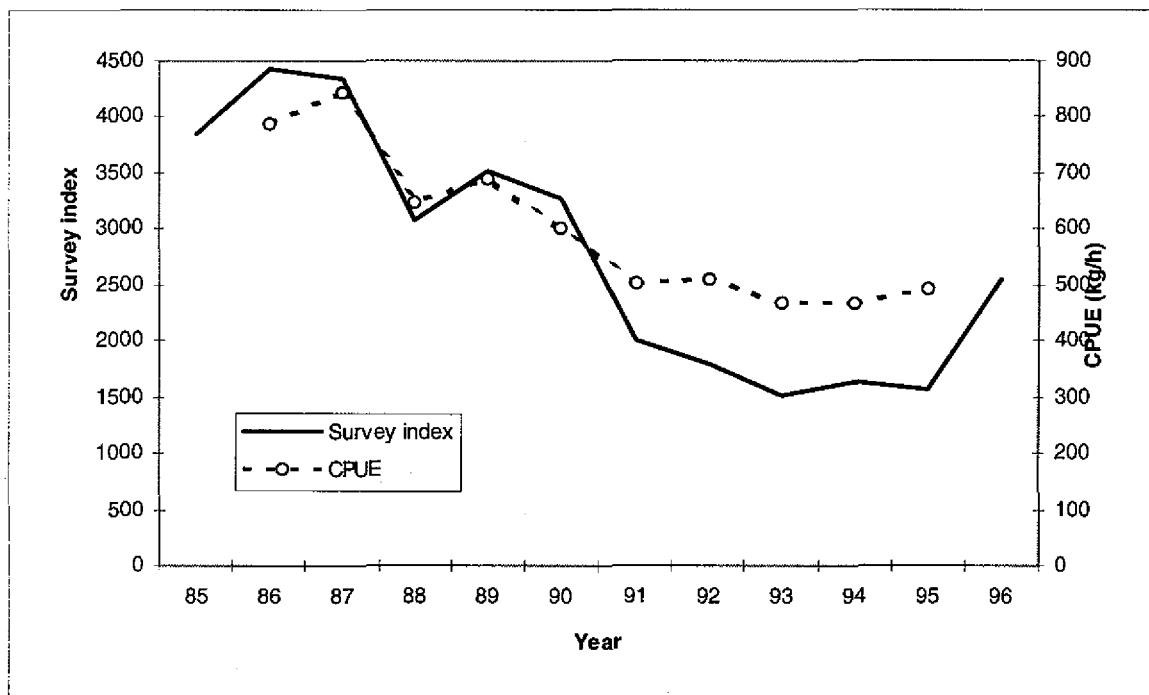
Management advice: ACFM recommends that fishing effort in 1997 be reduced by 25% from the 1995 level.

Special comments: An effort reduction of 25% corresponds to a catch of 30,000 t in Division Va in 1997. A catch prognosis cannot be given for Division Vb and ICES therefore recommends a 25% reduction in catches in Division Vb, corresponding to a catch of 2,000 t in 1997.

In Sub-area XIV a drastic effort reduction has already taken place.

Data and assessment: An age-based production model is under development for Division Va. CPUE and survey data from an Icelandic survey and fishery in Division Va were used as indicators of stock development. CPUE from a German groundfish survey in Sub-area XIV, and combined redfish CPUE from the Faroes fishery in Division Vb.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).



CPUE of *S. marinus* from Icelandic trawlers and survey indices from the ground fish survey.

3.2.5 c Deep-sea *Sebastes mentella* in Sub-areas V, VI and XIV

Catch data (Table 3.2.5.c1):

Year	ICES advice	Catch corresp. to advice	Deep-sea <i>S. mentella</i> ACFM catch	Combined ACFM catch ¹
1987	Precautionary TAC	41–58	38	115
1988	Precautionary TAC	41–58	31	121
1989	TAC ¹	117 ¹	54	111
1990	TAC ¹	116 ¹	44	111
1991	Precautionary TAC	(40) 117 ¹	68	123
1992	Precautionary TAC	(40) 116 ¹	63	118
1993	Precautionary TAC ¹	120 ¹	74	124
1994	Precautionary TAC, if required	100 ¹	83	125
1995	TAC	90 ¹	55	99
1996	Precautionary TAC (45 in Va; 23 in VI and XIV)	68 ²		

Weights in '000 t.

¹ Deep-sea *S. mentella* and *S. marinus* combined.

² Deep-sea *S. mentella* only.

Historical development of the fishery: In Division Va deep-sea *S. mentella* are taken mainly by Icelandic trawlers in depths greater than 500 m. In Division Vb the fishery is carried out mainly by Faroese trawlers though some by-catch is taken by other countries fishing demersal species. In Sub-area XIV the catch is taken largely by German freezer trawlers. The annual catches have almost doubled from the average level of the 1980s. This was mainly caused by an increase in Division Va and in 1993–1994 also in Sub-area XIV due to the development of a pelagic fishery for this stock.

There were substantial catches of small redfish in Sub-area XIV in 1993–1994 but not in 1995.

State of stock: It is not possible to evaluate the state of the stock in terms of a historical perspective. The CPUE for Icelandic trawlers fishing in Division Va, however, has shown a 57% decline from a stable level before 1990 (see Figure on the following page). In Sub-area XIV the German groundfish survey shows that adult deep-sea *S. mentella* above 30 cm have almost disappeared.

(Details in Table 3.2.5.c1).

These results indicate that the stocks may be at a low level.

Forecast: A *status quo* forecast predicted a catch in 1997 of 48,000 t in Division Va.

Management advice: ICES recommends that fishing effort in 1997 be reduced by 25% from the 1995 level.

Special comments : A 25% reduction in effort corresponds to a catch of 35,000 t in Division Va. A catch prognosis cannot be made for Division Vb and ICES therefore recommends a 25% reduction in catches in Division Vb relative to the 1995 level, corresponding to catches of 4,200 t in 1997.

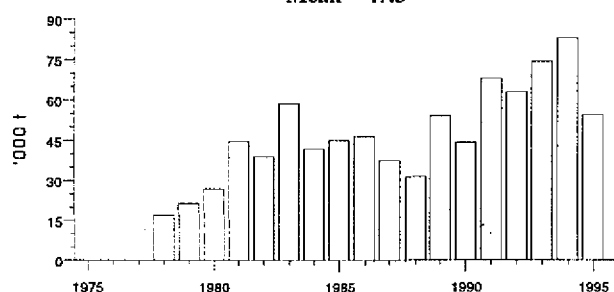
In Sub-area XIV a drastic effort reduction has already taken place.

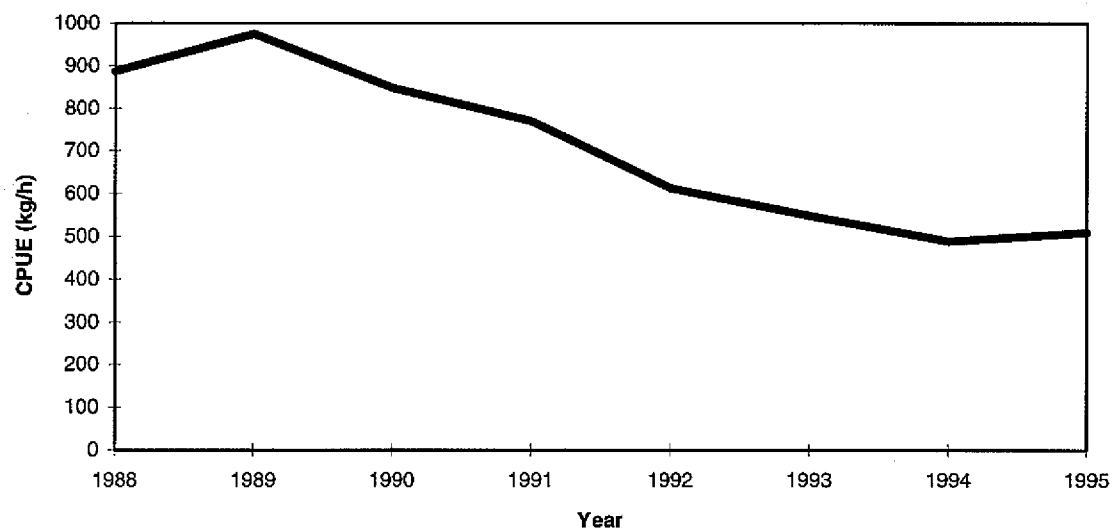
See also comment on stock identification in Section 3.2.5 a.

Data and assessment: No analytical assessment could be made due to age reading problems. CPUE from Icelandic trawlers in Division Va, from the German groundfish survey in Sub-area XIV and a combined redfish CPUE from the Faroese fishery in Division Vb.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Landings
Mean = 47.3





CPUE in *S. mentella* from Icelandic trawlers.

3.2.5 d Oceanic redfish *Sebastes mentella* in Division Va and Sub-areas XII and XIV

Catch data (Tables 3.2.5.d1–d2):

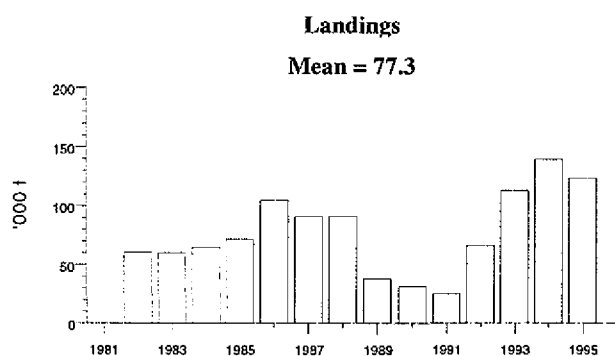
Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	No assessment	-		91
1988	No assessment	-		91
1989	TAC	90–100		38
1990	TAC	90–100		32
1991	TAC	66		25
1992	Preference for no major expansion of the fishery	-		66
1993	TAC	~50		113
1994	TAC	~100		140
1995	TAC	100		124
1996	No specific advice	-	153 ¹	

¹Set by NEAFC. (Weights in '000 t)

Historical development of the fishery: The pelagic fishery in the Irminger Sea is conducted on the mature part (approx. 95% mature) of the stock only. The fishery started in 1982. After decreasing from 1988 to 1991, landings increased. The decrease was mostly due to a reduction in Russian effort. The catches from Sub-area XII have been greater than those in Sub-area XIV since 1993. The increase in the catches since 1991 is a direct consequence of increased fishing effort due to new fleets entering the fishery. The fishing season has recently expanded to March–December.

State of stock: The stock is considered to be within safe biological limits. Acoustic surveys from 1991–1995 indicate the stock biomass to be in the range 1.9 to 2.6 million t in the area surveyed to date, but the productivity of the stock is uncertain. The present fishing mortality on fully-recruited ages is estimated to be about 0.06. No information is available on recruitment.

(Details in Table 3.2.5.d2).



Medium-term prediction: In response to a request from NEAFC, a number of simulations were performed to investigate the consequences of suggested management strategies. Three scenarios were considered based on the request for advice:

Scenario 1 - Proportional harvesting.

The quota each year is set at a certain percentage (5–10%) of the spawning stock biomass.

Scenario 2 - Constant catches within each 5-year period.

Stock and catch scenarios were also made assuming constant catches within each 5-year period based on a certain percentage (5–10%) of the fishable biomass at the beginning of each 5-year period.

Scenario 3 - Fixed TAC to 2001 of either 100,000 t, 125,000 t or 150,000 t.

A scenario is also presented with a constant catch of 100,000 t, 125,000 t or 150,000 t in the years 1997–2001, and a catch in later years set at 5% of the fishable biomass at the beginning of each 5-year period.

The scenarios considered above and shown on the following pages are not sufficient to define a sustainable harvesting strategy, partly because the simulations do not reach an equilibrium SSB, partly because the model parameters are not well defined and partly because the model does not take uncertainty into account.

Maintaining SSB at or above half the virgin biomass is considered to be sustainable. Many strategies can be envisaged which satisfy this criterion, based on taking larger or smaller catches initially and vice versa subsequently.

Amongst strategies in which a 5-year quota equal to a fixed percentage of the available biomass is set at the beginning of each period, only those in the above simulations which

are set at 5% or less will maintain the stock above 50% of the virgin biomass, but this is dependent on the model used.

Special comments: The stock could suffer from recruitment failure over many years before it is possible to observe it. It is therefore of vital importance that research is conducted to localise nursery areas to achieve knowledge about recruitment.

Since this is an expanding fishery, ICES notes that careful monitoring of the stock is important in order to measure the actual response of the stock.

Stock Distribution and Migration with Respect to National Fishing Zones: Oceanic redfish inhabit the pelagic waters of the Irminger Sea both within the 200-mile economic zones of Iceland and Greenland and in international waters. The fishing season starts in March in the north-eastern part of the area and in the EEZ of Iceland as far north as 63°N.

The distribution of oceanic *S. mentella* from several acoustic surveys conducted between March and September during the period 1982–1995 was reviewed. In general, there appears to be a south-westward movement of oceanic redfish during the summer into the open part of the Irminger Sea and inside the 200 mile zone to the east of Greenland. In autumn and winter there is a suggestion of an eastward migration. None of the surveys has covered the entire area of distribution. However, one survey conducted in June-July 1994 was the most extensive. On this survey it was estimated that 66% of the biomass was in the Greenland EEZ, 33% in international waters and less than 1% in the Iceland EEZ. A new Russian survey in June-July 1995 confirmed this distribution.

Because the stock is known to undergo seasonal migrations, these numbers cannot be considered reliable estimates of the proportion of the biomass lying within national EEZs and international waters. A new international survey will be conducted in June–July 1996.

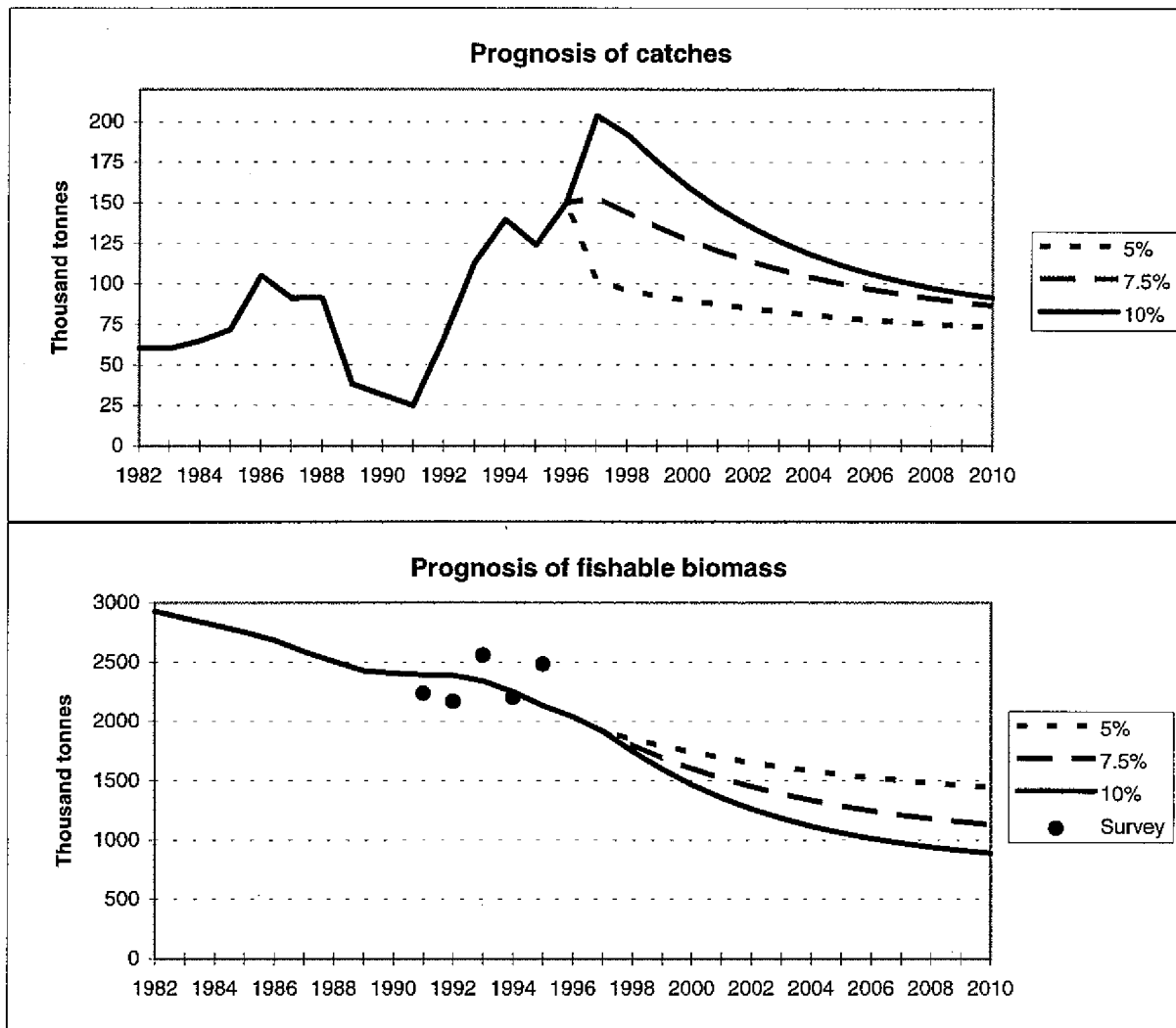
Stock Identification: Due to inadequate knowledge about the distribution (vertical and horizontal) of deep-sea *S. mentella* caught in midwater in the Irminger Sea, and due to the lack of information about stock size, it is impossible to give advice on catches for oceanic *S. mentella*. Monitoring of the catch composition is only recent and an appropriate regular monitoring programme is not in place at present.

There is, furthermore, great uncertainty about the response of oceanic *S. mentella* to fishing. It is therefore impossible for ICES to advise different management measures for the two stock components. However, further research should be conducted to ascertain if it would be possible to provide such advice in the future.

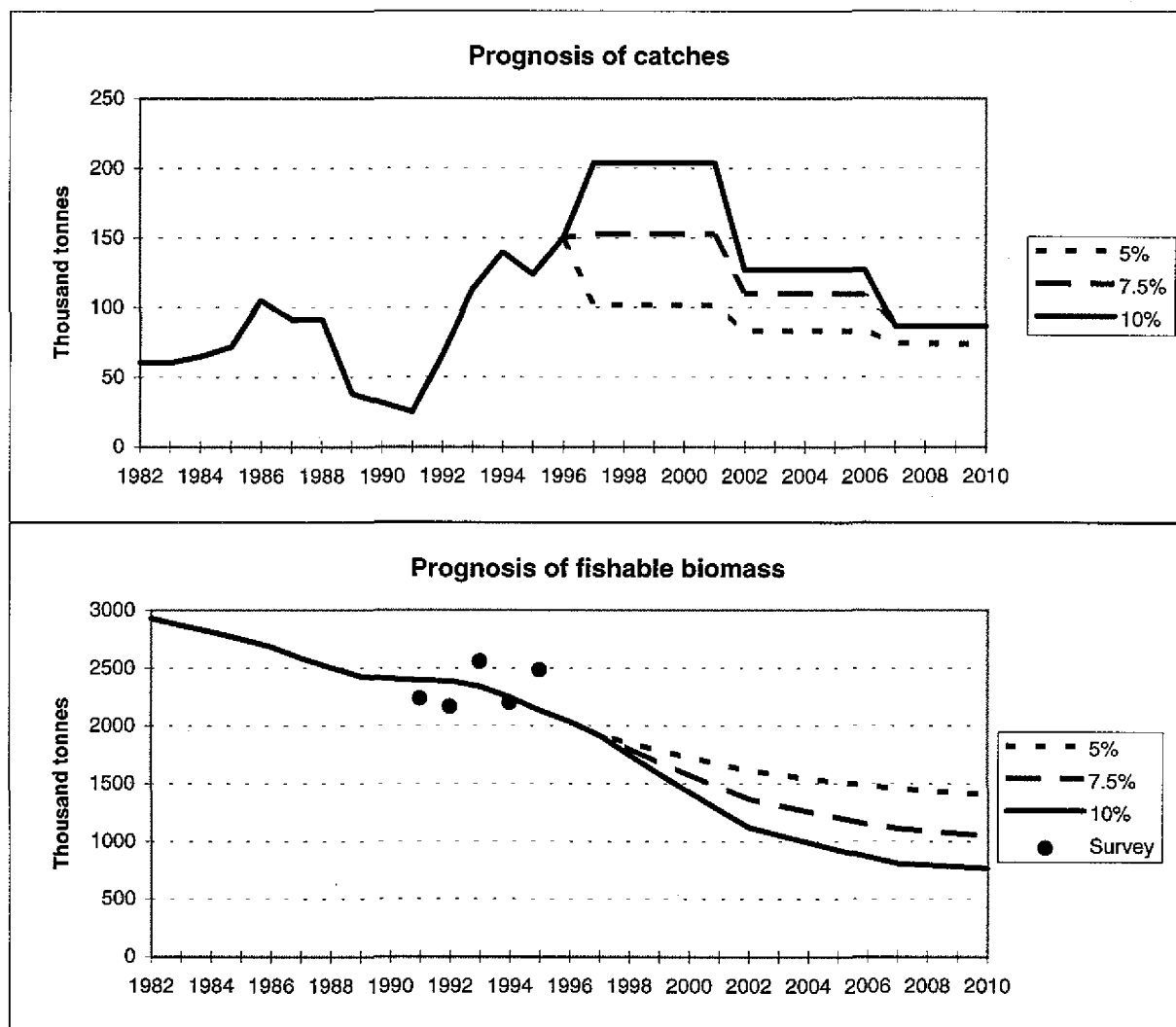
Data and assessment: A stock-production model was used for assessment. Length, weight, data on maturity and some age reading experiments were available from both the survey and the fishery. Effort series are available for two fleets. Comparable acoustic estimates are available for a given area in 1991, 1992, 1993, 1994 and 1995.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15); Report of the Joint Icelandic/Norwegian Survey on Oceanic Redfish in the Irminger Sea and Adjacent Waters, in June/July 1994 (CM 1994/G:44); Stock Assessment and Distribution of the Oceanic Type Redfish *S. mentella* in the Irminger Sea in 1995 (Shibanov *et al.* Working Document No. 19, NWWG 1996).

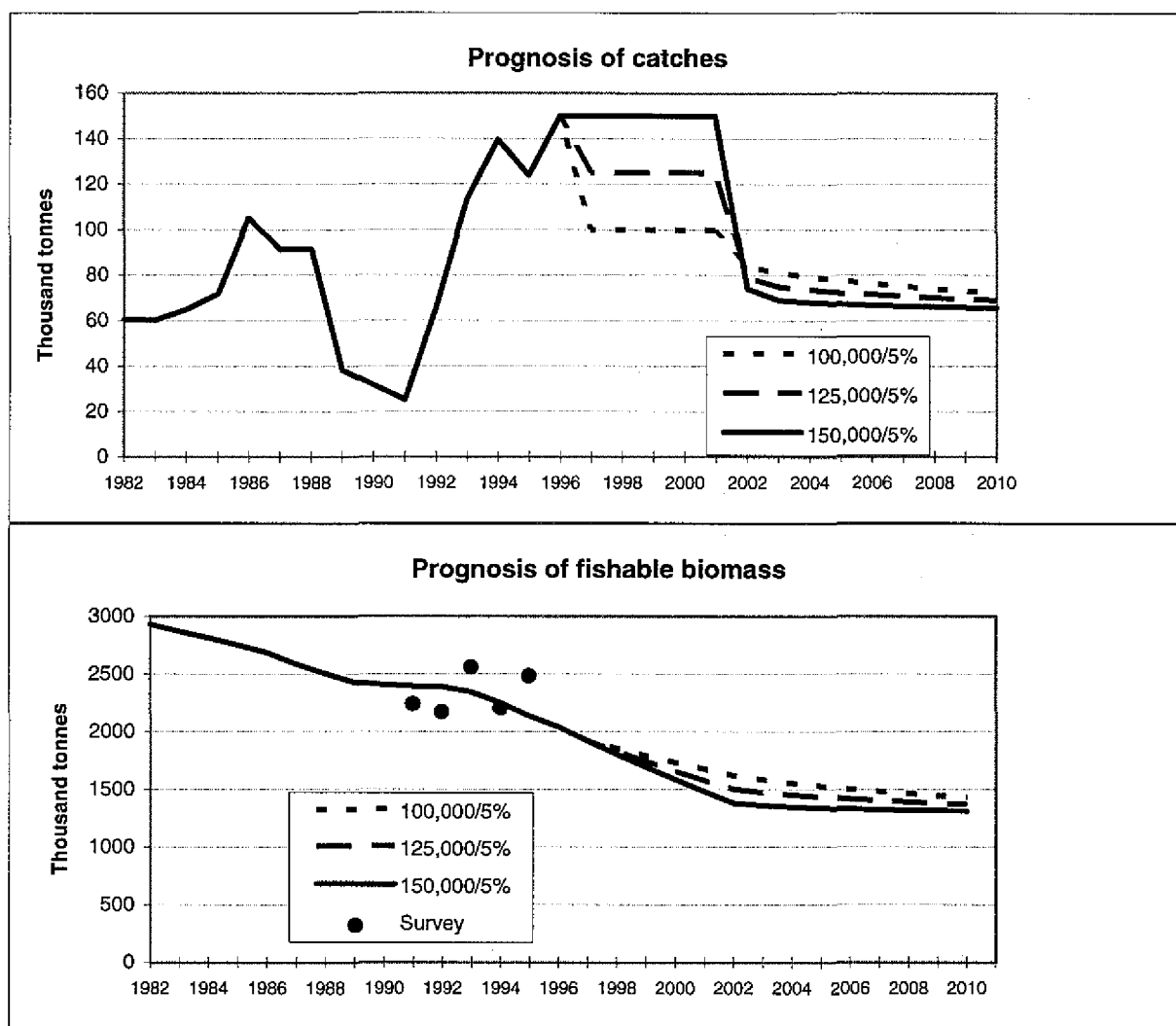
'Oceanic *S.mentella* . Medium term prognosis of stock and catches. Scenario 1.



'Oceanic *S.mentella*. Medium term prognosis of stock and catches. Scenario 2.



'Oceanic *S.mentella*. Medium term prognosis of stock and catches. Scenario 3.



3.2.6 Icelandic summer-spawning herring (Division Va)

Catch data (Table 3.2.6.1) :

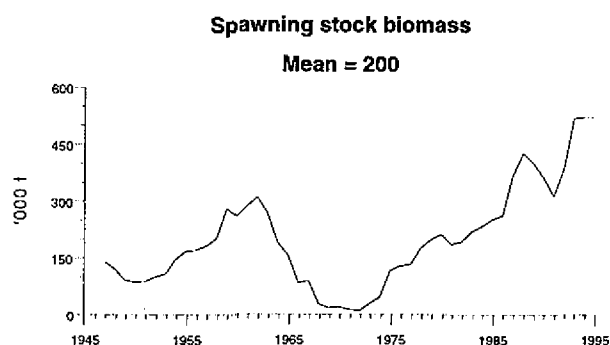
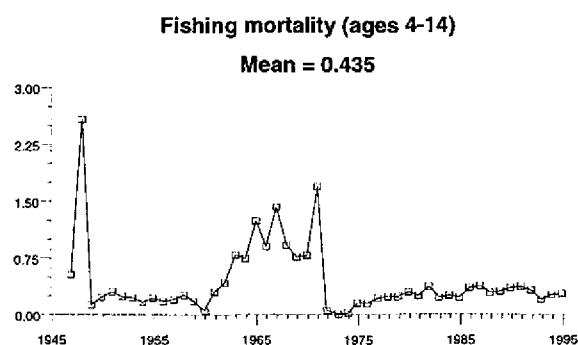
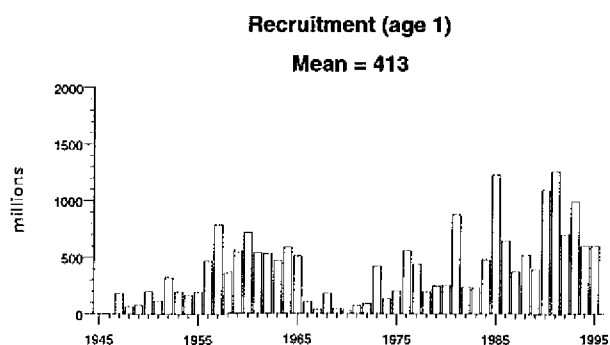
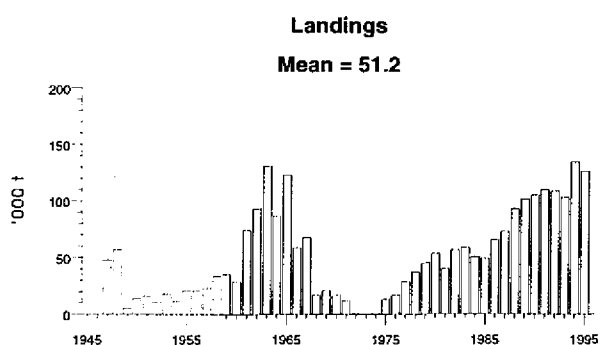
Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	$F_{0.1}$	70	72.9	73
1988	$F_{0.1}$	-100	90	93
1989	$F_{0.1}$	95	90	101
1990/91 ³	Status quo F	90	100	105
1991/92 ³	$F_{0.1}$	79	110	110
1992/93 ³	$F_{0.1}$	86	110	109
1993/94 ³	No gain in yield by fishing higher than $F_{0.1}$	110 ¹	110	103
1994/95 ³	No gain in yield by fishing higher than $F_{0.1}$	83 ¹	130	134
1995/96 ³	No gain in yield by fishing higher than $F_{0.1}$	120 ¹	110	126
1996/97 ³	No gain in yield by fishing higher than $F_{0.1}$	110 ¹ (97 ²)		

¹) Catch at $F_{0.1}$. ² Revised forecast made in 1996. ³ Season starting in October of first year. Weights in '000 t.

Historical development of the fishery: The catches of Icelandic summer-spawning herring increased rapidly in the early 1960s due to the development of the purse seine fishery along the south coast of Iceland. This resulted in a rapidly increasing exploitation rate until the stock collapsed in the late 1960s. A fishing ban was enforced during 1972–1975. Thereafter the catches have increased gradually to over 100,000 t. In the most recent years a change in fishing pattern has occurred with increased exploitation on 2- and 3- ringers.

Previously the fleet consisted of multi-purpose vessels, mostly below 300 GRT, operating purse seine and drift net. In recent years larger vessels (up to 1500 GRT) have entered the fishery. These are highly specialised purse seiners operating in both the herring and capelin fisheries. Some vessels have converted to demersal fisheries in the most recent years.

Details in Table 3.2.6.2



State of stock: The stock is considered to be within safe biological limits. The spawning stock biomass (SSB) is currently at a historically high level. The SSB has shown an increasing trend during the last 20 years. In 1994 the SSB was about 550,000 t, i.e. 70% higher than prior to the collapse. Moreover, recruitment has shown an increasing trend coinciding with the development of the SSB. The stock has been managed at an exploitation rate at or near the $F_{0.1}$ level (0.23).

Forecast for the 1996/97 season: A forecast for the 1996/1997 season was given in the 1995 ACFM report. This forecast was based on the assumption that the catch in 1995/96 would be 107,000 t. Actual catches were 126,000 t. The revised forecast below is based on the actual catch figure and new survey information.

SSB(95) = 520, $F(95-96) = 0.27$, Basis: TAC, Catch (95-96) = 126

Option	Basis	F (96)	SSB (96)	Catch (96)	SSB (97)
A	0.4 $F(95)$	0.11	480	50	524
B	0.6 $F(95)$	0.16		71	502
C	0.8 $F(95)=F_{0.1}$	0.23		97	475
D	1.0 $F(95)$	0.27		114	458
E	1.2 $F(95)$	0.33		136	437

Weights in '000 t.

The change in SSB in the near future is very much dependent on the 1991 year class, which was estimated as very strong as 1-ringers in 1993.

Medium-term considerations: Medium-term simulations show that there is little probability that the current harvest strategy will reduce the stock to low levels.

Management advice: ICES notes that recent fishing mortalities have been somewhat above $F_{0.1}$ and that fishing at higher levels of F will not lead to any significant gain in long-term yield.

Data and assessment: An analytical assessment based on catch, acoustic survey and catch-at-age data is considered reliable.

Source of information: Report of the Northern Pelagic and Blue Whiting Fisheries Working Group, April 1996 (CM 1996/Assess:14).

3.2.7 Capelin in the Iceland-East Greenland-Jan Mayen area (Sub-areas V and XIV and Division IIa west of 5°W)

Catch data (Table 3.2.7.1):

Year	ICES advice	Catch ¹ corresp. to advice	Agreed TAC ²	ACFM catch ³
1987	TAC ¹	500	1,115	1,116
1988	TAC ¹ (TAC for whole season)	500 (915)	1,065	1,037
1989	TAC ¹	900		808
1990	TAC ¹	500	250	314
1991	No fishery pending survey results ¹	0	740	677
1992	Precautionary TAC ¹	500	900	787
1993	TAC ¹	900	1,250	1,179
1994	Precautionary TAC ¹	950	850	842
1995	Precautionary TAC ¹	800	1,390	930

¹TAC advised for July–December part of the season. ²Final TAC recommended by national scientists for whole season. ³July–March of following year. (Weights in '000 t)

Historical development of the fishery: The fishery is mainly an industrial fishery based on maturing capelin, i.e. the 2- and 3-group in the autumn which spawn at age 3 and 4 in March of the following year.

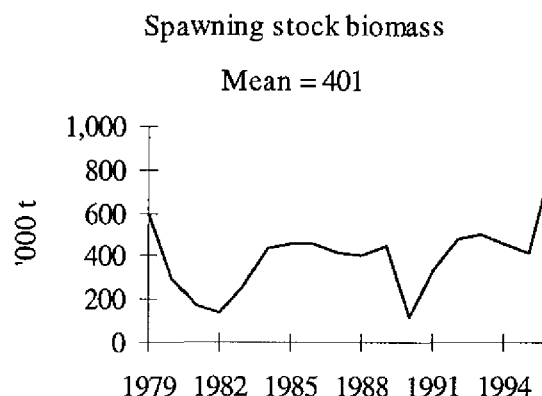
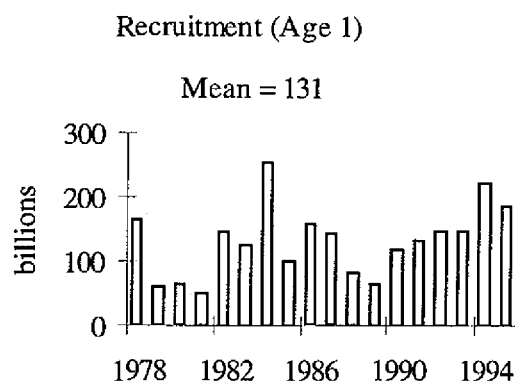
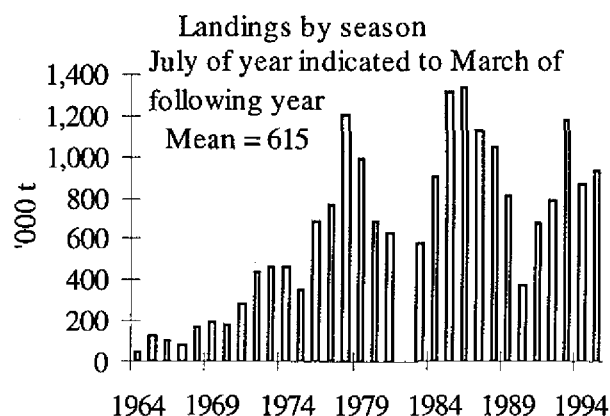
After being low in the 1989/90 and 1990/91 seasons, catches have been increasing. A record catch of approximately 725,000 t was taken during the 1996 winter season.

The fishery is managed by aiming at maintaining a residual spawning stock biomass of 400,000 t. A preliminary TAC of 2/3 of the catch forecast is set before the opening of the fishery to be revised as a final TAC on the basis of survey information becoming available during the fishing season.

State of stock: The stock is considered to be within safe biological limits. SSB is highly variable due to dependence on only 2 age groups.

The spawning stock fell below the minimum safe level of 400,000 t in the 1989/90 and 1990/91 seasons. The stock recovered quickly due to good recruitment and appears to be strong at present.

Details given in Table 3.2.7.2



Forecast: The basis for the forecast is acoustic surveys and a regression-based prediction model. However, the estimate of 2 year old capelin from the acoustic survey in October 1995 was a record high and well above the range on which the regression is based. The predictive figure for the maturing 2 group was set at 90 billion (equal to an earlier maximum value obtained from the prediction model). For the maturing 3 year olds the predictive value was set at 35 billion individuals. From these predictions a catch of 1,635 million t for the 1996/97 season is expected to leave 400,000 t for spawning.

Management advice: In order to ensure a spawning stock biomass of 400,000t in March 1997 ICES recommends that the preliminary TAC for the first half of the 1996/97 season should not exceed 1,100,000 t.

ICES recommends that the data from the surveys in October-November 1996 and January-February 1997 be used when the final TAC is set for the 1996/97 season.

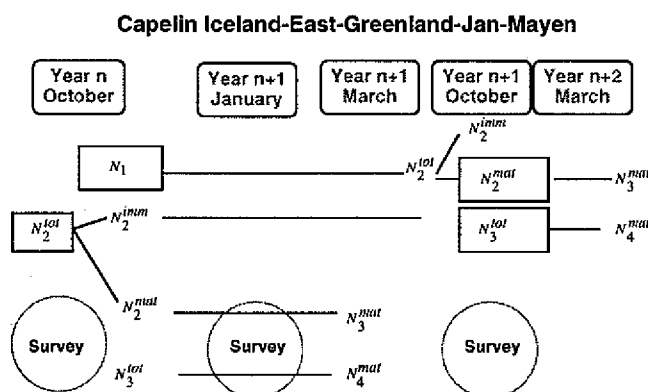
It is known from acoustic surveys that the main distribution area of juvenile 1-group capelin is usually in the shelf area north and north-east of Iceland. In order to avoid excessive mortalities of juveniles due to their repeated escape through the mesh used in capelin seines, ACFM recommends that the most important areas of juvenile abundance remain closed to a commercial fishery, until determined from surveys if the area needs to be closed for the current year.

Special comments: The preliminary TAC computations are based on the method which was first used in 1992 (see Figure below). This involves the use of 1-group (N_1) indices from the October-November survey for predicting the mature 2-group (N_2^{mat}) in the following year. The total 2-group (N_2^{tot}) abundance from the same survey and the relationship between maturation ratios and year class abundance are used for predicting numbers of capelin in the 3-group (N_3^{mat}).

In the 1989/90 season the TAC was overestimated by one third. To reduce the risk of over exploitation, the preliminary TAC for the summer-autumn part of the season is therefore set at two thirds of the total TAC predicted for the whole season. In the calculation a monthly natural mortality of 0.035 is applied for all age groups.

Data and assessment: The stock size is assessed using acoustic surveys.

Source of information: Report of the Northern Pelagic and Blue Whiting Fisheries Working Group, April 1996 (CM 1996/Assess:14).



3.3 Demersal stocks at the Faroe Islands (Division Vb)

3.3.1 Overview

The fisheries and management measures: In 1977 an EEZ was introduced in the Faroe area. The demersal fishery by foreign nations has since decreased and now Faroese vessels take most of the catches. The fishery may be considered a multi-fleet and multi-species fishery. The longliners fish mainly cod and haddock; in addition, some longliners fish in deep water for ling, tusk and Greenland halibut. Most of the trawlers fish cod, haddock and saithe, while some large trawlers fish in deeper waters for redfish, blue ling, Greenland halibut and occasionally grenadier and black scabbardfish. The jiggers fish mainly saithe and cod. Recently, gill net fisheries for Greenland halibut and anglerfish have been introduced. The total demersal catches have decreased from 120,000 t in 1985 to 65,000 t in 1994. The decrease is mainly due to lower catches of cod, haddock and saithe. In 1995 and in the first 3 months of 1996 the cod catches have increased considerably compared to 1994; catch rates have also increased. Catches of saithe have, however, decreased in the same period.

During the 1980s and 1990s Faroese authorities have attempted to regulate the fishery and the investment in fishing vessels. In 1987 a system of fishing licences was introduced. The demersal fishery at the Faroe Islands has been regulated by technical measures (minimum mesh sizes and closed areas). In order to protect juveniles and young fish, fishing is temporarily prohibited in areas where the number of small cod, haddock and saithe exceeds 30% in the catches; after 1-2 weeks the areas are opened again for fishing. A reduction of effort has been attempted through banning of new licences and a buy back of licences.

A new quota system, based on individual quotas, was introduced in 1994. The quota year starts on 1 September and ends on 31 August the following year. The aim of the quota system is, through restrictive TAC's for the period 1994-1998, to increase the SSB's of Faroe Plateau cod and haddock to 52,000 t and 40,000 t, respectively. As a kind of compensation, the TAC for saithe was set higher than recommended. It should be noted that cod, haddock and saithe are caught in a mixed fishery and any management measure should account for this. Species under the quota system are Faroe Plateau cod, haddock, saithe, redfish and Faroe Bank cod.

The catch quota management system introduced in the Faroese fisheries in 1994 has been met with considerable criticism and it has resulted in discarding and in the fact that at least some fleets have misreported substantial portions of their catches. Reorganisation of enforcement and control have so far not solved the problems. As a result of the dissatisfaction with the catch quota management system, the Faroese Parliament has adopted a law

stipulating that the system would end as of 31 May 1996. In addition, the Faroese government has developed, in close cooperation with the fishing industry, a new system based on individual transferable effort quotas in days. The new system will enter into force on 1 June 1996.

The individual transferable effort quotas apply to 1) the longliners less than 100 GRT and the jiggers, 2) the single trawlers less than 400 HP, 3) the pair trawlers and 4) the longliners greater than 100 GRT. The single trawlers greater than 400 HP do not have effort limitations, but they are not allowed to fish within the 12 nautical miles limit and the areas closed to them, as well as to the pair trawlers, have increased in area and time. Their catch of cod and haddock will be limited by maximum by-catch allocation. The single trawlers < 400 HP are given special licences to fish inside 12 nautical miles with a by-catch allocation of 30% cod and 10% haddock. Holders of individual transferable effort quotas who fish outside an area where cod and haddock are normally found can fish for 3 days for each day allocated within the area of cod and haddock distribution. One fishing day by longliners less than 100 GRT is considered equivalent to two fishing days for jiggers in the same gear category. Longliners less than 100 GRT could therefore double their allocation by converting to jigging.

The effort quotas are transferable within gear categories but not between gears. The allocation of number of days by gear categories has been made such that the fixed allocation of catches in tonnes under the present management regime is expected to be maintained. The new effort quota system is expected to result in more reliable catch and effort data.

The marine environment: The waters around the Faroe Islands are in the upper 500 m dominated by the North Atlantic Current, which to the north of the islands meets the East Icelandic current. Clockwise current systems create retention areas on the Faroe Plateau and on the Faroe Bank. In deeper waters to the north and east is deep Norwegian Sea water and to the south and west is Atlantic water. In recent years the intensity of the North Atlantic current passing the Faroe area has decreased. The productivity of the Faroese waters has been very low since the middle of the 1980s. This applies also to the recruitment of many fish stocks, and the growth of the fish has been poor as well. Measurements of phyto- and zooplankton production show that the situation has gradually improved since 1991. Since 1992 the recruitment of important prey such as sandeel and Norway pout has been good and the growth of fish such as cod, haddock and saithe has improved considerably. The 1992-1993 and 1993-1994 year classes of cod and haddock, respectively, are estimated to be at or above the long-term average.

State of stocks: As a result of the combined effect of poor recruitment in the last decade and high fishing effort the SSB's of Faroe Plateau cod and Faroe haddock have been reduced to low levels. In 1993 ACFM considered them to

be well below minimum biologically acceptable levels and consequently advised no fishing. In 1995 the SSB of Faroe saithe was assessed to be the lowest on record.

The cod stock on Faroe Plateau and the haddock stock have increased and are expected to be within safe biological limits in 1997. On the other hand, the saithe stock is considered to be outside safe biological limits.

3.3.2 Faroe saithe

Catch data (Tables 3.3.2.1–3.3.2.3):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM landings
1987	No increase in F	32		40
1988	No increase in F	32		45
1989	Reduction in F	<40		44
1990	Reduction in F	41		62
1991	TAC	30		55
1992	Reduction in F	27		38
1993	Reduction in F	<37		33
1994	TAC	26	42 ¹	33
1995	TAC	22	39 ¹	27
1996	TAC	39		

(Weights in '000 t)

¹In the quota year 1 September–31 August the following year.

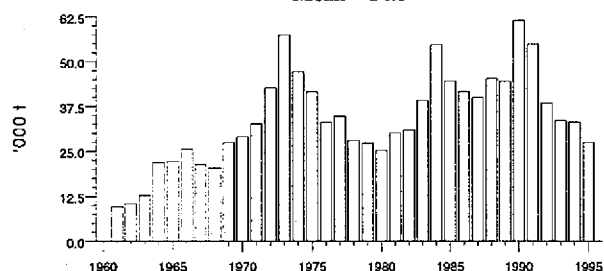
Historical development of the fishery: Saithe are taken in a mixed demersal fishery although they may be targeted with a small by-catch of other demersal species. The fishery was originally international, but for all practical purposes saithe has been fished only by Faroese vessels since the introduction of the 200 nm EEZ in 1977. The principal fleet consists of large pair trawlers, with engines larger than 1000 HP accounting for 60% of the catches in 1993–95. In the same period the smaller pair trawlers (<1000 HP) caught 19%, jiggers 11% and large single trawlers 8%. All other vessels only had small catches of saithe as by-catch.

State of stock: The stock is considered to be outside safe biological limits. Despite a high level of recruitment during the 1980s, the SSB has decreased significantly due to high fishing mortalities and is presently at a record-low level. Recent growth rates have increased from the low level observed in 1990–1991 but seem to have stabilised in 1994–1995. Fishing mortality peaked in 1991 and is still at a relatively high level.

(Details in Table 3.3.2.4).

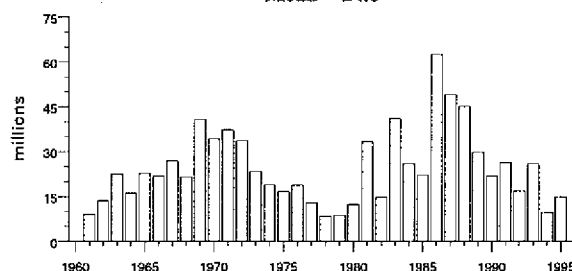
Landings

Mean = 34.0



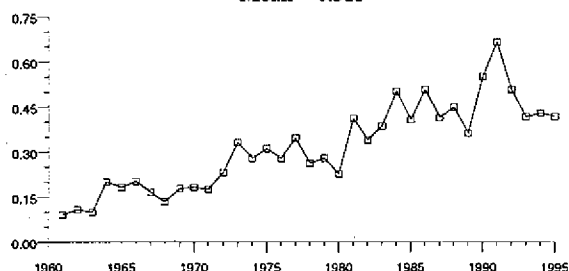
Recruitment (age 3)

Mean = 24.6



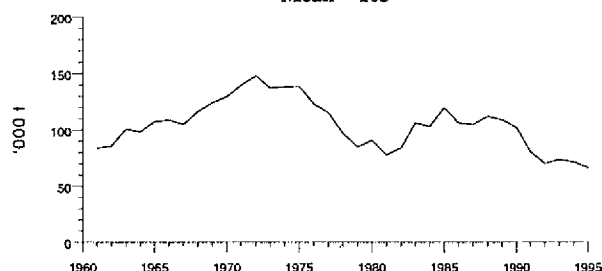
Fishing mortality (ages 4-8)

Mean = 0.315



Spawning stock biomass

Mean = 105



Forecast for 1997: SSB(96) = 64, F(96) = 0.42, Basis: F(96) = F(95), Catch(96) = 27, Landings(96) = 27

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4 F(95)	0.17	59	12	12	70
B	0.6 F(95)	0.25	59	17	17	66
C	0.8 F(95)	0.33	59	21	21	61
D	1.0 F(95)	0.42	59	26	26	58
E	1.2 F(95)	0.50	59	30	30	54

(Weights in '000 t)

A-C Reduction in catches and landings and decreasing, stable or increasing SSB.

D-E Stable or reduced catches and landings and decrease in SSB.

Management advice: ICES recommends that fishing mortality in 1997 should be reduced by at least 20% from the 1995 level corresponding to a catch of not more than 21,000 t in 1997.

Special comments: It should be noted that saithe and haddock are caught in a mixed fishery with cod. Given the state of the saithe stock, management measures for cod and haddock should ensure the greatest protection for the saithe stock.

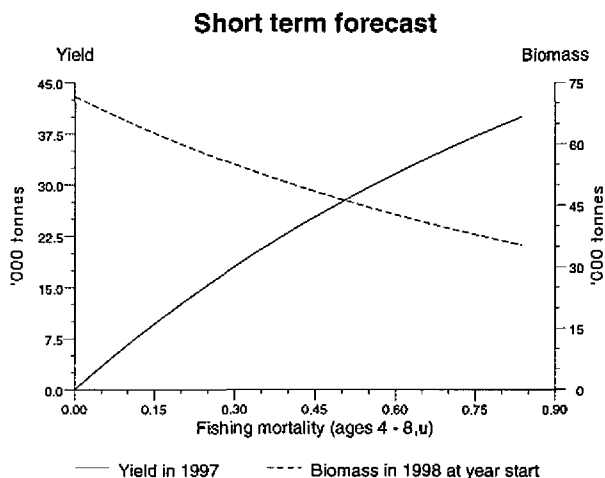
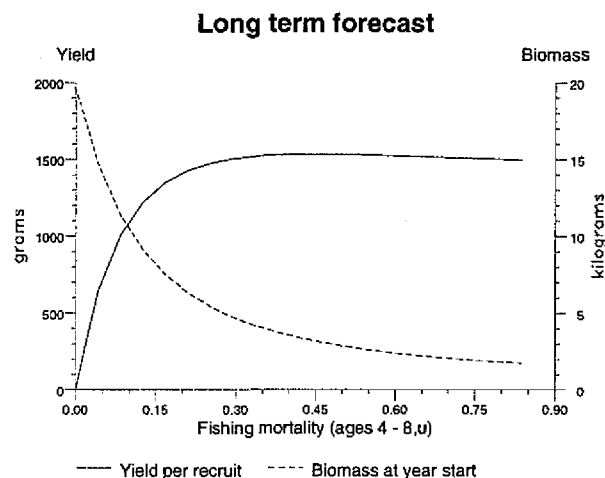
There are indications of the 1992 year class being small.

A revision of data on maturity at age has resulted in a substantial revision of the size of the spawning stock.

Data and assessment: Assessment tuned with effort data from a group of pair trawlers. No recruitment indices are available.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Yield and Spawning Stock Biomass



3.3.3 Cod

3.3.3.a Faroe Plateau cod (Sub-division Vb₁)

Catch data (Tables 3.3.3.a1 - 3.3.3.a2):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	No increase in F	31		21.4
1988	No increase in F (Revised estimate)	29 (23)		23.2
1989	No increase in F	19		22.1
1990	No increase in F	20		13.5
1991	TAC	16		8.7
1992	No increase in F	20		6.5
1993	No fishing	0		6.0
1994	No fishing	0	8.5/12.5 ^{1,2}	8.8
1995	No fishing	0	12.5 ¹	23.1
1996	F at lowest possible level	-	20 ²	

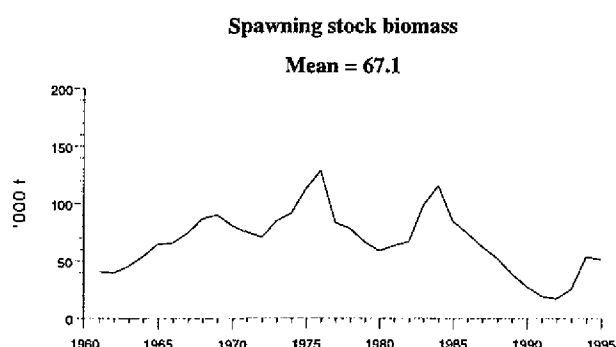
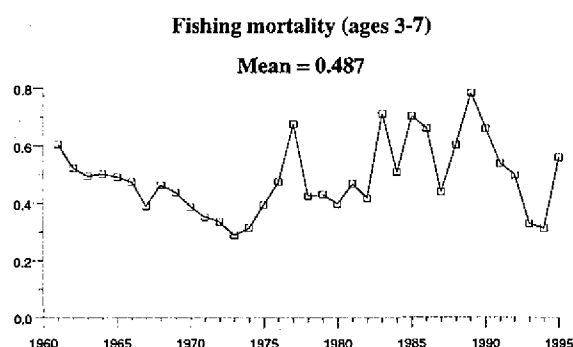
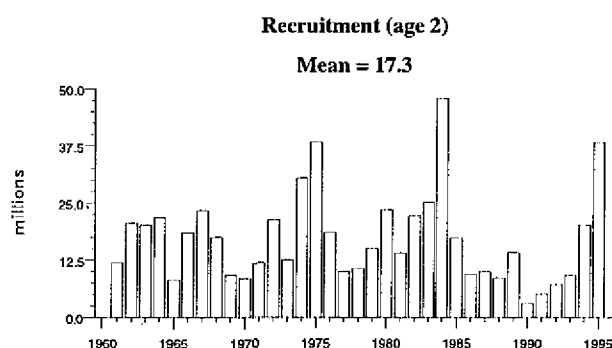
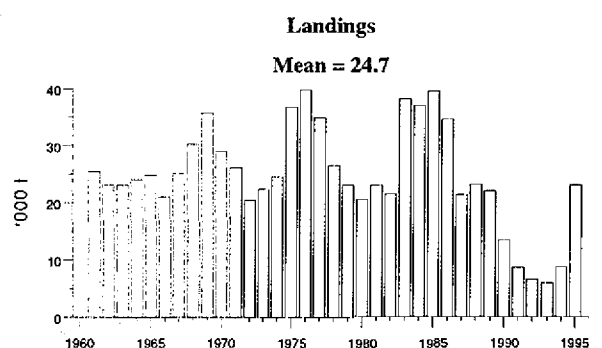
Weights in '000 t.

¹ In the quota year 1 September–31 August the following year.

² The TAC was increased during the quota year

Historical development of the fishery: Cod are taken in a mixed demersal fishery which was initially international. Following the declaration of EEZs in the 1970s, the fishery became largely Faroese and fishing mortality declined briefly but it has increased since to high levels. Most of the vessels

involved are trawlers and longliners. An effort control system is to be adopted from 1 June 1996 as described in Section 3.3.1.



State of stock: The stock is considered to be within safe biological limits. It is estimated to be above the Minimum Biologically Acceptable Level (MBAL) of 52,000–55,000 t but the fishing mortality exceeds F_{med} (0.47). Due to the combined effect of high fishing mortality and poor recruitment between 1984 and 1991, the SSB reached very low levels in the early 1990s. SSB increased in 1994 and 1995 due to the recruitment of the 1992 and 1993 year classes which are estimated to be at the long-term average. The growth rate of fish in the stock has fluctuated around a declining trend over the last three decades, although there is evidence of a short-term increase in recent years. (Details in Table 3.3.3 a3).

Forecast for 1997: Basis: *status quo* F for 1996, Catch(96) = 27, Landings(96) = 27, $F(96)=0.56$, SSB(96) = 55

Option	Basis	F(97)	SSB (97)	Catch (97)	Landings (97)	SSB (98)
A	No fishing	0.00	67	0	0	92
B	0.4F(95)	0.22	67	13	13	78
C	0.6F(95)	0.34	67	19	19	72
D	0.8F(95)	0.45	67	24	24	66
E	1.0F(95)	0.56	67	29	29	61
F	1.2F(95)	0.67	67	33	33	57

Weights in '000 t.

ICES notes that if the proposed effort reduction results in a 20% reduction in fishing mortality, then this is likely to maintain the stock above MBAL in the near future. Continued fishing at current or higher levels of fishing mortality is, however, likely to lead to a decrease in SSB.

Medium-term considerations: Evaluation of the medium-term effect of implementing a catch limit at or above 25,000 t for 1996 and onwards suggests that the probability of an increase in the stock is less than 50% (see Figure on next page). These results are dependent on the estimates of the size of incoming year classes and growth at age which cannot be forecast in advance.

Management advice: ICES recommends that fishing mortality in 1997 should be reduced by 20% from the 1995 level.

Special comments: All data sources available indicate that the spawning stock biomass in recent years has been increasing and is now most probably above MBAL. The sources, however, are not consistent in the indications of the strength of this recovery.

In 1995 catch per unit effort increased considerably, both in the survey and in the fishery. The CPUE increased for all age-groups compared to 1994, which suggests that the availability of the stock to both the fishery and the survey may have increased in 1995, possibly because of a change in the behaviour or distribution of the stock. Such changes make analytical assessments difficult and uncertain.

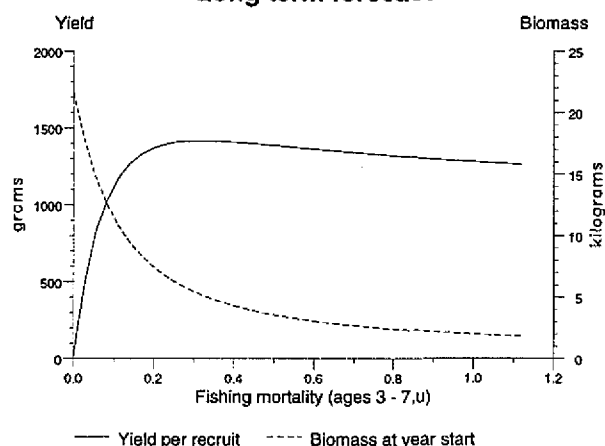
It is essential that close monitoring is carried out in order to evaluate the effect of the proposed effort limitation, if implemented.

Data and assessment: Analytical assessment using catch at age data tuned with 2 commercial CPUE series.

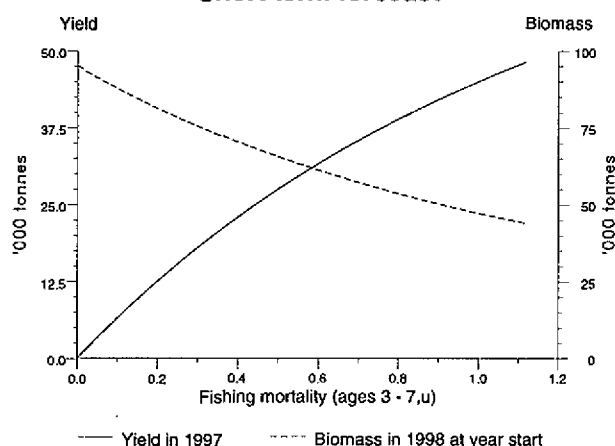
Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Yield and Spawning Stock Biomass

Long term forecast

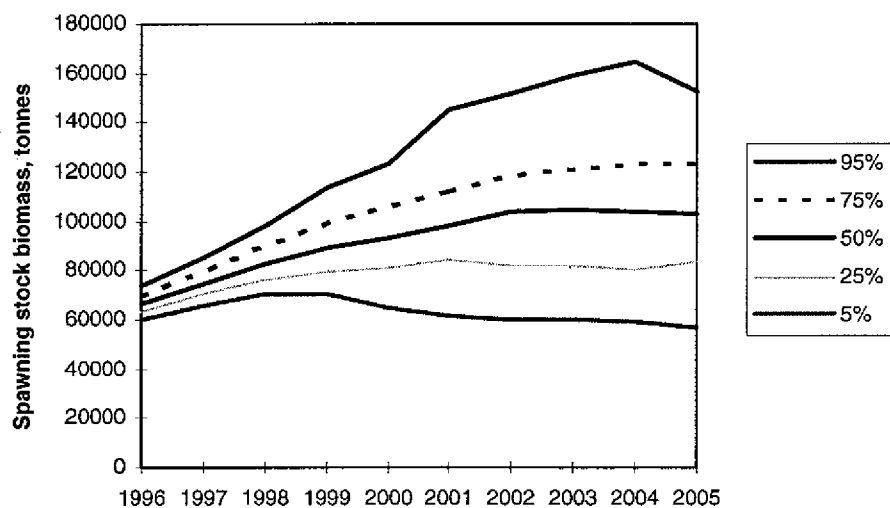


Short term forecast

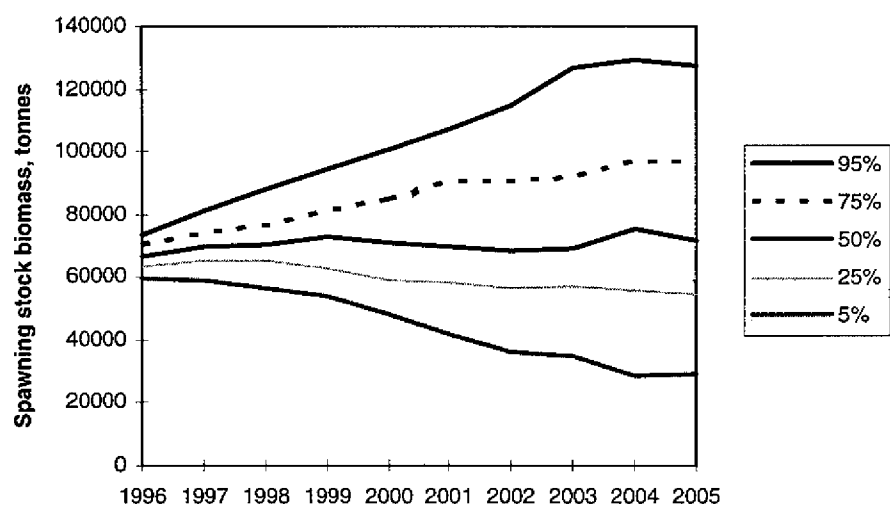


Results of the medium-term predictions for Faroe Plateau cod.

Fixed quota 20,000 tonnes



Fixed quota 25,000 tonnes



3.3.3 b Faroe Bank cod (Sub-division Vb2)

Catch data (Table 3.3.3.b1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Off. Indgs.
1987	No assessment	-		3.5
1988	No assessment	-		3.1
1989	Addition to Faroe Plateau TAC	-2.0		1.4
1990	Access limitation may be required	-		0.6
1991	Access limitation may be required	-		0.4
1992	No fishing	0.3		0.3
1993	TAC	0.5		0.4
1994	TAC	0.5		1.0
1995	Precautionary TAC	0.5		0.7 ¹
1996	Precautionary TAC	0.5	1.0	

Weights in '000 t.

¹ Preliminary

Historical development of the fishery: This was an international fishery until the declaration of EEZs since when the stock has largely been exploited by Faroese vessels. The stock was the subject of a summer trawl fishery but trawling is now banned. The fishery is mainly carried out by longliners.

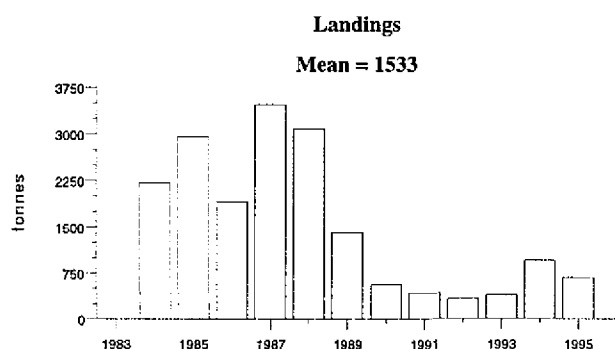
State of stock: Not known precisely. The Faroese groundfish surveys of the Bank indicate a steady decline from 1984 to 1990 after which a slight increase was observed from 1991 to 1995. The 1996 survey suggests a steep increase compared with previous years. CPUE data for the longliners fishing Faroe Bank cod indicate a similar trend with decreases until the early 1990s and slight increases since then.

Management advice: In view of the uncertainties about the state of this stock **ICES recommends that catches in 1997 on the Faroe Bank should not exceed the present level.**

Data and assessment: Survey and commercial CPUE data but no analytical assessment possible.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Details in Table 3.3.3 b2.



3.3.4 Faroe haddock

Catch data (Tables 3.3.4.1 - 3.3.4.2):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	No increase in F	17		14.9
1988	No increase in F	18		12.2
1989	No increase in F	11		14.3
1990	No increase in F	11		11.7
1991	TAC	11		8.4
1992	TAC	13-15		5.5
1993	Reduction in F	<8		3.8
1994	No fishing	0	6.2	4.3
1995	No fishing	0	6.2	5.0
1996	TAC	8.3	12.6 ¹	

Weights in '000 t.

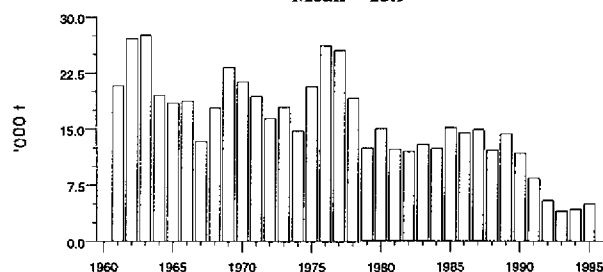
¹For the period 1 September 1995 to 31 May 1996.

Historical development of the fishery: Haddock are part of a mixed demersal fishery which was initially international. Following the declaration of EEZs in the 1970s, the fishery became largely Faroese and fishing mortality declined in this period. Most of the vessels involved are trawlers and longliners.

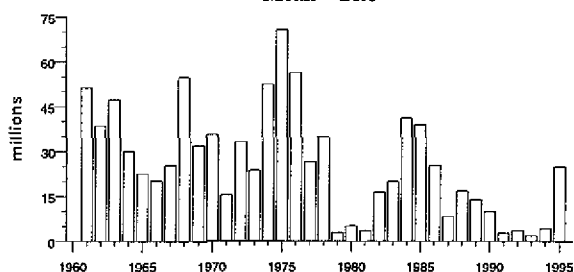
State of stock: The stock is considered to be outside safe biological limits. Fishing mortality is currently at a relatively low level. The SSB is close to a record low level but is expected to improve significantly by 1997 if the 1993 and 1994 year classes are at the long-term average, as indicated by the surveys.

Details in Table 3.3.4.3.

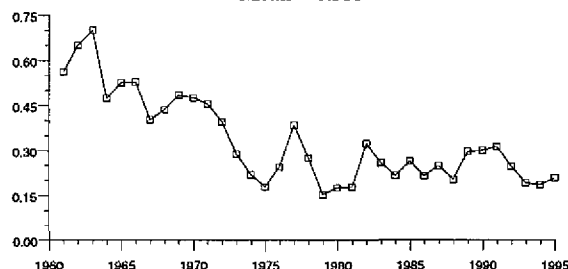
Landings
Mean = 15.9



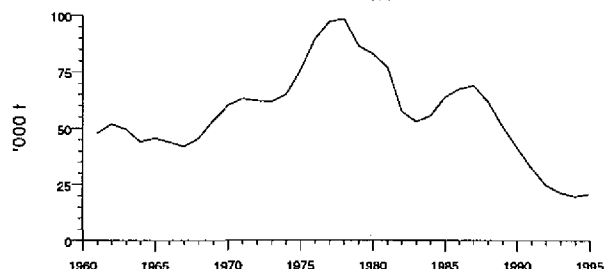
Recruitment (age 2)
Mean = 26.0



Fishing mortality (ages 3-7)
Mean = 0.333



Spawning stock biomass
Mean = 56.6



Forecast for 1997: $F(96) = 0.21$, Basis: $F(96)=F(95)$, $Catch(96) = 7.3$, Landings (96) = 7.3, $SSB(96) = 27$

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	No catch	0	41.1	0	0	59.4
B	0.4F(95)	0.08	41.1	4.0	4.0	54.9
C	0.6F(95)	0.12	41.1	5.8	5.8	52.8
D	0.8F(95)	0.17	41.1	7.6	7.6	50.7
E	1.0F(95)	0.21	41.1	9.3	9.3	48.8
F	1.2F(95)	0.25	41.1	10.9	10.9	46.9

Weights in '000 t.

The stock is expected to increase under all the scenarios considered.

Management advice: ICES recommends that fishing mortality in 1997 should not be allowed to increase above the level observed in 1995.

Special comments: It should be noted that saithe and haddock are caught in a mixed fishery with cod.

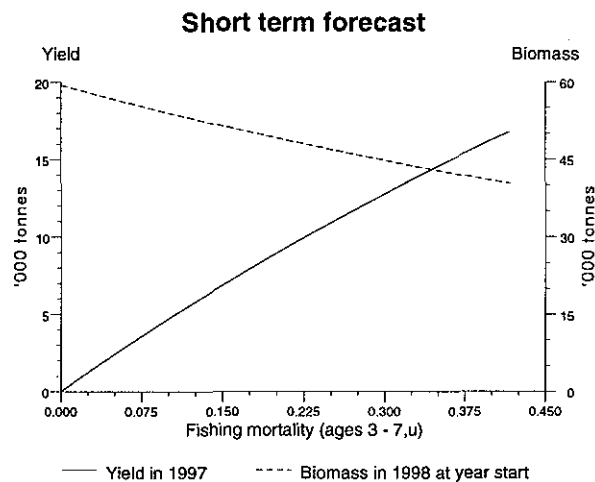
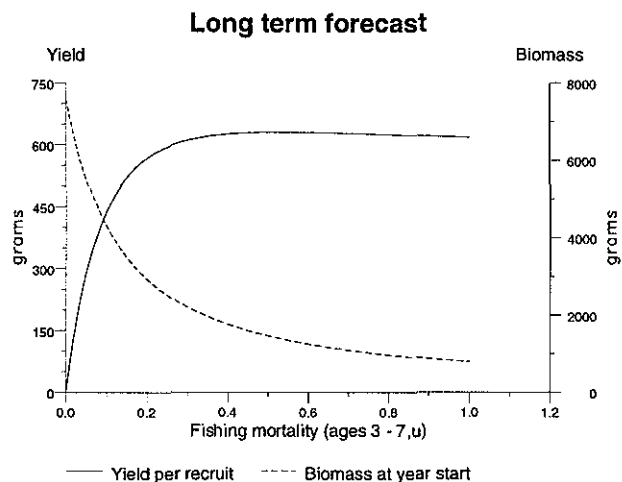
Analysis of spawning stock and recruitment estimates indicates that a spawning stock below 40,000 t has generally produced small year classes. It is therefore advisable to allow the stock to increase towards that level.

The mean weights at age have been increasing since 1992 and the available information from the first quarter of 1996 indicates that the increase has continued at least in 1996 for ages 3 and older.

Data and assessment: Analytical assessment using groundfish survey and commercial trawl and longline data. Recruitment indices from bottom trawl surveys.

Source of information: Report of the North-Western Working Group, May 1996 (CM 1996/Assess:15).

Yield and Spawning Stock Biomass



3.4 Stocks in the Skagerrak and Kattegat (Division IIIa)

3.4.1 Overview

Description of fisheries

The fleets operating in the Skagerrak and Kattegat (Division IIIa) include vessels targeting species for human consumption as well as vessels engaged in fisheries for reduction purposes. The human consumption fleets are diverse including gillnetters and Danish seiners exploiting flatfish and cod and demersal trawlers involved in various human consumption fisheries (roundfish, flatfish, *Pandalus* and *Nephrops*). Demersal trawling is also used in the fisheries for Norway pout and sandeel which are landed for reduction purposes. Pelagic trawlers and purse seiners exploit herring, mackerel, horse mackerel and sprat.

The roundfish, flatfish and *Nephrops* stocks are mainly exploited by Danish and Swedish fleets consisting of bottom trawlers (*Nephrops* trawls with >70 mm meshes and bottom trawls with >90 mm mesh size), gill netters and Danish seiners. The number of vessels operating in Division IIIa has decreased in recent years. This is partly an effect of the EU withdrawal programme which until now has affected the Danish fleets only, but these fleets still dominate the fishery in Division IIIa. *Pandalus* is exploited by Danish, Swedish and Norwegian shrimp trawlers.

The industrial fishery is a small-mesh trawl fishery mainly carried out by vessels of a size above 20 m. This fleet component has also decreased over the last decade. The most important fisheries are those targeting sandeel and Norway pout. There is also a trawl fishery landing a mixture of species for reduction purposes. Landings in the industrial fisheries in Division IIIa are given in Table 3.4.1.1.

There are important technical interactions between the fleets. Most of the human consumption demersal fleets are involved in mixed fisheries and the Norway pout and the mixed clupeoid fishery have by-catches of protected species. For whiting and haddock the by-catches taken in industrial fisheries are larger in weight than the landings for human consumption.

Misreporting and non-reporting of catches has occurred in recent years, particularly for cod, but the amounts vary between years. There are no discard data available for assessments. The time series of age samples from landings for industrial purposes is short and there are gaps in this series.

Overview of resources

The Skagerrak-Kattegat area is to a large extent a transition area between the North Sea and the Baltic - both in terms of hydrography and topography and the identity of stocks in the area. The exchange of water between the North Sea and the Baltic is the main hydrographic feature of the area.

Several of the stocks in the Skagerrak show close affinities to the North Sea stocks, in terms of both population dynamics (similar trends in recruitment and SSB) and biological indicators such as parasites or genetics. Tagging experiments have demonstrated extensive migration between the two areas for several species. Stocks which are believed to be closely associated between the North Sea and Skagerrak include saithe, hake, cod (except for coastal populations in fjords), haddock, whiting and Norway pout. Sandeel in the North Sea and Skagerrak is probably a complex of several local populations rather than separate populations in the two areas. The landings of sandeel from the Skagerrak area have had a different composition of sandeel species from that in the North Sea.

The main herring stocks exploited in the area are the North Sea autumn spawners and the stock of spring-spawners spawning in the western Baltic and the southern part of Division IIIa. Both stocks have important components migrating into Division IIIa at some time during their life cycle. The juvenile herring in Division IIIa are mainly of North Sea stock origin while the mature fish are predominantly spring-spawners. The major part of the Western Baltic spring spawners migrates into Division IIIa outside the spawning season and is found in the Skagerrak in summer.

Cod in the Kattegat and Belt area are also associated with the western Baltic stock. The structure and extent of migrations is, however, not clear.

Most of the stocks are now assessed in conjunction with the stocks in the neighbouring areas - cod in the Skagerrak, haddock, saithe, Norway pout and autumn-spawning herring are assessed with the North Sea stocks, spring spawning-herring with the western Baltic stock. The state of these stocks is considered in the sections concerning the North Sea and Baltic respectively.

For plaice, the spawning stock biomass and the exploitation level is around the average level over the last 20 years.

The state of the cod in the Kattegat is uncertain, but indications are that the stock has been decreasing for two decades until recently.

For *Nephrops* in Division IIIa there are indications of overexploitation. The stock of *Pandalus* is considered to be within safe biological limits.

3.4.2 Cod in Division IIIa

3.4.2 a Cod in the Skagerrak. See Section 3.5.2

3.4.2 b Cod in the Kattegat

Catch data (Table 3.4.2 b1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	Reduction in F	<13.0	15.5	11.5
1988	Reduction in F	<15.0	15.0	5.5
1989	TAC	10.0	12.5	8.6
1990	TAC	7.0	8.5	5.9
1991	TAC	6.3	6.65	6.8
1992	30% reduction in fishing effort	-	6.65	6.3
1993	Limit fishing effort to 70% of 1991 effort	-	6.8	7.2
1994	Reduction in catch from 1991-1992	<6.3-6.8	6.7	7.8
1995	Precautionary TAC based on recent catches	6-7	6.7	8.2
1996	30% Reduction in fishing effort from 1994 level	-	7.7	

Weights in '000 t.

Historical development of the fishery: The officially reported catch has decreased over the last two decades. Catch figures are considered unreliable for recent years due to under-reporting and misreporting. Cod is caught mainly by trawl – both fish trawl (90 mm) and *Nephrops* trawl (70 mm) – and by gillnet and Danish seine. Large changes in the Danish fleet have occurred in recent years, including a decline in the *Nephrops* fishery and an increase in the effort by gillnet and fish trawl.

State of the stock: The state of the stock is uncertain. The spawning stock declined steadily for two decades and reached a historically low level in 1991. The fishing mortality more than doubled over the same period. Due to recent improved recruitment the stock size has increased, but current stock size cannot be estimated well. It is, however, evident that fishing mortality is high and that a continuation of this level will hamper stock recovery.

Forecast: Not available. The assessment is considered unreliable due to uncertainties in recent catch data.

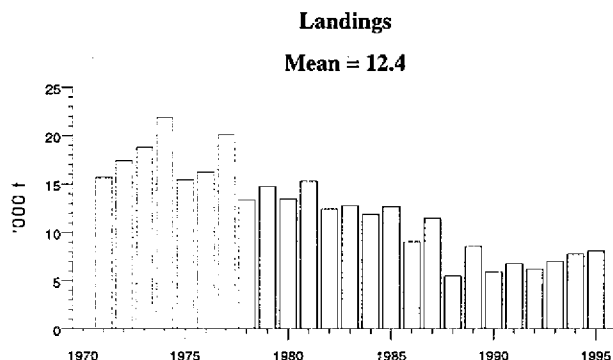
Management advice: ICES recommends that fishing effort on this stock should not exceed 70% of the 1994 level.

Special comments: In order to enable a recovery on a more permanent basis, an effort reduction is necessary.

Data and assessment: In recent years an unknown but probably substantial amount has been either unreported or allocated to other areas. Some amounts have also been allocated to the Kattegat but caught elsewhere. The analytical assessment is considered unreliable.

Source of information : Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

(Details in Table 3.4.2 b1).



3.4.3 Haddock in Division IIIa. See Section 3.5.3

3.4.4 Whiting in Division IIIa

Catch data (Table 3.4.4.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch ²
1987	Precautionary TAC	-	17.0	16.7
1988	Precautionary TAC	-	17.0	11.8
1989	Precautionary TAC	-	17.0	13.2
1990	Precautionary TAC	-	17.0	19.3
1991	TAC	-	17.0	14.1
1992	No advice	-	17.0	12.2
1993	Precautionary TAC	-	17.0	4.6
1994	If required, precautionary TAC	-	17.0	5.9
1995	If required, precautionary TAC	-	15.2	9.6
1996	If required, precautionary TAC	-	15.2	

¹Includes by-catch in small-mesh industrial fishery. Weights in '000 t.

Historical development of the fishery: The major part of the catch is taken in small mesh fisheries directed at Norway pout.

assessment with the North Sea was performed this year due to the lack of information on age compositions in the historical time series.

State of stock: Unknown.

Data and assessment: Age composition data are missing for most years. No analytical assessment is available.

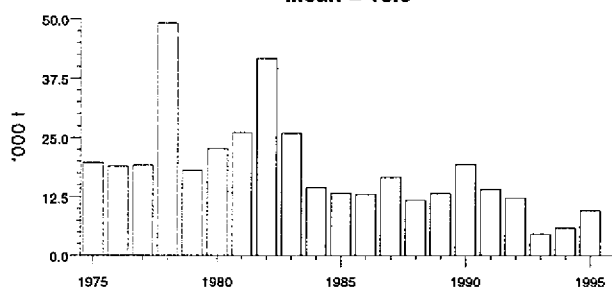
Management advice: ICES recommends that if a TAC for whiting in Division IIIa is set for 1997, it should be calculated as an average catch of recent years.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Special comment: Whiting in Division IIIa are likely to be linked to the North Sea population. No combined

Details in Table 3.4.4.1.

Landings
Mean = 18.5



3.4.5 Plaice in Division IIIa

Catch data (Table 3.4.5.1):

Year	ICES advice	Catch corresp. to advice: ¹		Agreed TAC:		ACFM catch
		Kattegat	Skagerrak	Kattegat	Skagerrak	
1987	Precautionary TAC	-	-	4.75	14.5	15.8
1988	No increase in F^3 ; precautionary TAC ⁴	3.7	-	4.75	15.0	12.8
1989	No increase in F^3 ; precautionary TAC ⁴	2.9	-	4.0	15.0	7.7
1990	80% of $F(88)^3$; TAC ³ ; TAC ⁴	1.3	10.0	2.0	11.0	12.1
1991	TAC	1.1 ²	10.0 ²	1.3	10.0	8.7
1992	TAC	14.0		2.8	11.2	11.8
1993	Precautionary TAC	-		2.8	11.2	11.3
1994	If required, precautionary TAC	-		2.8	11.2	11.3
1995	If required, precautionary TAC	-		2.8	11.2	10.9
1996	If required, precautionary TAC	-		2.8	11.2	

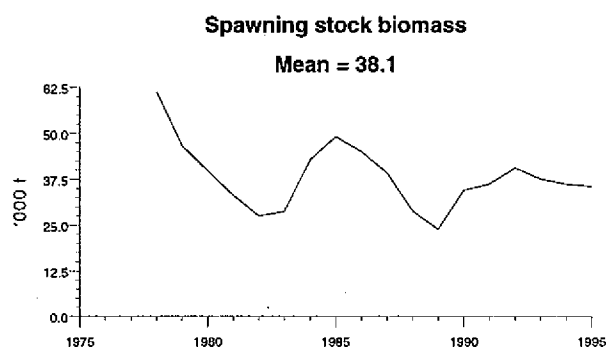
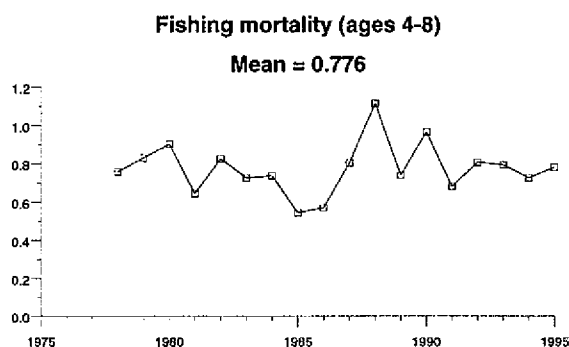
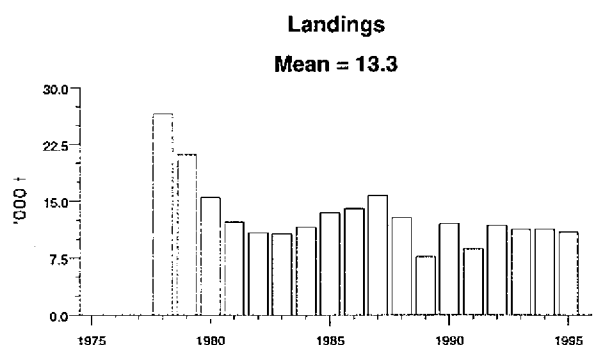
¹From 1992 onwards recommended TACs are combined. ²In May 1991 ACFM revised its advice to 12.0 for both areas combined.

³Kattegat. ⁴Skagerrak. Weights in '000 t.

Historical development of the fishery: Catches are taken by seine, trawl and gill net typically in mixed fisheries. Landings have declined since the late 1970s especially in the Kattegat but have remained stable over the last decade. In recent years the catch has been taken largely in the Skagerrak.

State of stock: The stock is considered to be within safe biological limits. The fishing mortality has remained at a level of about 0.8 per year over the last ten years. In the same period the SSB has fluctuated between 25,000 and 45,000 t.

Details in Table 3.4.5.2.



Forecast for 1997:

SSB(96)=31.2, F(96)=0.78, Basis: F(96)=F(95),
Catch(96)=10.5, Landings(95)=10.5

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs ¹ (97)	SSB (98)
A	0.4 F ₉₅	0.31	32.3	4.7	4.7	39.3
B	0.6 F ₉₅	0.47		6.7	6.7	37.1
D	0.8 F ₉₅	0.63		8.4	8.4	35.3
E	1.0 F ₉₅	0.78		10.0	10.0	33.7
F	1.2 F ₉₅	0.94		11.3	11.3	32.2

For all options, SSB remains approximately stable in the short term.

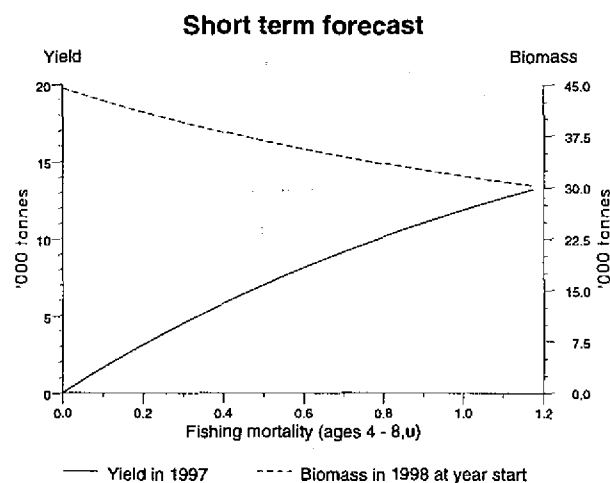
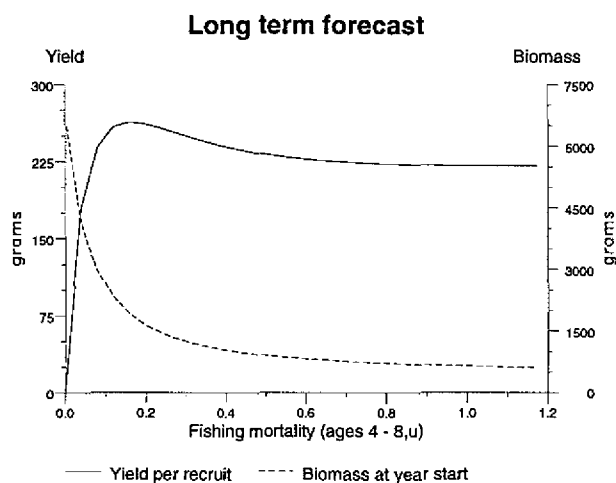
Weights in '000 t.

Special comment: The catch at age data have been revised since the last assessment. The present assessment is therefore considered adequate to indicate stock trends and provide a stock forecast.

Data and assessment: Analytical assessment based on commercial catch and effort data.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Yield and Spawning Stock Biomass



3.4.6 Sole in Division IIIa

Catch data (Table 3.4.6.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	-	-	0.85	0.72
1988	-	-	0.95	0.71
1989	TAC	<0.8	0.80	0.82
1990	Precautionary TAC	0.6	0.50	1.05
1991	TAC	1.0	1.00	¹
1992	TAC	1.0	1.40	¹
1993	TAC at recent catch levels	1.0	1.60	¹
1994	No advice due to uncertain catches	-	2.10	1.20
1995	No advice	-	2.25	1.30
1996	No advice	-	2.25	

¹Uncertain. Weights in '000 t.

Historical development of the fishery: Sole is mainly taken in a demersal trawl fishery directed at cod, sole and various other flatfish species and in gillnets directed at sole. Since 1987 the sole catches have been at a considerably higher level than previously.

State of the stock: The stock is considered to be within safe biological limits but the stock size is not known precisely. Both the fishery and data from surveys indicate that the stock has been exceptionally high in the period 1988–1995. Surveys in 1996 indicate that recruitment is back to the level prior to 1988.

Forecast: No forecast is available for this stock.

Management advice: ICES is not in a position to provide management advice for this stock.

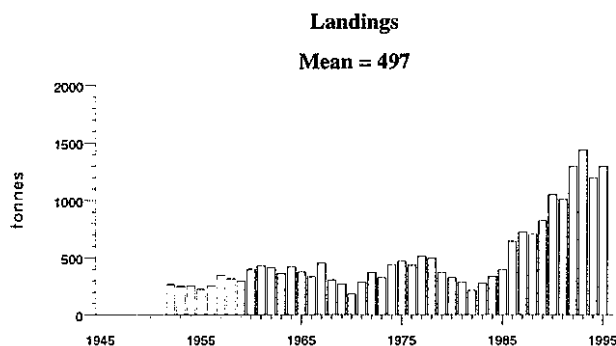
Special comments: The long-term (1952–1985) catch level was 250–500 t. The yield has increased since 1986

due to a series of increased recruitment. Recruitment seems now to have returned to the average level which suggests that the catches may decline towards that level in the future. Regulation of the mixed demersal trawl fisheries should be seen as an entity. The cod is more heavily exploited than sole and management of sole should take the management measures needed for cod into consideration.

Data and assessment: The catch statistics in the 1990s, when the TAC restricted the fishery, are influenced by significant non-reported catches. The catch statistics since 1994 are assumed to be reliable due to a change from a TAC to effort regulation removing the incentive for non-reporting. A bottom trawl survey in the area is not directed at sole but indicates stock trends qualitatively.

Source of information : Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

(Details in Table 3.4.6.1. For 1991–1993 the values given are officially reported landings).



3.4.7 *Pandalus borealis* in Division IIIa and Division IVa East (Skagerrak and Norwegian Deeps)

Catch data (Tables 3.4.7.1–2):

Year	ICES advice	Catch corresp. to advice	Agreed TAC Skagerrak	Agreed TAC IIIa + IVaE	Disc. slip.	ACFM lndgs	ACFM catch
1987	Not assessed				0.8	14.3	15.1
1988	Catches significantly below 1985–1986 ³				0.8	12.0	12.8
1989	No advice		3.1 ¹		1.5	11.0	12.5
1990	F as F(pre-85) ³ ; TAC ³ ; No increase in F ⁴ ; TAC ⁴	10.0	2.75 ¹		1.7	10.2	11.9
1991	No increase in F; TAC	12.0	8.55		0.8	11.6	12.4
1992	Within safe biological limits	15 ²	10.5	15.0	0.7	13.0	13.7
1993	Within safe biological limits	13 ²	10.5	15.0	1.2	12.7	13.9
1994	Within safe biological limits	19 ²	12.6	18.0	0.4	11.7	12.1
1995	Within safe biological limits	13 ²	11.2	16.0	0.5	13.3	13.9
1996	No advice	11 ²	10.5	15.0			

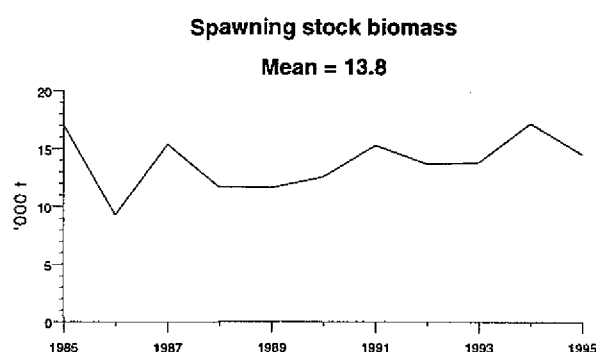
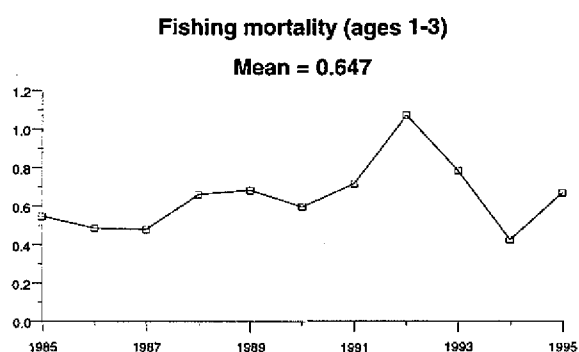
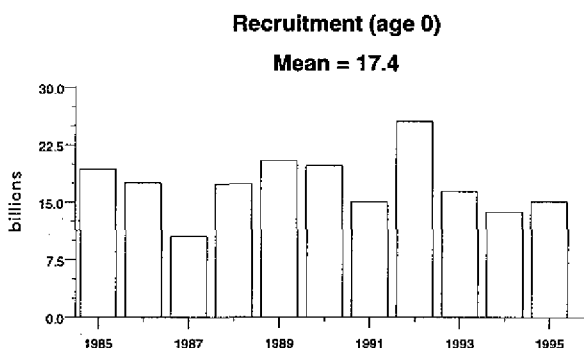
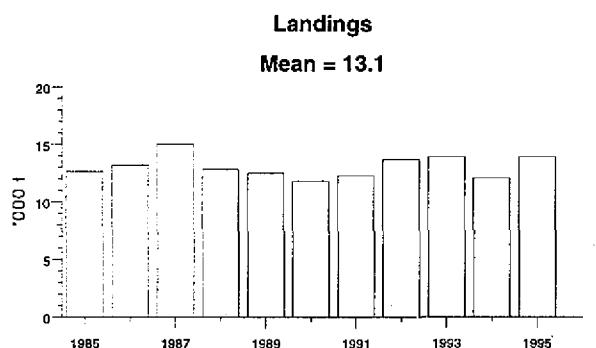
¹EU zone only. ²Catch at status quo F. ³IIIa. ⁴Norwegian Deep. Weights in '000 t.

Historical development of the fishery: The stock is fished by shrimp trawlers from Denmark, Norway and Sweden. The landings increased from a level of around 6,000 t in the 1970s to around 12,000 t during the last decade. The catches are - on Norwegian and Swedish boats - sorted according to size. The largest individuals are boiled on board, the medium-sized shrimps are sold fresh to the canning industry and the smallest are discarded.

The TAC (introduced for the whole stock area in 1992) has never been fully utilized.

State of stock: The stock is considered to be within safe biological limits. The spawning stock biomass has remained stable in the recent period. Recent recruitment has been at average level.

Details given in Table 3.4.7.3.



Forecast for 1997: Recruitment of the 1996 and 1995 year classes at age 0 and 1 respectively are estimated by a recruit survey (October 1996).

SSB(96)= 10.4; F(96) = 0.72; Basis: F(96)=F(95); Catch(96) = 11.6; Landings(96) = 11.2

Option	Basis	F(97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4 F(95)	0.29	12.5	6.0	5.8	19.0
B	0.6 F(95)	0.43	12.1	8.5	8.2	16.8
C	0.8 F(95)	0.58	11.7	10.7	10.3	15.0
D	1.0 F(95)	0.72	11.3	12.7	12.2	13.4
E	1.2 F(95)	0.86	10.9	14.6	14.0	12.0

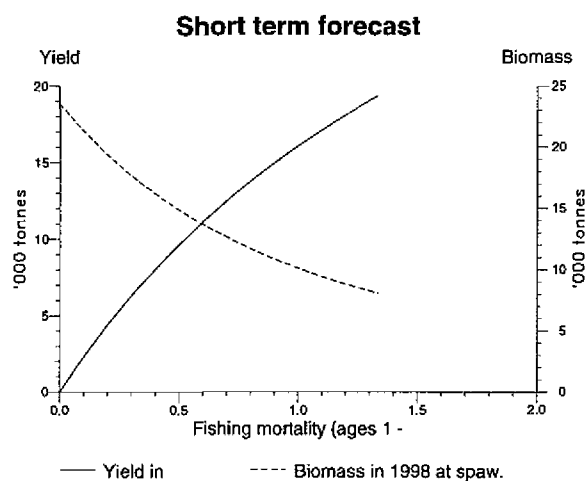
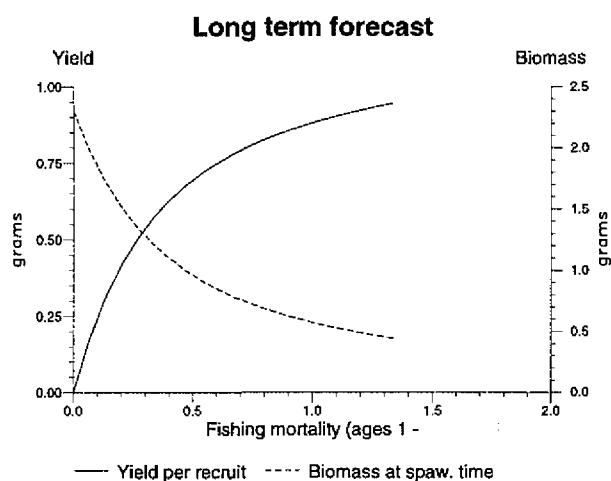
Weight in '000 t.

The SSB is predicted to increase in 1997 and 1998.

Data and assessment: Age-based assessment including discard estimates, tuned using effort data and survey indices.

Source of information: Report by Correspondence of the *Pandalus* Assessment Working Group. ICES CM 1996/Assess:17. Additional assessment by ACFM.

Yield and Spawning Stock Biomass



3.4.8 Herring in Sub-divisions 22-24 and Division IIIa (spring-spawners)

Catch data: Catches of herring (spring-spawners and North Sea autumn-spawners) are given for Divisions 22-24 and IIIa in Table 3.4.8.1. Catches of Baltic spring-spawners are given in the table below and in Table 3.4.8.2.

Year	ICES advice	Corresp. catch	Agreed TAC	ACFM catch of stock		
				22-24	IIIa	Total ¹
1987	Reduction in F	224		102	59	175
1988	No increase in F	196		99	129	251
1989	TAC	174		95	71	186
1990	TAC	131		78	118	204
1991	TAC	180		70	113	192
1992	TAC	180		85	75	168
1993	Increased yield from reduction in F; reduction in juvenile catches	188		81	81	171
1994	TAC	130-180		66	84	164
1995	If required, TAC not exceeding recent catches	168-192		74	90	173
1996	If required, TAC not exceeding recent catches	164-171				

¹Including catches of Baltic spring spawners in North Sea. ²Spring-spawners in IIIa and 22-24. Weights in '000 t

Historical development of the fishery: Herring are taken in Division IIIa and Sub-divisions 22-24 in a directed fishery by trawlers and purse seiners (fleet c) and in Division IIIa as by-catch in a fishery for Norway Pout and sandeel (fleet e) and in the "mixed clupeoid fishery" (fleet d). After a period of high landings in the early 1980s the landings have decreased to the long-term average.

State of stock: The state of the stock is uncertain as available information is conflicting. Results from research surveys indicate intermediate to high levels of total mortalities.

Forecast for 1997: Not available.

Management advice: ICES recommends that the fisheries on herring in Division IIIa should be managed in accordance with the management advice given in Section 3.5.8a for fleets c, d and e.

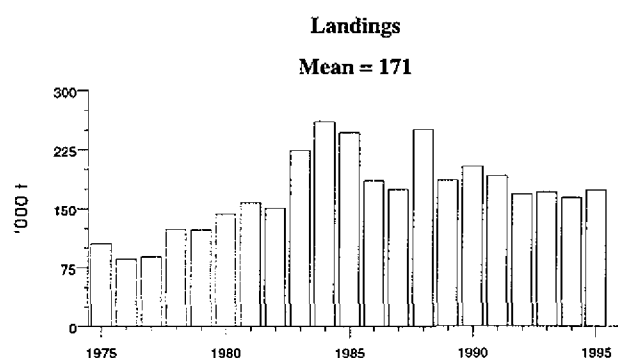
If a precautionary TAC is required for Sub-divisions 22-24, ICES advises that it should not exceed recent catch levels in that area.

Special comments: A considerable part of the landings of juvenile herring in Division IIIa originate from the North Sea stock.

Data and assessment: Catch-at-age data are uncertain due to low sampling intensity of landings, particularly in Division IIIa. The situation improved in 1995 compared to previous years. There are problems with stock separation in historical data and with independent survey indices.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).

Details in Table 3.4.8.2.



3.4.9 Sprat in Division IIIa

Catch data (Table 3.4.9.1)

Year	ICES advice	Corresp. catch	Agreed TAC ¹	Official landings ²	ACFM catch
1987	-	-	80	68	14
1988	TAC for "mixed clupeoid" fishery	80 ¹	80	63	9
1989	Sprat catch at lowest possible level; TAC for "mixed clupeoid fishery	80 ¹	80	62	10
1990	Sprat catch at lowest possible level; TAC for "mixed clupeoid fishery	60 ¹	65	43	10
1991	Sprat catch at lowest possible level; Zero TAC for "mixed clupeoid" fishery	-	50	44	14
1992	No advice for sprat; Zero TAC for "mixed clupeoid" fishery	-	50	40	10
1993	No advice for sprat	-	45	31	9
1994	Separate sprat TAC based on recent catches	10-14	43	42	96
1995	Separate sprat TAC based on recent catches	9-14	43	31 ³	56
1996	No advice	-	43		

¹TAC applies to all species in "mixed clupeoid" catch.; ²Includes other species in "mixed clupeoid" catches; ³No Swedish landings data provided. Weights in '000 t.

Historical development of the fishery: In Division IIIa sprat are caught primarily by various types of trawl in both the "mixed clupeoid" fishery and in directed fisheries for human consumption. The catches of sprat in the "mixed clupeoid" fishery have been at a low level (about 15%) in recent years but increased significantly in 1994. Landings of sprat in Division IIIa decreased from a peak of about 100,000 t in 1975 to low values of less than 10,000 t in the end of the 1980s. Since the mid-1980s, the total landings have been relatively stable at about 10,000 t, but increased to higher levels in 1994 and 1995.

State of stock: The state of the stock is unknown.

Forecast for 1997: No forecast is available.

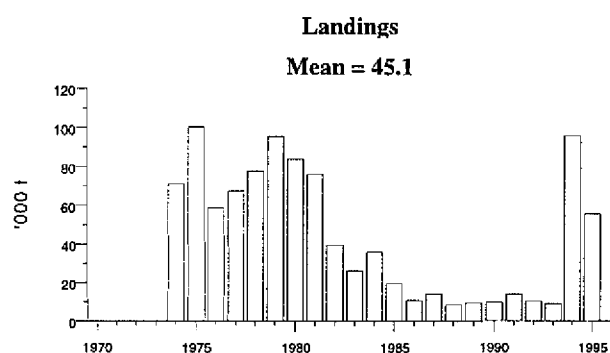
Management advice: ICES recommends that by-catches of herring in the sprat fisheries be reduced in accordance with advice given for the "mixed clupeoid fishery" (fleet d) and the industrial fishery for Norway pout and sandeel (fleet e) in Section 3.5.8.a.

Special comments: Except for 1994 and 1995, most catches in the "mixed clupeoid" fishery are of species other than sprat. A reduction of the catches of juvenile "human consumption" species in this fishery will improve the yield per recruit for these species.

Data and assessment: The data series is too short to carry out an assessment. The amount of sampling has been adequate in the last two years but not in previous years. There was no sampling of the landings in the human consumption fishery.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (C.M.1996/Assess:10).

Details in Table 3.4.9.1



3.4.10 Norway pout in Division IIIa

See Section 3.5.12.

3.4.11 Sandeel in Division IIIa

Catch data (Table 3.4.1.1, 3.4.11.1):

Year	ICES advice	ACFM landings
1987	No advice	5
1988	No advice	23
1989	No advice	18
1990	No advice	16
1991	No advice	23
1992	No advice	39
1993	No advice	45
1994	No advice	55
1995	No advice	12
1996	No advice	

Weights in '000 t.

Historical development of the fishery: An extension of the North Sea fishery into Division IIIa but with smaller vessels working closer inshore, mostly along the coast of Jutland.

State of stock: Uncertain.

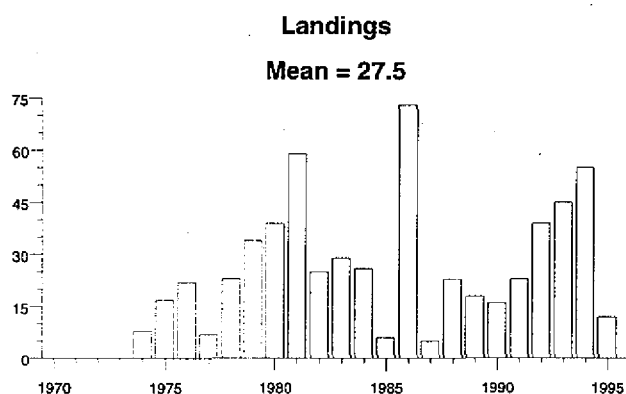
Special comments: Biological samples taken since 1992 indicate a mixture of four sandeel species. Species other than *Ammodytes marinus* make up a greater proportion of the landings in this area than in other sandeel fisheries.

A request for advice on sandeels from the Government of the United Kingdom is dealt with in Section 3.5.13.c.

Data and assessment: Insufficient data for an assessment.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Details in Table 3.4.1.1.



3.5 Stocks in the North Sea (Sub-area IV)

3.5.1 Overview

Description of the fisheries

The fisheries in the North Sea can be grouped into demersal and pelagic human consumption fisheries and industrial fisheries which land their catch for reduction purposes. Demersal human consumption fisheries usually target a mixture of roundfish species (cod, haddock, whiting), or a mixture of flatfish species (plaice and sole) with a by-catch of roundfish. A fishery directed at saithe exists along the shelf edge. The catch of these fisheries is landed for human consumption. The pelagic fisheries mainly target herring, mackerel and horse mackerel. Although most of the landings of these species may be landed for human consumption purposes, part of the landings are used for reduction purposes. The catch of the industrial fisheries mainly consists of sandeel, Norway pout and sprat. The industrial catches also contain by-catches of other species including herring, haddock and whiting (Table 3.5.1.1 and Table 3.5.1.2). In addition to the demersal, pelagic and industrial fisheries for fish, smaller fleets exist which fish for crustaceans including *Nephrops*, *Pandalus* and brown shrimp (*Crangon crangon*).

Each fishery uses a variety of gears. Demersal fisheries: otter trawls, pair trawls, seines, gill nets, beam trawls. Pelagic fisheries: pelagic trawls and purse seines. Industrial fisheries: small meshed otter trawls, pelagic trawls and purse seines.

Some major technological developments changed the fisheries in the North Sea during and after the 1960s such as the development of the beam trawl fishery for flatfish, purse seines in the industrial fishery and large pelagic trawls to replace driftnets. The introduction of power blocks in the 1960s has enormously increased the possibilities for the purse seiners. Also further development of electronic equipment such as satellite navigation, fish finders and sonar have increased fishing efficiency of the fleets.

The trends in landings of the most important species landed by these fleets during the last 25 years, together with the total international landings, are shown in Table 3.5.1.3 and in the figure on the following page. The demersal landings have steadily declined over the last 25 years. The pelagic landings, dominated by herring, decreased to reach a minimum in the late 1970s, when the fishery for herring was closed, but increase again up to 1988. Since then a (slight) decrease has occurred. The landings of the industrial fisheries increased to approximately 1.8 million t in the early 1970s, but have fluctuated around 1 million t in recent years. These landings show the largest annual variations, probably due to the short life span of the species. The total landings reached 3 million t in 1974, and have been around 2.5 million t since the 1980s.

A general upward trend in effort can be seen in all beam trawl fleets, in the Scottish light trawl fleet and the English

gill netters. Most other demersal effort series show a downward trend. The effort in the Danish and Norwegian fishery for Norway pout and sandeel has been gradually decreasing since 1989.

Most commercial species are managed by TAC/quota regulations that apply for Sub-area IV. For saithe the TAC is set for Sub-area IV and Division IIIa. The national management measures with regard to the implementation of the quota in the fisheries differ between species and countries. The industrial fisheries are subject to regulations for the by-catches of protected species.

Data

The data available from scientific sources for the assessment of roundfish, flatfish, herring and mackerel are relatively good. The level of biological sampling of most of the commercial landings has been maintained. Discard data are only available for haddock and whiting, but a historical series exists only for one country. Data on landings, fishing effort and species composition are available from all industrial fisheries. In recent years there was misreporting of roundfish landings associated with restrictive TACs.

Several series of research vessel survey indices are available for most species. Quarterly data were available from the International Bottom Trawl Survey for quarter 2 and 4 for a period of 5 years and were used in the assessment for some stocks. For herring and mackerel the spawning stock sizes are estimated by annual acoustic surveys (herring) or intermittent egg surveys (mackerel).

Analytical assessments were performed on cod, haddock, whiting, saithe, herring, mackerel, plaice, sole, sandeel and Norway pout.

A combined assessment was made for the first time for cod in Sub-area IV, Division IIIa Skagerrak and Division VIIId. Also combined assessments for whiting in Sub-area IV and Division VIIId and haddock in Sub-area IV and Division IIIa were done for the first time. Previously these species were assessed in the areas separately. Following an evaluation of the stock units in 1995, it was concluded that there was little justification for maintaining separate stock assessments for these separate Sub-areas and Divisions, either in terms of biological stock identity or the fisheries. The combined catch prediction for these stocks has, however, been split into the original Sub-areas and Divisions.

Multispecies considerations are not incorporated in the assessments or the forecasts for the North Sea stocks. However, natural mortalities estimated by multispecies assessments are incorporated in the assessments of cod, haddock, whiting, herring, sprat, sandeel and Norway pout.

Overview of resources

In the North Sea all stocks of roundfish and flatfish species are exposed to high levels of fishing mortality which are, with the exception of saithe and whiting, at a historically high level. This is in itself a clear indication of excessive effort. A number of cod stocks in the North Atlantic have become depleted or collapsed at fishing mortalities lower than those currently affecting the North Sea stock. The roundfish stocks, particularly cod, haddock, and whiting are subjected to a high exploitation rate which removes approximately 60% of the biomass each year. This makes the fisheries on these stocks highly dependent on recruiting year classes. Most of the roundfish stocks have been outside or close to safe biological limits in recent years and several stocks are at this level presently. The plaice stock has been outside safe biological levels in recent years and the sole stock is expected to fall outside these levels in the short term.

The herring in the North Sea is also exposed to a high level of fishing mortality. The stock is exploited in the North Sea and English Channel (Downs herring) by human consumption fisheries and considerable by-catches of juvenile North Sea herring have been taken in the industrial fishery for sprat in the North Sea and Division IIIa (Skagerrak). Although recruitment of herring has remained at average levels, the stock has declined rapidly and the present exploitation is considered to be unsustainable. Sprat has been abundant in recent years due to good recruitment but this is not expected to last in the near future. The North Sea component of the mackerel stock is collapsed and shows no signs of recovery to historical levels.

Landings of **cod** in 1995 were 139,000 t. Recruitment has been well below average in most years since 1985. The cod stock has been stable in recent years but on a very low level. It has increased recently to about 100,000 t in 1996 due to the contribution of the relatively abundant 1993 year class. It is expected to remain outside safe biological limits in the short term.

The stock of **saithe** is at a low level compared to the seventies when it was lightly exploited. In recent years it is gradually increasing. Landings in 1995 were 114,000 t. Fishing mortality has declined considerably since 1986. The stock may currently be within safe biological limits.

Human consumption landings of **haddock** in 1995 were 77,500 t. Although the stock of haddock is considered to be within safe biological limits, it is by no means sure that this position will be maintained in the medium term. The present stock size is largely due to the influence of one strong year class and the exploitation rate is high.

The assessment of **whiting** has always been of lower precision than the assessment for other stocks. Total landings have gradually decreased since 1976, and are on a record low level; 47,000 t in 1995. Fishing mortalities have been highly variable with no clear trend, although a downward shift is indicated for recent years. In recent years recruitment has been stable, but at a level below the long-

term geometric mean. The state of the whiting stock is uncertain.

The spawning stock of **plaice** has been decreasing and the stock is considered to be outside safe biological limits. Landings have fallen since 1990 to 98,000 t in 1995 and fishing mortality is at a record high level. The stock is expected to increase in the short term but is expected to remain below the MBAL of 300,000 t in the medium term at the present rate of exploitation.

Landings of **sole** have been high in recent years due to two strong year classes in the fishery. The 1995 landings were 30,000 t. Recruitment of recent year classes is, however, below average. The stock seems also to have suffered from additional natural mortality in the most recent winter but the level of mortality could not be quantified. The spawning stock is declining rapidly, fishing mortality is high and there is a high probability that SSB will be below the MBAL of 35,000 t in 1998.

The stocks of **Norway pout**, which now include both the North Sea and the Skagerrak, and **sandeel** are variable due to the short life span and variable recruitment. The stocks are considered to be within safe biological limits. Landings of both species in 1995 amounted to 240,000 and 920,000 t respectively.

The **herring** stock, which collapsed in the late 1970s but recovered through the 1980s, has been decreasing in recent years to levels well below the MBAL of 800,000 t and is considered to be outside safe biological limits. Catches in the North Sea in 1995 were 534,000 t. Fishing mortality in the human consumption fishery is very high and considerable by-catches of juvenile herring have been taken in the industrial fisheries for sprat. Landings of sprat in 1995 were 357,000 t. The state of the **sprat** stock is not precisely known, but the stock seems to have declined recently due to poor recruitment.

The spawning stock of **mackerel** in the North Sea is still at a very low level. Recruitment to this stock component has been very low for many years. The fisheries for mackerel in the North Sea rely on a much larger stock component, the western mackerel, which spawns outside the North Sea and which is present in the northern North Sea in the second half of the year. Landings of western mackerel in the North Sea in 1995 were 322,000 t.

The present state of the North Sea **horse mackerel** stock is not known. The last estimate from 1990 indicates an SSB of more than 200,000 t. Considerable quantities of western horse mackerel are taken in the northern North Sea in the second half of the year.

The state of the stock of ***Pandalus borealis*** in Division IVa (Norwegian Deep) and Division IIIa remains stable and the stock is considered to be within safe biological limits. The state of the stocks in Division IVa (Fladen Ground) and Division IVb (Farn Deep) is not known as no data for assessments were available. The fishery in the latter two

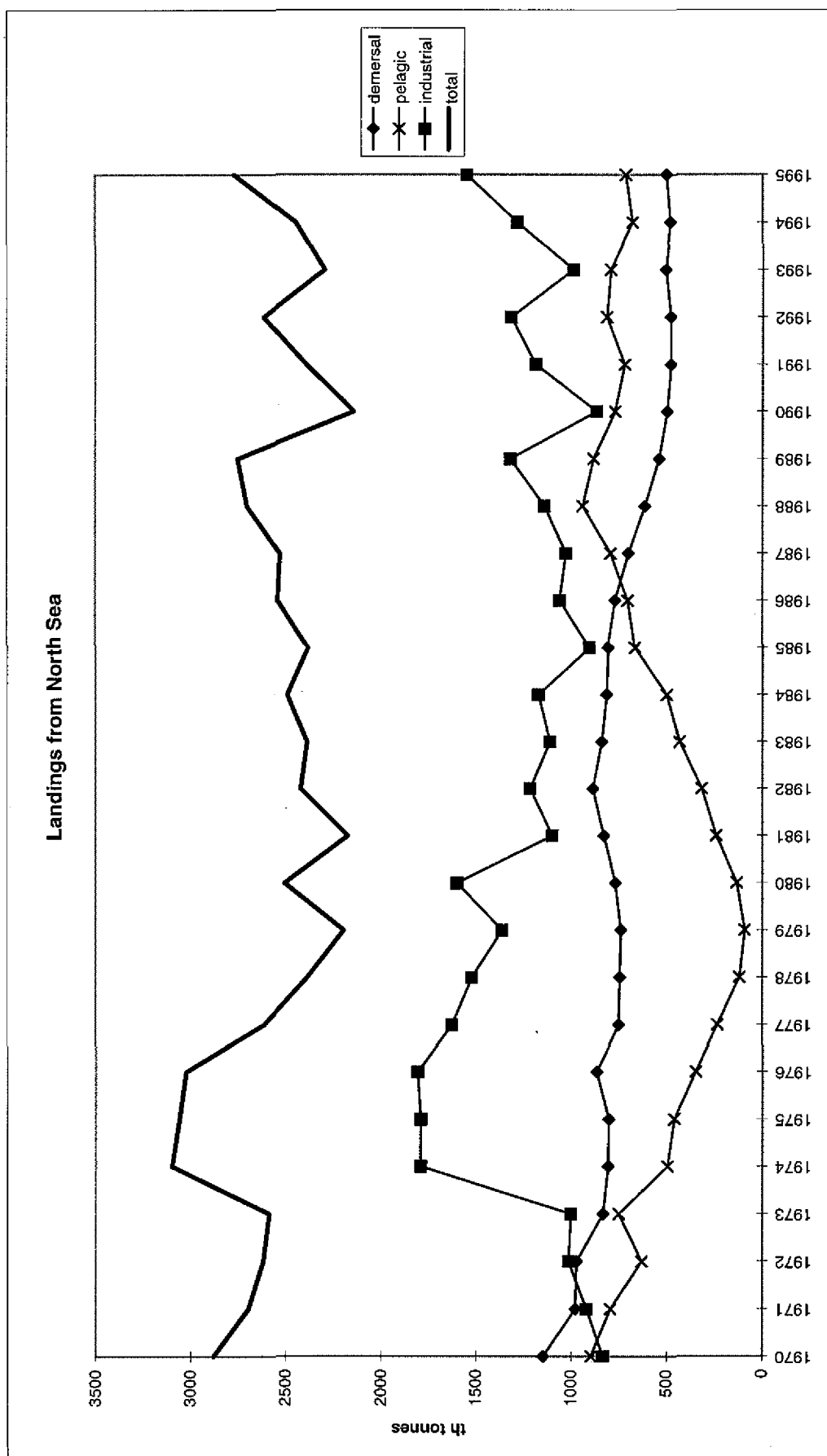
areas is opportunistic, strongly influenced by stock abundance and market prices.

Management advice

All stocks of roundfish and flatfish species in the North Sea which are targeted by human consumption fisheries are characterized by a very high fishing mortality. Most of these stocks have been outside or close to safe biological limits in recent years and several stocks are currently at this level. ICES has recommended significant and sustained reductions in fishing mortality on some of these stocks. The TAC regulations resulting from this advice, however, did not lead to the desired reductions in fishing mortality. ICES has therefore since 1991 indicated that reductions in fishing effort are required to achieve fishing mortality reductions.

Fishing mortality is generally high and reached for most stocks the highest historical values in recent decades. This is in itself a clear indication of excessive effort. This, and the poor performance of TACs, as implemented, in reducing fishing mortality, leads ICES to reiterate that the required reductions in fishing mortality can only be achieved if reductions in effort are included in management.

The herring stock in the North Sea is outside safe biological limits and has historically shown low recruitment at the present level. A rapid and significant reduction in fishing mortality is required to reduce the probability that further decline in SSB will be accelerated by low recruitment. In May 1996, ICES advised that the TAC for 1996 should be reduced and action was subsequently taken by the management authorities.



3.5.2 Cod in Sub-area IV (North Sea), Division VIIId (Eastern English Channel), Skagerrak (Division IIIa)

Catch data: Catches for each of the three parts of this combined assessment area are given in Tables 3.5.2.1–3 respectively and for the combined area in Table 3.5.2.4.

North Sea (Sub-area IV)

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Off. Indgs.	ACFM catch
1987	SSB recovery; TAC	100–125	175	167	175
1988	70% of F(86); TAC	148	160	142	150
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	86	89
1992	70% of effort (89)		100	98	97
1993	70% of effort (89)		101	95	105
1994	Significant effort reduction		102	88	94
1995	Significant effort reduction		120	111	120
1996	80% of F(94) = 0.7	141	130		

Skagerrak (Division IIIa)

Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	ACFM catch ¹
1987	F = F _{max}	<21	22.5	20.9
1988	Reduce F		21.5	16.9
1989	F at F _{med}	<23	20.5	19.6
1990	F at F _{med} ; TAC	21.0	21.0	18.6
1991	TAC	15.0	15.0	12.4
1992	70% of F(90)		15.0	14.8
1993	Precautionary TAC		15.0	15.3
1994	No long-term gain in increased F + precautionary		15.5	13.9
1995	If required precautionary TAC; link to North Sea		20.0	14.6
1996	If required precautionary TAC; link to North Sea		23.0	

¹ Norwegian fjords not included. Weights in '000 t.

Division VIIId

Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Off. Indgs.	ACFM catch
1987	Not assessed	-	-	9.4	14.2
1988	Precautionary TAC	-	-	10.1	9.4
1989	No increase in F; TAC	10.0 ²	-	n/a	5.5
1990	No increase in F; TAC	9.0 ²	-	n/a	2.7
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	-	-	n/a	2.4
1994	Reduce F+ precautionary TAC		-	n/a	2.8
1995	Significant effort reduction; link to North Sea		-	n/a	3.6
1996	Reference made to North Sea advice				

¹ Included in TAC for Sub-area VII (except Division VIIa). ² Including VIIe. Weights in '000 t.

Historical development of the fishery: Cod have been exploited in the North sea and adjacent areas for centuries. They are mainly taken together with haddock and whiting in mixed roundfish fisheries using towed gears. In recent years directed fisheries using fixed gears have increased. Cod are also taken as a by-catch in flatfish fisheries in the southern North Sea.

State of stock: The stock is considered to be outside safe biological limits. Spawning stock biomass is close to a historically low level and is well below a level where there is evidence that there has been impaired recruitment. Only two year classes (1985 and 1993) in the past 10 years have been at or above average. Current F is close to levels which might lead the stock to collapse.

Details in Table 3.5.2.4.

Forecast for 1997:

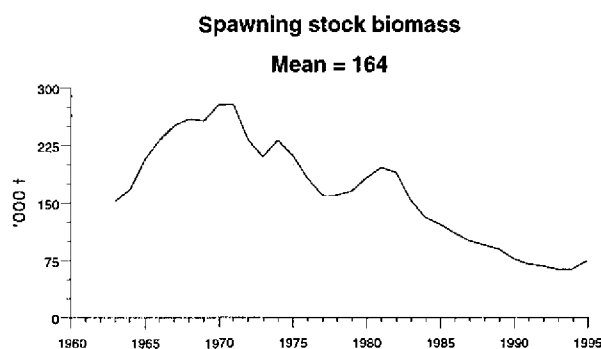
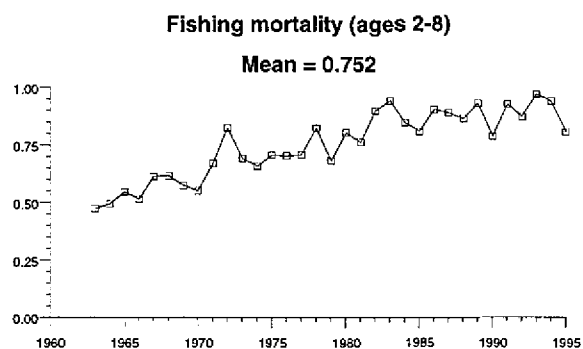
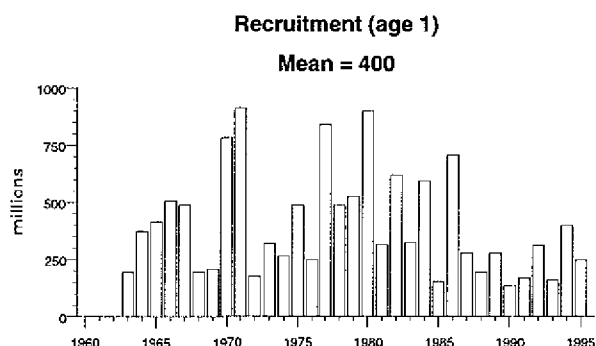
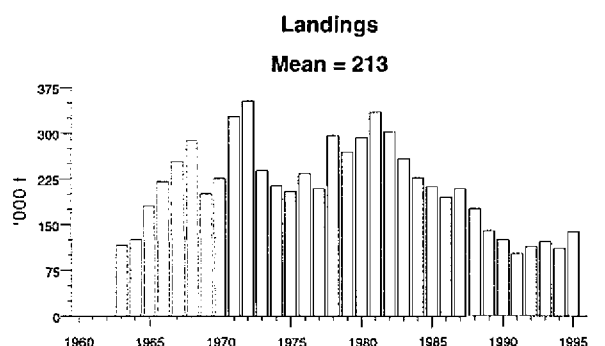
SSB(96)= 103, F(96)=0.81, Basis: F(96)=F(95), Catch(96)=168, Landings (96)=168

Option	Basis	F (97)	SSB (97)	Catch in combined area (97)	Lndgs in IIIa (97)	Lndgs in IV (97)	Lndgs in VIId (97)	SSB (98)
A	0.4 F ₉₅	0.33	124	76	9.2	65.1	1.7	191
B	0.6 F ₉₅	0.49		107	12.9	91.7	2.5	165
C	0.8 F ₉₅	0.65		134	16.1	114.8	3.1	142
D	1.0 F ₉₅	0.81		158	19.0	135.3	3.6	122
E	1.2 F ₉₅	0.97		179	21.6	153.3	4.1	105

Weights in '000 t.

Continuation of the fishery at recent levels will result in the SSB remaining below MBAL (150,000 t). An increase in the SSB to the level of MBAL at the start of 1998 would require a reduction in F in 1997 of about 40%.

Landings by Division or Sub-area are obtained by applying multipliers to the combined area catch. These were 0.121 for IIIa, 0.856 for IV and 0.023 for VIId. The factors are the ratio of the mean catches by area to the combined area for the period 1991–1995.



Medium-term considerations: Medium-term projections show that the future development of the stock is very sensitive to fishing mortality rate (graph on following page). Small increases in F lead to substantial reductions in SSB which may result in stock collapse. This is because the cumulative mortality operating up to the age of maturity is large. At the present level of F the SSB would be expected to fluctuate around MBAL after a very slow recovery from present levels. Such a recovery, however, is contingent on the recent estimates of lower selectivity of cod at younger ages.

A reduction in fishing mortality rate of 20% from the 1995 value would result in a probability of over 95% that the stock would recover to an SSB of 200,000 t, and hence well above MBAL, in the medium term.

Management advice: In order to bring the stock within safe biological limits in the medium term, **ICES recommends that fishing mortality be reduced by at least 20% of the 1995 value. This corresponds to an F in 1997 of 0.65.**

Special comments: Recent fishing mortality rates have been close to values which would be expected to result in stock collapse. Present exploitation rates are therefore dangerous and it is necessary to reduce fishing mortality rates significantly to reduce the probability of stock collapse.

Investigations of North Sea cod trends since the 1920s suggest that the typical fishing mortality rate before the second world war was in the region of 0.6. After the war these levels were lower, around 0.4, but have risen continuously to

more than double this value at present. Recent analyses which examine the stock-recruitment relationship suggest that the stock may collapse under sustained fishing mortality rates above 0.75. Present fishing mortality is above this level. A number of cod stocks in the North Atlantic have become depleted or collapsed at fishing mortalities lower than those currently affecting the North Sea stock. This reinforces the view that the exploitation rate on North Sea cod should be reduced substantially.

As it is unlikely that a lower fishing mortality can be achieved by the application of technical measures and or TAC's/quotas alone, ICES believes that the required decrease can only be achieved by a reduction in effort in the directed fisheries for cod and in the mixed roundfish fisheries which take a large cod component.

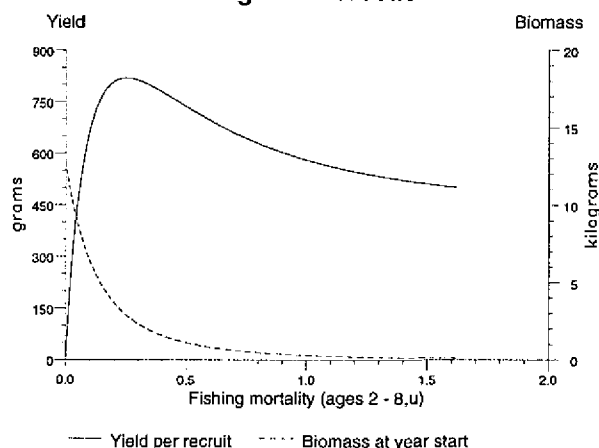
As a result of the combined area assessment, the value of MBAL was re-examined. The stock-recruitment data do not indicate any reason to change the value of MBAL of 150,000 t, the value below which recruitment is reduced.

Data and assessment: Analytical assessment based on landings, survey and CPUE data. Catch-at-age data considered reliable. Estimates of misreported landings have been included in the assessment.

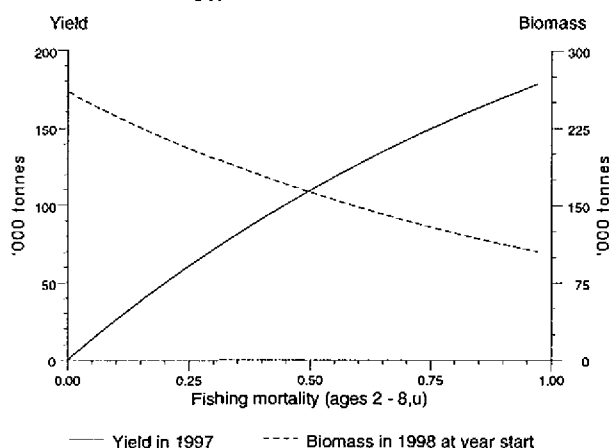
Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Yield and Spawning Stock Biomass

Long term forecast

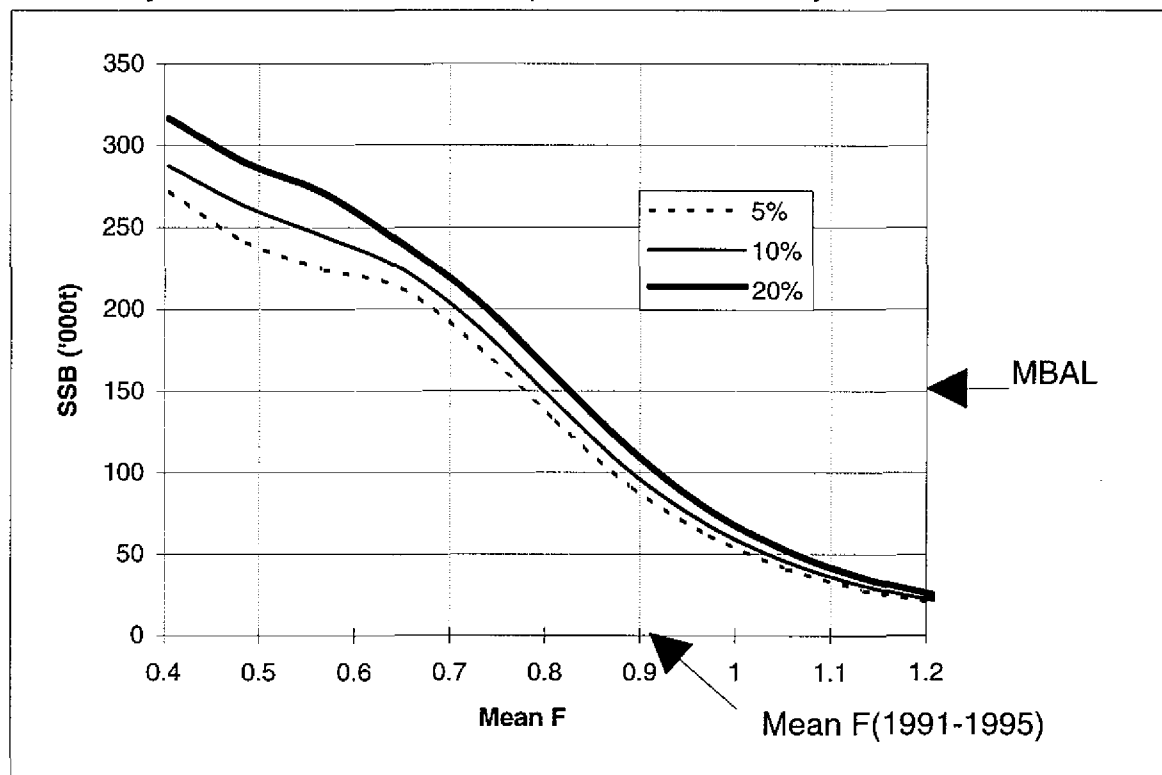


Short term forecast



Cod in IIIa+IV+VIId medium-term projections.

Probability that SSB will be below a given value after 10 years.



3.5.3 Haddock in Sub-area IV (North Sea) and Division IIIa

Catch data (Table 3.5.3.1-2):

Sub-area IV								
Year	ICES advice	Catch corresp. ¹	Agreed TAC	Off. Indgs.	ACFM catches			Total
					Hum. Co. ldgs.	Disc slip.	Indust. by-catch	
1987	80% of F(85)	105	140	109	108	59	4	172
1988	77% of F(86); TAC	185	185	105	105	62	4	171
1989	Reduce decline in SSB; TAC; protect juveniles	68	68	64	76	26	2	104
1990	80% of F(88); TAC	50	50	43	51	33	3	87
1991	70% of effort (89)		50	44	45	40	5	90
1992	70% of effort (89)		60	51	70	48	11	129
1993	70% of effort (89)		133	80	80	80	11	170
1994	Significant reduction in effort; mixed fishery		160	87	81	65	4	150
1995	Significant reduction in effort; mixed fishery		120	76	75	57	8	140
1996	Mixed fishery to be taken into account		120					

¹Only pertaining to the North Sea. Weight in '000 t.

Division IIIa						
Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catches		Total ¹
				Hum. Co. ldgs.	Disc slip.	
1987	Precautionary TAC	-	11.5	3.8	1.5	5.3
1988	Precautionary TAC	-	10.0	2.9	1.4	4.3
1989	Precautionary TAC	-	10.0	4.1	0.4	4.5
1990	Precautionary TAC	-	10.0	4.1	2.0	6.1
1991	Precautionary TAC	4.6	4.6	4.1	2.6	6.7
1992	TAC	4.6	4.6	4.4	4.6	9.0
1993	Precautionary TAC	-	4.6	2.0	2.4	4.4
1994	Precautionary TAC	-	10.0	1.8	2.2	4.0
1995	If required, precautionary TAC; link to North Sea	-	10.0	2.2	2.2	4.4
1996	If required, precautionary TAC; link to North Sea		10.0			

¹Including by-catch in small-mesh industrial fishery. Weight in '000 t.

Historical development of the fishery: Haddock are taken along with cod and whiting as part of a mixed demersal fishery mainly in the northern North Sea. The large majority of the catch is taken by Scottish trawlers, seiners and pair trawlers. Smaller quantities of haddock are taken by other vessels, including *Nephrops* trawlers which use 70 mm mesh. The stock is also exploited by vessels from England, Denmark and Norway. In Division IIIa catches are taken by trawl, seine and gill-net in a mixed fishery. A significant part of the catches is taken in small mesh fisheries directed towards Norway pout. The fishery in Division IIIa declined from the early 1980s and has remained fairly low.

State of stock: The stock is considered to be within safe biological limits. The 1992 year class is average and the 1994 year class above average. This has resulted in an increase in the spawning stock from the historical low in 1991. Fishing mortality continues to be high and above F_{med} (0.58). At current levels of F, SSB would decline rapidly after a few poor year classes. The current estimates suggest that the 1994 year class is strong, but that subsequent year classes are of average or below average strength.

Further details in Table 3.5.3.3.

Forecast for 1997:

SSB(96) = 233, $F(96) = 0.74^1$, Basis: $F(96) = F(95)$, Catch(96) = 212, Landings $^2(96) = 118$

Option	Basis	F (97) ¹	SSB (97)	Catch (97)	HCLdgs (97) ^{2,4}	Disc (97)	By- catch (97) ³	Ldgs IIIa	HC ldgs IV	SSB (98)
A	0.4F ₉₅	0.30	243	97	64	25	7	2.9	61.1	305
B	0.6F ₉₅	0.44		133	90	36	7	4.1	90.0	269
C	0.8F ₉₅	0.59		165	112	46	7	5.0	107.0	237
D	1.0F ₉₅	0.74		194	131	56	7	5.9	125.1	210
E	1.2F ₉₅	0.89		219	148	64	7	6.7	141.3	187

Weights in '000 t.

¹Human consumption landings + discards

²North Sea human consumption plus IIIa total.

³All assume $F(\text{ind})96 = F(\text{ind})94 = 0.04$ ($F(\text{ind})$ is the fishing mortality in the small-mesh industrial fishery).

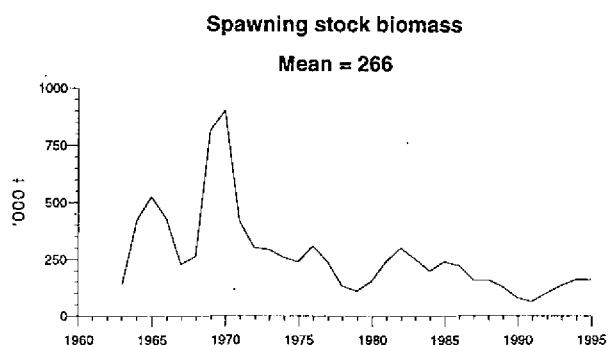
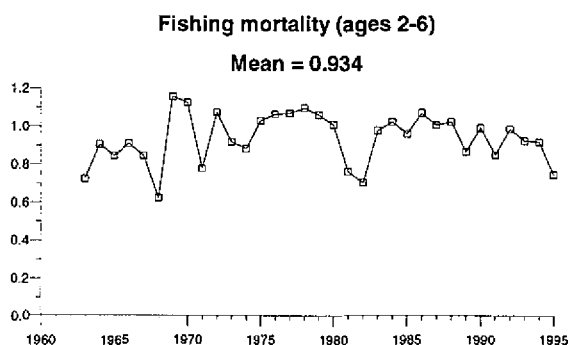
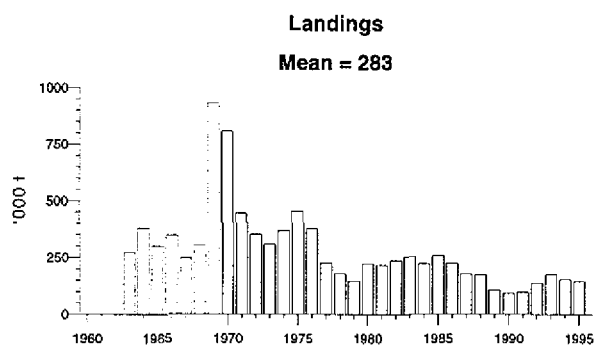
⁴The landings in Division IIIa are obtained by subtracting 4.5% of the combined area total. The figure of 4.5% is the long-term average of the Division IIIa landings expressed as a percentage of the combined IIIa+IV(human consumption) landings.

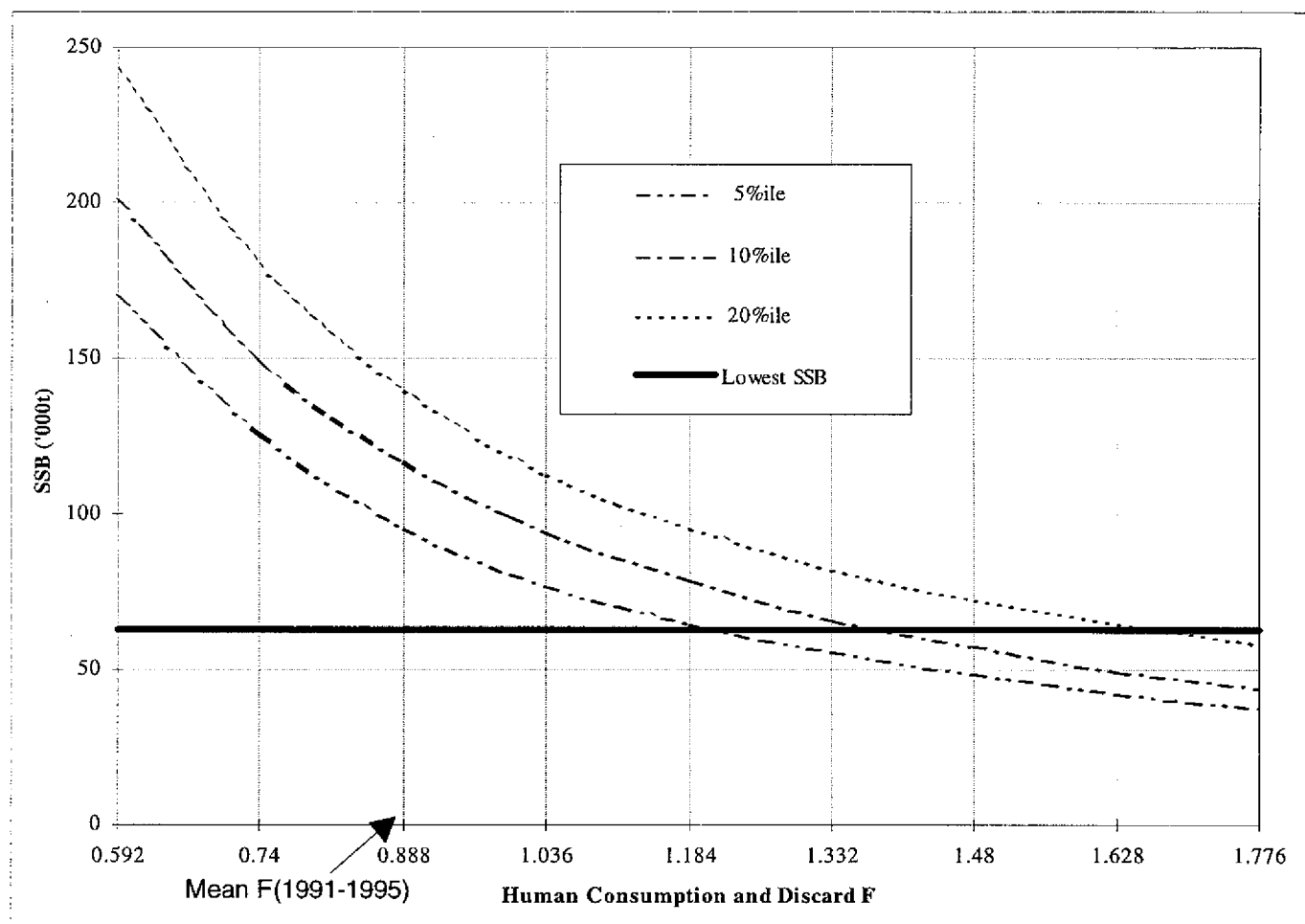
For options A–C, SSB is expected to increase in the short term. Options D and E imply a decrease in SSB relative to 1996. However, the forecast is not of high precision. The forecast for 1997 is strongly dependent on the strength of the 1994 year class which is estimated to be the largest since 1983, but its precise size is still uncertain.

Medium-term considerations: At present levels of fishing mortality rate the spawning stock is likely to remain above the lowest observed value of 63,000 t (see figure on next page). However, the high level of exploitation means that the stock will continue to fluctuate considerably in response to highly variable recruitment.

Management advice: Haddock is taken in mixed fisheries with cod, and management measures should take into account the recommended reduction in fishing mortality on cod.

Special comments: Since haddock is caught in a mixed fishery, an effort reduction in the fishery for cod implies also a reduction in the level of fishing mortality on haddock. This reduction would have positive benefits for haddock, such as a reduced dependence on strong year classes, and a reduced rate of fluctuation in stock size.





Haddock in IV+IIIa medium term projections. Probability that SSB will be below a given value after 10 years.

In some recent years there has been a significant amount of misreporting. Estimates have been made of the misreported catch but these are inevitably imprecise. It is likely that uncertainty in the estimates of past misreporting can still affect the precision of the present forecast to a significant degree. These problems, however, are not expected to affect the perception of the state of the stock.

Data and assessment: Analytical assessment using catch, effort and survey data.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

3.5.4 Whiting in Sub-area IV (North Sea) and Division VIIId (Eastern Channel)

Catch data (Table 3.5.4.1–2):

North Sea (Sub-area IV)								
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Off. Indgs.	ACFM figures			
					Hum. Con. Indgs.	Indust. by-catch	Disc. slip.	Total catch
1987	Reduce F towards F_{max}	120	135	65	64	16	54	134
1988	No increase in F; TAC	134	120	66	52	49	28	129
1989	Protect juveniles		115	40	41	43	36	120
1990	80% of F(88); TAC	130	125	41	43	51	56	150
1991	70% of effort (89)		141	47	47	38	34	119
1992	70% of effort (89)		135	47	46	27	31	104
1993	70% of effort (89)		120	47	48	20	43	111
1994	Significant reduction in effort; mixed fishery		100	43	43	10	33	86
1995	Significant reduction in effort; mixed fishery		81	41	42	27	31	100
1996	Mixed fishery; take into account cod advice		67					

Weights in '000 t.

Eastern English Channel (Division VIIId)					
Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Off. Indgs.	ACFM catch
1987	Not assessed	-	-	7.2	4.7
1988	Precautionary TAC	-	-	7.8	4.4
1989	Precautionary TAC	-	-	n/a	4.2
1990	No increase in F; TAC	8.0 ²	-	n/a	3.5
1991		-	-	n/a	5.8
1992	If required, precautionary TAC	6.0 ²	-	5.9	5.8
1993	No basis for advice	-	-	n/a	5.2
1994	No long-term gains in increasing F	-	-	n/a	6.6
1995	Significant reduction in effort; link to North Sea	-	-	n/a	4.9
1996	Reference made to North Sea advice				

¹Included in TAC for Sub-area VII (except Division VIIa). ²Including VIIe. Weights in '000 t.

Historical development of the fishery: The fishery for whiting is part of a mixed trawl fishery targeted at cod and haddock. Human consumption landings are stable but at lower levels than in the 1980s. A significant part of the landings is taken as by-catch in the industrial fishery, particularly the fishery for Norway pout. The 'Norway pout box' was set up in the 1980s to protect juvenile whiting and haddock from small mesh fisheries. Large quantities of smaller whiting are discarded.

State of stock: The state of the stock is uncertain but it is probably within safe biological limits. Estimates of SSB from conventional analytical assessments and the English groundfish survey indicate that SSB has been stable since 1984. An analysis using data from the Scottish groundfish survey and the first quarter International Bottom Trawl Survey indicates that it has increased during 1986–1992,

followed by a decrease in recent years. Fishing mortality rates as estimated from all data sources are high, particularly on the older fish.

Further details in Table 3.5.4.3.

Forecast for 1998: The *status quo* prediction for the combined area in 1997 is a catch of 128,000 t (64,000 t human consumption landings, 36,000 t discards and 28,000 t industrial by-catch). For the Sub-area IV component the human consumption landings are 57,000 t and for Division VIIId the landings are 6,200 t.

Management advice: Most of the fisheries exploiting whiting are mixed fisheries exploiting cod as well. Management measures should take into account the recommended reduction in fishing mortality on cod.

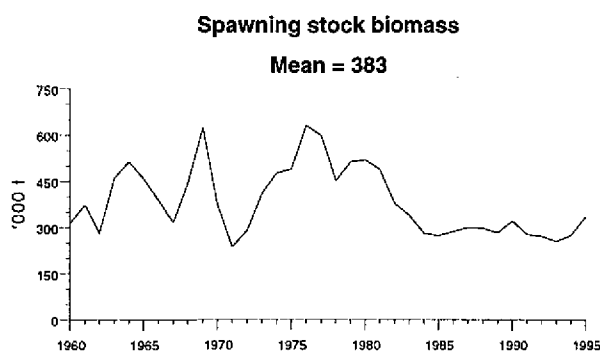
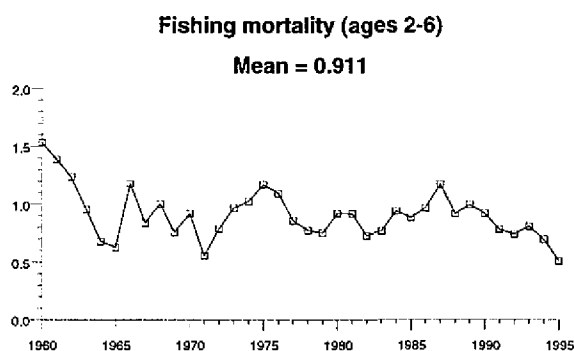
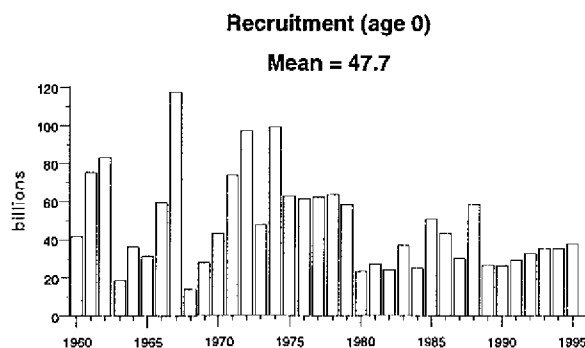
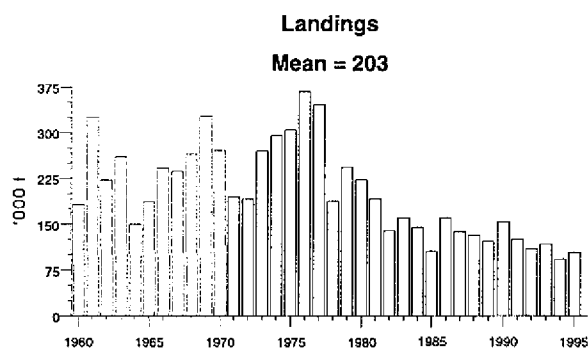
Special comments: A reduction in effort in fleets exploiting cod is likely to result in a reduction in fishing mortality rates on whiting. Such a reduction would increase the expected spawning stock of whiting and increase the proportion of larger fish in the catch.

Recruitment appears to have been lower in recent years. This has significant implications in attempting to make medium-term projections. At present these projections are not considered reliable for this stock.

Data and assessment: Analytical assessment based on landings, survey and CPUE data. Discards extrapolated from Scottish data.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Landings and discards



3.5.5 Saithe in Sub-area IV and Division IIIa (North Sea)

Catch data (Table.3.5.5.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Off. Indgs.	ACFM catch
1987	Reduce F	<198	173	154	149
1988	60% of F(86); TAC	156	165	113	105
1989	No increase in F; TAC	170	170	92	92
1990	No increase in F; TAC	120	120	85	88
1991	No increase in F; TAC	125	125	93	99
1992	No increase in F; TAC	102	110	92	93
1993	70% of F(91) ~ 93,000 t	93	93	100	106
1994	Reduce F by 30%	72	97	98	102
1995	No increase in F	107	107	101	114
1996	No increase in F	111	111		

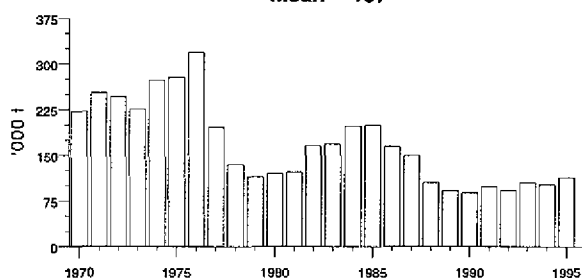
Weights in '000 t.

Historical development of the fishery: Saithe are mainly taken in a directed trawl fishery during the spawning season in deeper water near the northern shelf edge and the Norwegian Deep. The main fishery developed in the beginning of the 1970s. French, Norwegian and German catches make up about 80% of the total international catch. In recent years there has been a reduction in fishing effort, particularly by the French fleet.

State of stock: This stock is considered to be close to safe biological limits. Total biomass and spawning stock biomass show a continuous downward trend until 1990 when they were at historically low levels, but the present assessment indicates an improvement of the stock. The SSB is at present close to 150,000 t, the point below which recruitment will on average be lower. SSB would be expected to increase towards an equilibrium value above this at present levels of exploitation. Fishing mortality has shown a decreasing trend since 1986 and is now slightly below F_{med} (0.46).

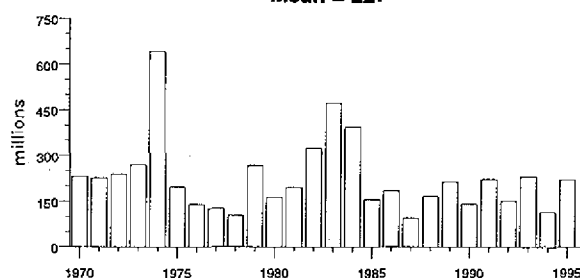
Landings

Mean = 167



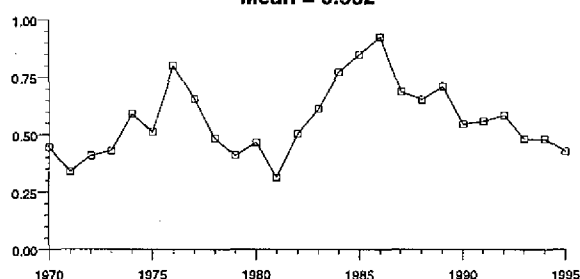
Recruitment (age 1)

Mean = 227



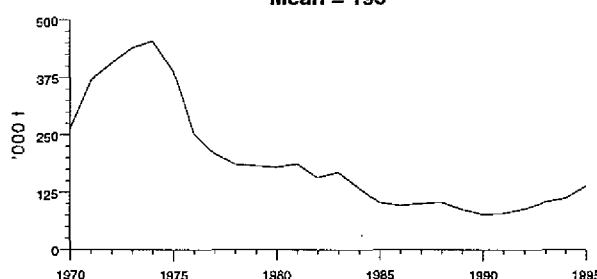
Fishing mortality (ages 3-6)

Mean = 0.562



Spawning stock biomass

Mean = 195



Further details in Table 3.5.5.2.

Forecast for 1997:

SSB(96)=143, $F(96) = 0.43$, Basis: $F(96)=F(95)$,
Catch(96) = 110, Landings (96) = 110

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs ¹ (97)	SSB (98)
A	0.4 F_{95}	0.17	163	51	51	216
B	0.6 F_{95}	0.26		73	73	197
C	0.8 F_{95}	0.34		94	94	179
D	1.0 F_{95}	0.43		113	113	164
E	1.2 F_{95}	0.51		131	131	149

Weights in '000 t.¹ Human consumption + Industrial by-catch

Under all options, SSB is expected to increase in the short term.

Medium-term considerations: At the most recently estimated values of fishing mortality, the stock would be

expected to fluctuate around an equilibrium value of about 200,000 t with only a low probability of falling below 150,000 t. However, the stock is very sensitive to fishing mortality rate and small increases in F could rapidly deplete the stock.

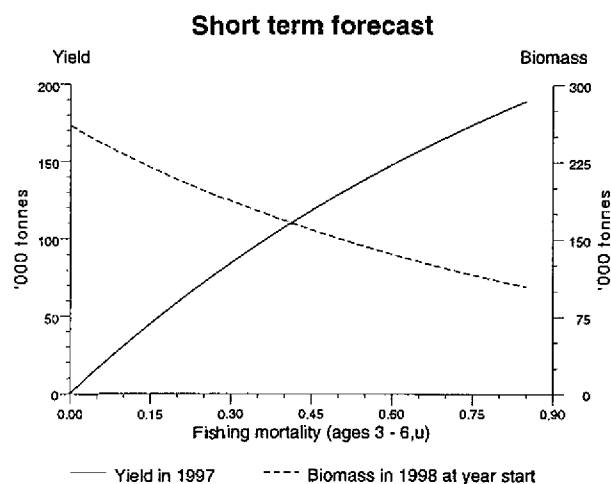
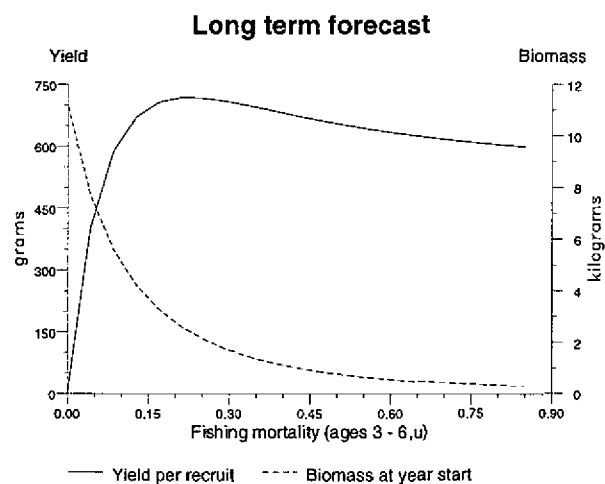
Management advice: ICES recommends that the fishing mortality in 1997 should not be allowed to increase above the 1995 level. An increase in fishing mortality above *status quo* would have a high probability of reducing the stock below safe biological limits.

Special comments: This stock is associated with the West of Scotland stock, both in terms of stock distribution and in terms of some of the major exploiting fleets. Trends in SSB and recruitment are similar in both stocks.

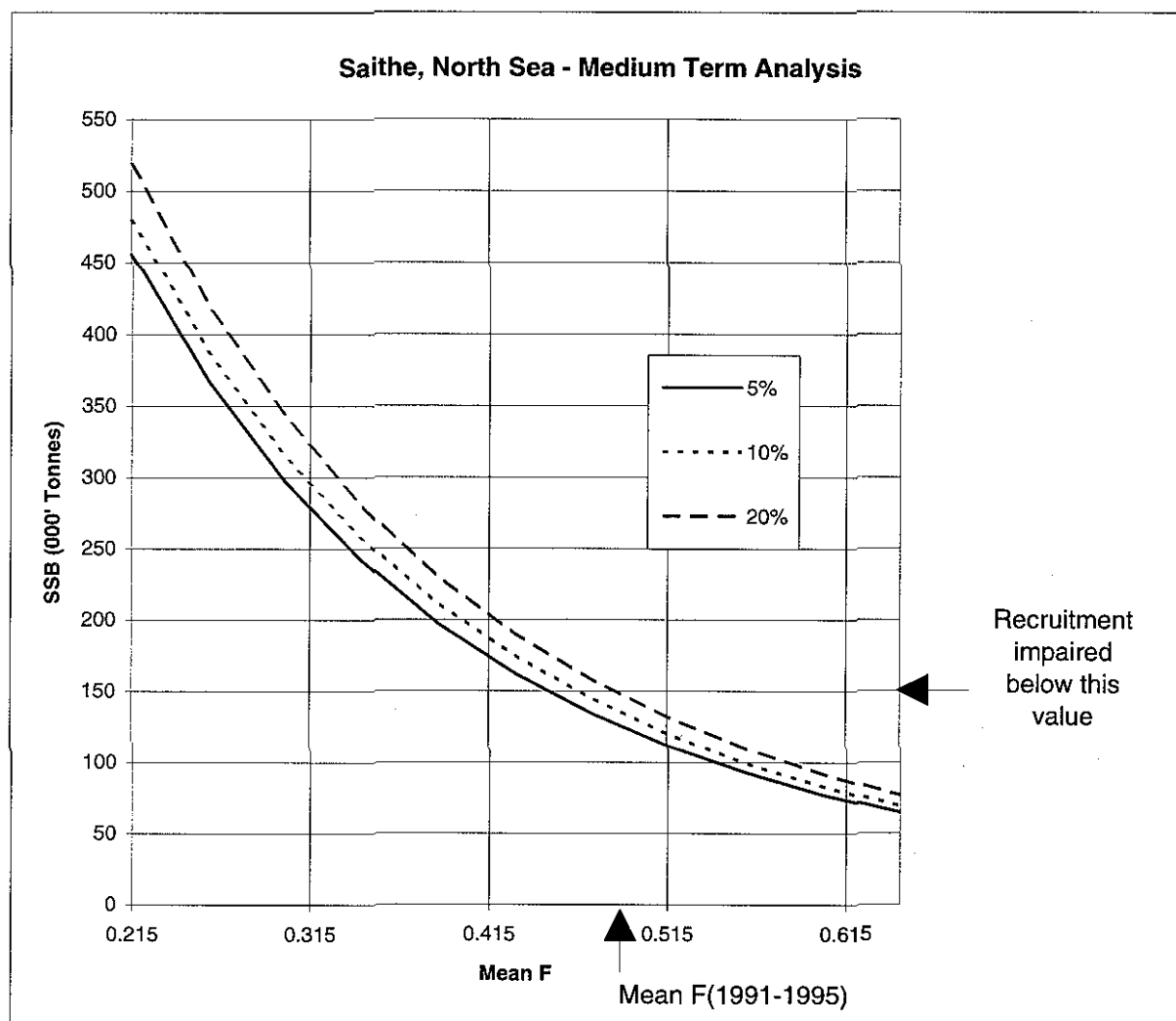
Data and assessment: Analytical assessment using catch-at-age data and effort data.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Yield and Spawning Stock Biomass



Saithe in the North Sea. 5%, 10% and 20 % probability for SSB being below Y after 10 years at different levels of F.



3.5.6 North Sea plaice

Catch data (Table 3.5.6.1)

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Off. Indgs.	ACFM catch
1987	$F < F(89)$; TAC	120	150	131	154
1988	70% of $F(85)$; TAC	150	175	138	154
1989	Reduce F ; buffer SSB	< 175	185	152	170
1990	<i>Status quo</i> F ; TAC	171	180	156	156
1991	No increase in F ; TAC	169	175	144	148
1992	No long-term gains in increasing F	¹	175	123	125
1993	No long-term gains in increasing F	170 ¹	175	115	117
1994	No long-term gains in increasing F	¹	165	110	110
1995	Significant reduction in F	87 ²	115	97	98
1996	Reduction in F of 40%	61	81		

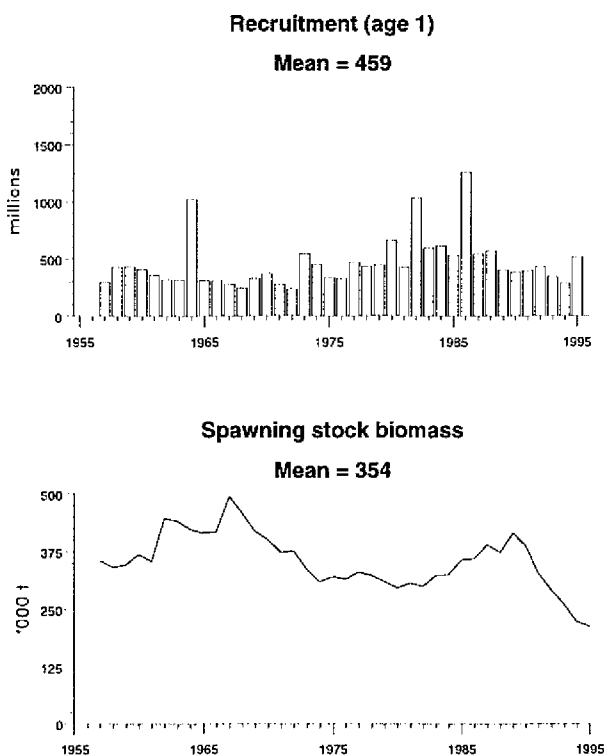
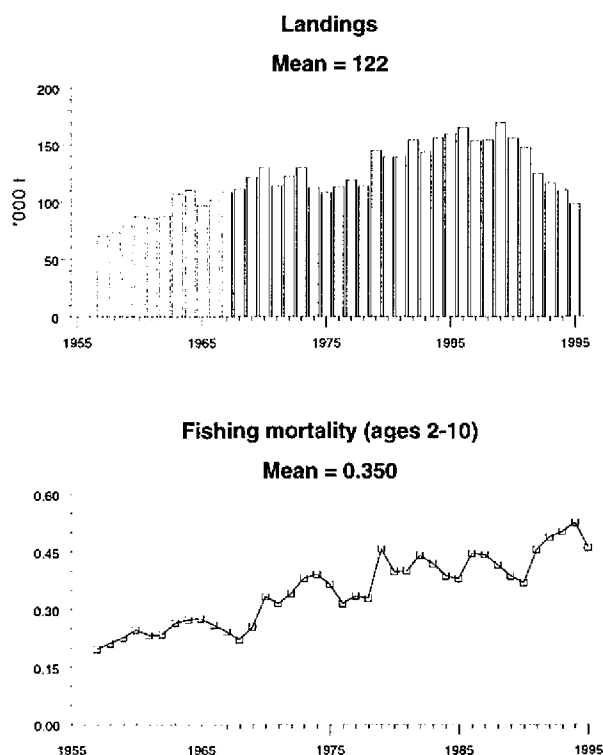
¹ Catch at *status quo* F ² Catch at 20% reduction in F . Weights in '000 t.

Historical development of the fishery: North Sea plaice is taken mainly in a mixed flatfish fishery by beam trawlers in the southern and south-eastern North Sea. Directed fisheries are also carried out with seine and gill net, and by beam trawlers in the central North Sea. Due to the minimum mesh size (80 mm) in the mixed beam trawl fishery, large numbers of plaice are discarded. Since 1989, an area with high concentrations of small plaice ("plaice box") was closed to beam trawl fisheries with vessels >300 hp during the second and third quarter and, since 1994, during the fourth quarter as well. Since 1995, the "plaice box" has been closed for the whole year. Beam trawlers < 300 hp are allowed to fish

inside the box and their effort more than doubled between 1989–1993.

State of stock: The stock is considered to be outside safe biological limits. Fishing mortality has increased steadily since the 1950s and is currently around a record high level. Spawning stock biomass has varied in relation to recruitment, but has declined rapidly since 1990 to an historical low of 209,000 t in 1996, well below the MBAL for this stock of 300,000 t.

Further details in Table 3.5.6.2.



Forecast for 1997:

SSB(96)=209, $F(96)=0.46$, Basis: $F(96)=F(95)$, Catch(96)=90, Landings (96)=90

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4 F_{95}	0.18	207	44	44	295
B	0.6 F_{95}	0.28		63	63	277
C	0.8 F_{95}	0.37		80	80	261
D	1.0 F_{95}	0.46		96	96	246
E	1.2 F_{95}	0.55		111	111	233

Weights in '000 t.

SSB increases in 1997 under all options but remains below MBAL unless F is reduced by more than 60%.

Medium-term considerations: At *status quo* fishing mortality the probability that SSB will reach MBAL in the medium term is low (see diagram on next page). A 20% reduction in F is the minimum reduction required to achieve an 80% probability of an increase in SSB above MBAL in the medium term. This analysis takes into account the beneficial effects of the "Plaice Box". The "Plaice Box" is expected to enhance the future recruitment to the stock and this will assist in the rebuilding of the SSB provided that F is reduced at least as much as indicated above.

Management advice: ICES recommends that fishing mortality in 1997 should be reduced by at least 20% from the 1995 level in order to rebuild the SSB.

Special comments: As it is unlikely that a lower fishing mortality can be achieved by the application of technical measures and/or TACs/quotas alone, ICES believes that the required decrease can only be achieved by a reduction in effort in the directed fishery for plaice and in the mixed flatfish fisheries which take a large plaice component.

The decrease in mean weight at age since the mid-1980s, which has contributed to the recent reduction in yield and SSB, has reversed due to a recovery of pre-recruit growth rates since 1990.

This year's assessment is consistent with that of last year and is considered to be more reliable than the assessment made between 1991 and 1993 which gave a substantial overestimate of the *status quo* catch forecast. This was due to difficulties in the estimation of past misreporting levels.

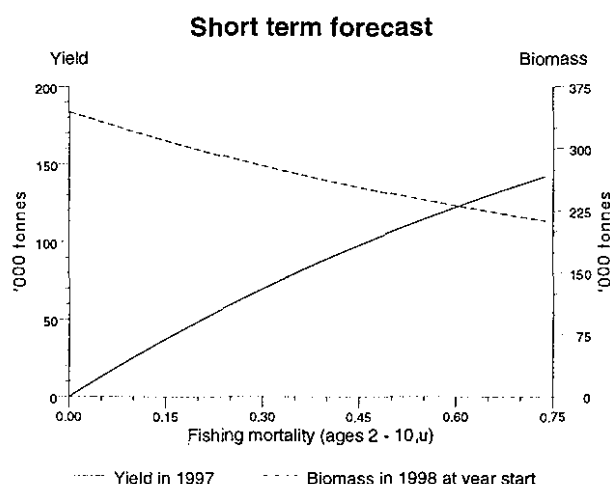
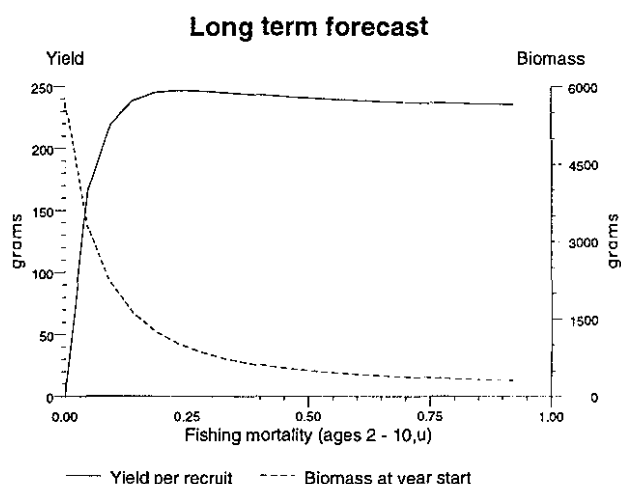
A temporary increase in CPUE for plaice and sole was observed in the fishery in the 1st quarter of 1996 due to a behavioural response of these species to abnormally cold water. Plaice and sole were concentrated in relatively warmer water in some areas in the southern North Sea. In order to avoid exhausting the quota before the end of the year, the effort in some fisheries may have been reduced by 25% in the first quarter of 1996. ICES considered that, although effort may have decreased, it was probable that fishing mortality in 1996 would not be affected to a significant extent because of an increase of catchability in the first quarter and decided to base the forecast for plaice and sole in 1997 on *status quo* fishing mortality.

Plaice is mainly taken in a mixed fishery with sole. Any management measures should take into account advice for sole.

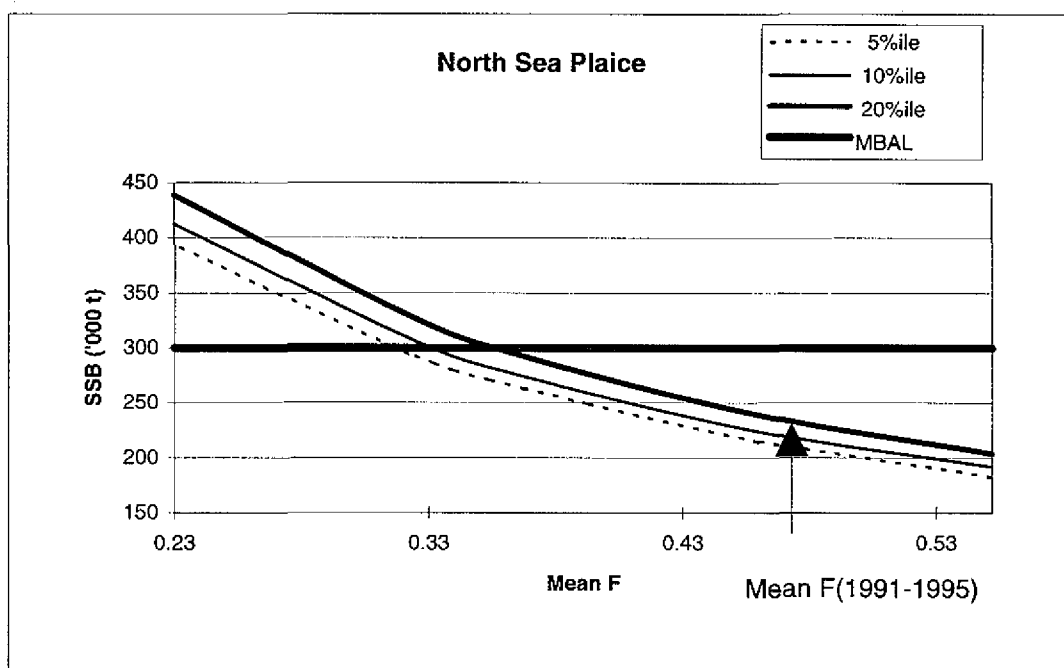
Data and assessment: Assessment based on analytical analysis of age compositions based on a sampling programme covering 90% of the landings. Recruitment estimates are based on pre-recruit surveys covering all important nursery grounds. Fishery-independent survey data available to evaluate trends in stock numbers of recruited fish. Forecasts use indices from 1996 surveys.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Yield and Spawning Stock Biomass



Plaice in IV. Medium term projections. Probability that SSB will be below a given value after 10 years.



3.5.7 North Sea sole

Catch data (Table 3.5.7.1):

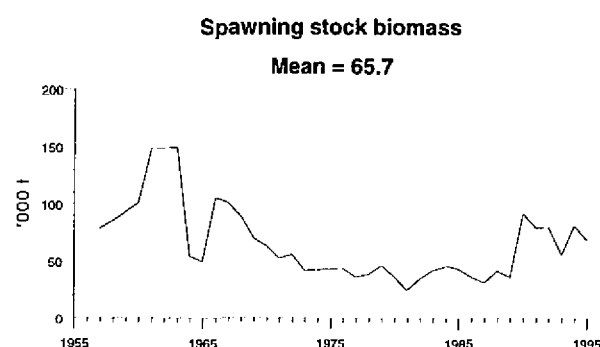
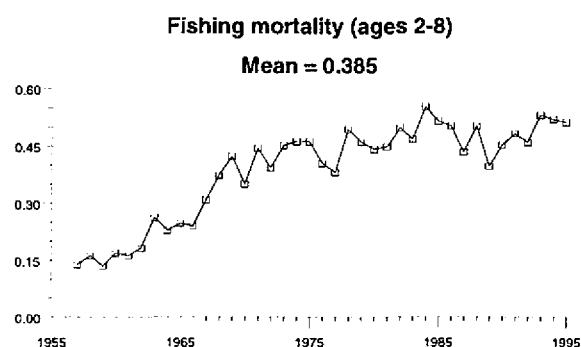
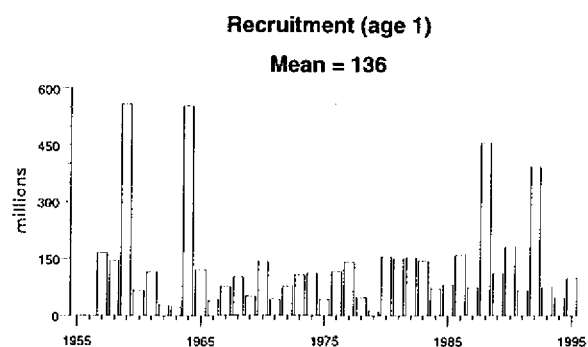
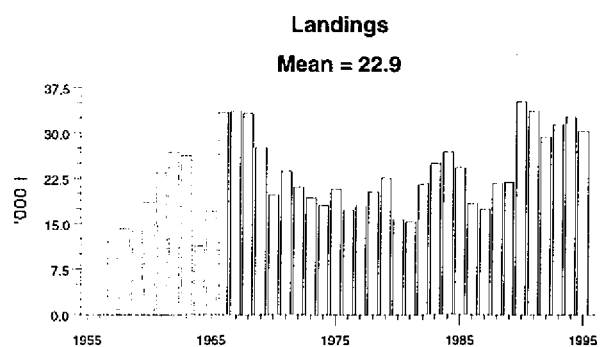
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Off. Indgs.	ACFM catch
1987	Rebuild SSB to 40,000 t; TAC	11.0	14.0	13.8	17.4
1988	Increase SSB towards 50,000 t; TAC	11.0	14.0	13.4	21.6
1989	Increase SSB towards 50,000 t; TAC	14.0	14.0	14.5	21.8
1990	80% of F(88); TAC	25.0	25.0	26.5	35.1
1991	SSB>50,000 t; TAC	27.0	27.0	27.6	33.5
1992	TAC	21.0	25.0	26.0	29.3
1993	No long-term gains in increased F	29.0 ¹	32.0	29.8	31.4
1994	No long-term gains in increased F	31.0 ¹	32.0	31.3	32.6
1995	No long-term gains in increased F; link to plaice	28.0 ¹	28.0	28.7	30.3
1996	Mixed fishery, link plaice advice into account	23.0 ¹	23.0		

¹Catch status quo F. Weights in '000 t.

Historical development of the fishery: Sole is mainly taken by beam trawl fleets in a mixed fishery for sole and plaice in the southern part of the North Sea. The minimum mesh size permitted in this fishery is 80 mm. Beam trawl fleets started to develop in the mid-1960s and have expanded up to the present. A relatively small part of the catch is taken in a directed fishery by gill-netters in coastal areas, mostly in the 2nd quarter of the year. Since 1989, the distribution pattern of the beam trawl fleets >300 HP has changed due to the introduction of the "Plaice Box" in the south-eastern part of the North Sea.

State of stock: In recent years, the stock has been at a relatively high level due to the two very strong year classes of 1987 and 1991. It is still considered to be within safe biological limits but is declining rapidly. There is a high probability that it will decrease below the minimum biologically acceptable level (MBAL) of 35,000 t in 1998 as no large year classes have been produced in recent years. It has also suffered from higher natural mortality in the cold winter of 1995–1996. Fishing mortality is stable at a high level.

Further details in Table 3.5.7.2.



Forecast for 1997:

SSB(96)= 48, F(96) = 0.51, Basis: F(96)=F(95),
Catch(96) = -, Landings (96) = 24

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
B	0.4 F ₉₅	0.20	39		8.1	41
C	0.6 F ₉₅	0.31			11.5	37
D	0.8 F ₉₅	0.41			14.6	34
E	1.0 F ₉₅	0.51			17.4	31
F	1.2 F ₉₅	0.61			20.0	28

Weights in '000 t.

For all options the spawning stock is expected to decrease in 1998 compared to 1996.

The forecast assumes no change in natural mortality in 1996; see Special Comments.

Medium-term considerations: Medium-term analyses indicate that at the present level of fishing mortality the spawning stock is expected to fluctuate around an equilibrium value of about 35–40,000 t (see graph on next page). Landings are expected to vary around a value of about 18,000 t. At this level of exploitation, the SSB would be expected to fall below MBAL in about 40–50% of years with a 5% probability of falling as low as 22,000 t. Occasionally, the sole produces very large year classes. These can produce yields and SSBs above the equilibrium values quoted above which last for a few years. This is the reason for high values in the recent past.

Management advice: In order to maintain the spawning stock above MBAL, a significant and sustained reduction in fishing mortality of at least 20% of the 1995 value is required.

Special comments: As it is unlikely that a lower fishing

mortality can be achieved by the application of technical measures and/or TACs/quotas alone, ICES believes that the required decrease can only be achieved by a reduction in effort in the directed fisheries for sole and in the mixed flatfish fisheries which take a large sole component.

Information both from fishermen and surveys indicate that additional natural mortality on sole occurred in the cold winter of 1995–1996. It has not been possible to quantify the size of this additional mortality but it does mean that the short-term prognosis for the stock given in the forecast may be optimistic if the mortality was large.

A temporary increase in CPUE for plaice and sole was observed in the fishery in the 1st quarter of 1996 due to a behavioural response of these species to abnormally cold water. Plaice and sole were concentrated in relatively warmer water in some areas in the southern North Sea. In order to avoid exhausting the quota before the end of the year, the effort in some fisheries may have been reduced by 25% in the first quarter of 1996. ICES considered that, although effort may have decreased, it was probable that fishing mortality in 1996 would not be affected to a significant extent because of an increase of catchability in the first quarter and decided to base the forecast for plaice and sole in 1997 on *status quo* fishing mortality.

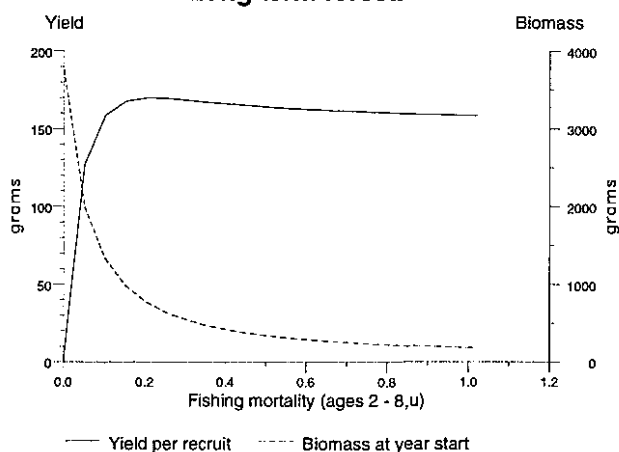
Sole is mainly taken in a mixed fishery with plaice, and any management should take into account the recommended reduction in fishing mortality on plaice.

Data and assessment: The analytical assessment is based on catch, survey and CPUE data. The estimates of unreported landings in 1994 were the lowest since 1982. Forecasts use indices from 1996 surveys.

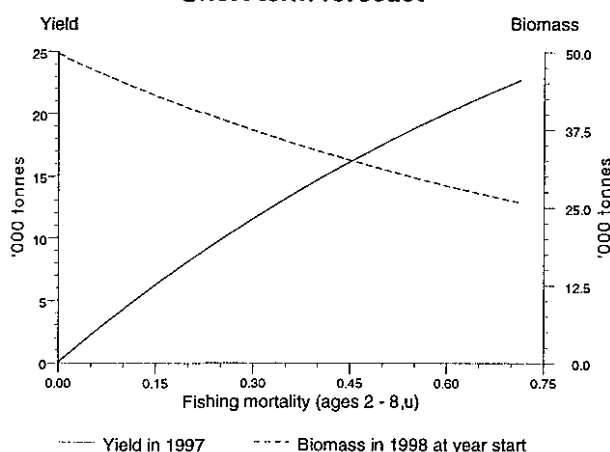
Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Yield and Spawning Stock Biomass

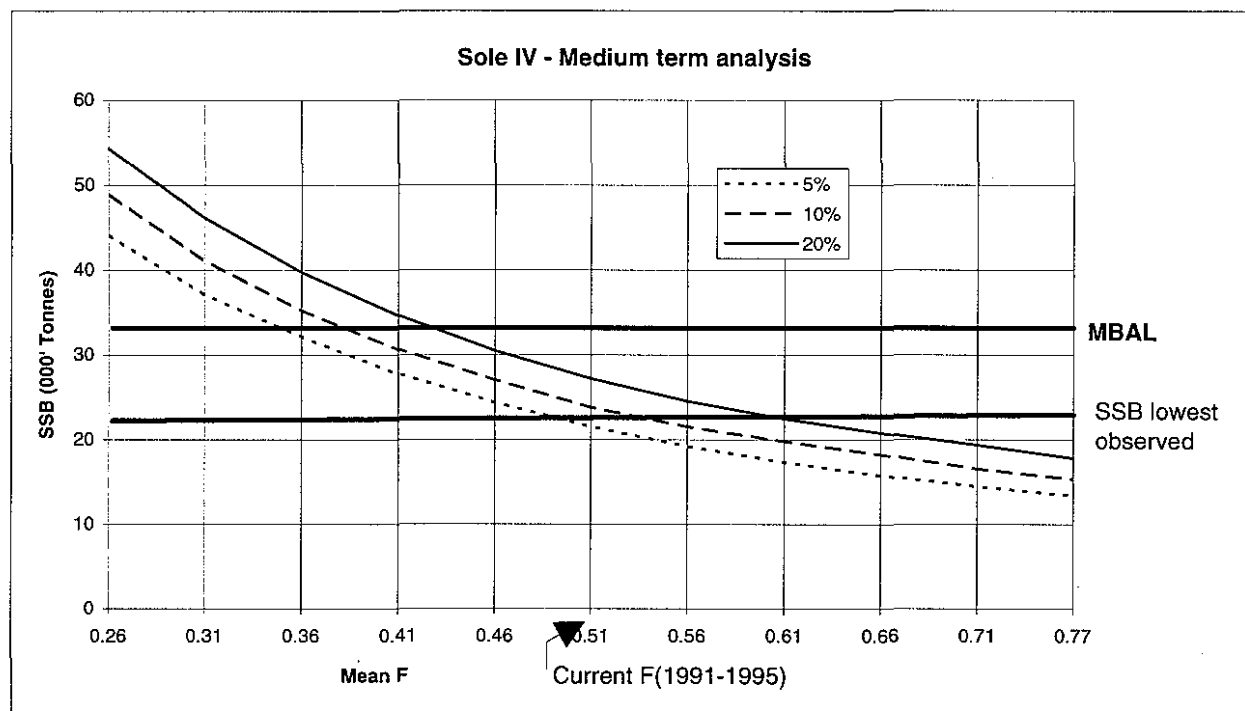
Long term forecast



Short term forecast



Sole IV - Medium-term predictions showing 5th,10th and 20th percentiles of SSB in tenth year (2006) for different fishing mortalities using an assumed natural mortality of 0.2 in 1996 and 0.1 for subsequent years.
No stock-recruitment relationship 500 simulations.



3.5.8 Herring in Sub-area IV, Division VIIId and Division IIIa (autumn-spawners)

(Tables 3.5.8.1-6)

3.5.8.a Total stock complex

Catch data for Sub-area IV and Division VIIId:

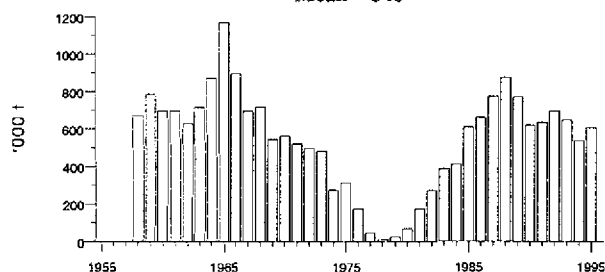
Year	ICES advice	Corresp. catch	Agreed TAC	ACFM Indgs.	ACFM catch
1987	TAC	610	600	625	625
1988	TAC	515	530	698	698
1989	TAC	514	514	696	700
1990	TAC	403	415	544	553
1991	TAC	423	420	561	566
1992	TAC	406	430	544	549
1993	No increase in yield at $F > 0.3$	340 ¹	430	521	524
1994	No increase in yield at $F > 0.3$	346 ¹	440	465	468
1995	Long-term gains expected at lower F	429 ¹	440	534	534
1996	At least 50% reduction in F from 1994 level	235 ¹	313		

Weights in '000 t. ¹ Catch in directed fishery.

Details of catch by fleet, stock and area are provided in Table 3.5.8.6.

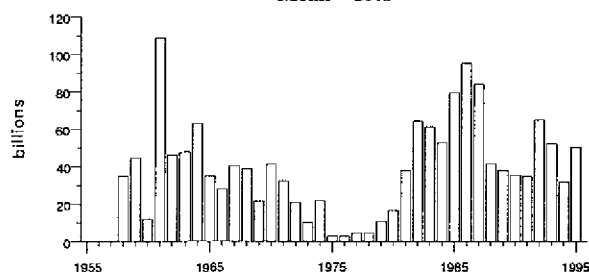
Landings

Mean = 546



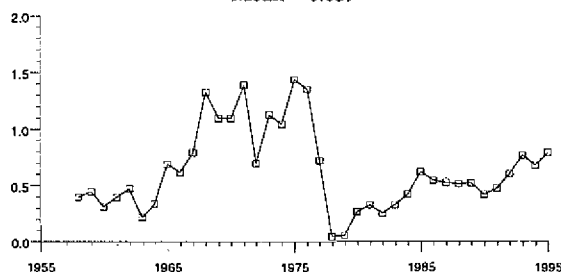
Recruitment (age 0)

Mean = 39.8



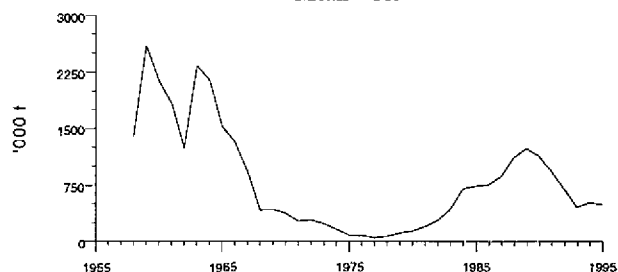
Fishing mortality (ages 2-6)

Mean = 0.639



Spawning stock biomass

Mean = 809



Historical development of the fishery: Stock depletion in the 1970's resulted in closure of the fishery over a period of four years. This was followed by a recovery during the 1980's when the fishery reopened. Herring are taken in the North Sea in a directed trawl and purse seine fishery (fleet a), and as by-catch in a small-mesh industrial fishery (fleet b). Juvenile North Sea herring are also taken in the Kattegat and Skagerrak. The directed North Sea fishery has been managed by TACs since reopening in 1981. The TAC covers only a proportion of the total catch. Total catches have consistently exceeded recommended TACs.

State of stock: The stock is outside safe biological limits. Spawning stock biomass (SSB) has declined since 1989 with

the present assessment indicating an SSB of 500,000 t in 1995. Historically, there is strong evidence of reduced recruitment when the SSB is below 800,000 t, the minimum biologically acceptable level (MBAL) for this stock. Exploitation increased from the early 1980's, and is presently at a very high level with the fishing mortality at more than double the level considered to be sustainable in the longer term. Since 1990 the fishery has become dependent upon a few recruiting year classes. Although recent recruitment has been near average it is not sufficient to replenish the stock at present exploitation levels.

Details are given in Table 3.5.8.7

Forecast for 1997: The forecast is given for North Sea autumn spawners by the following fleets in the North Sea and Division IIIa combined:

- a : Directed herring fisheries (mainly for human consumption) in the North Sea
- b: Small mesh fisheries in the North Sea
- c: Human consumption fisheries in Division IIIa
- d: Mixed clupeoid fisheries in Division IIIa
- e: Other industrial fisheries in Division IIIa

The catch forecast below is based on a TAC constraint for fleet a in 1996 and $F(96)=F(95)$ for the other fleets.

Basis : Catch (96,a) = TAC=313; $F(96,a) = 0.63$; Catch(96): Fleet a = 313; b = 81; c = 44; d = 14; e = 88;

Total Catch(96) = 540; SSB(96) = 416 (unit: '000 t)

	F(97) multiplier rel. to F(95) by fleet						Catch (97) by fleet					Total catch	SSB (97)
	a	b	c	d	e	$F_{2.6}(97)$	a	b	c	d	e		
A	0	0	0	0	0	0	0	0	0	0	0	0	567
B	0.2	0.2	0.2	0.2	0.2	0.16	93	19	8	2	14	135	510
C	0.35	0.35	0.35	0.35	0.35	0.28	154	32	12	4	23	223	471
D	0.4	0.4	0.4	0.4	0.4	0.32	172	36	13	4	25	251	458
E	0.6	0.6	0.6	0.6	0.6	0.48	241	52	17	5	33	350	412
F	0.8	0.8	0.8	0.8	0.8	0.65	300	67	21	6	40	435	371
G	1	1	1	1	1	0.81	352	81	24	7	46	510	333
H	0.1	0.5	0.5	0.5	0.5	0.09	48	44	16	5	30	142	534

According to the short-term prediction the SSB will remain below MBAL in 1997 even with a complete ban on all fisheries catching herring (A in table above). Continued fishing at *status quo* fishing mortality (G in table above) leads to a further decline in SSB. A substantial reduction in fishing mortality rate would lead to modest increases in SSB in the short term.

Additional forecasts for 1997 are given below contingent upon two alternative assumptions regarding 1996 : 1) that the TAC is reduced to 50% of the agreed TAC for the human consumption fleet only and 2) that the TAC is reduced to 50% for the human consumption fleet and that the fishing mortality is halved for other fleets.

- 1) Basis : 50% reduction in the catches in 1996 relative to the agreed 1996 TAC for fleet a and $F(96)=F(95)$ for the other fleets

Basis : Catch(96,a) = 156; $F(96,a) = 0.28$; Catch(96): Fleet a = 156; b = 81; c = 45; d = 14; e = 88; Total catch = 385 (unit: '000 t)

	F(97) multiplier rel. to F(95) for all fleets			Catch (97) by fleet					Total catch	SSB (97)
			$F_{2.6}(97)$	a	b	c	d	e		
A	0		0	0	0	0	0	0	0	722
B	0.125		0.10	74	12	5	2	9	101	676
C	0.249		0.20	140	23	9	3	17	192	633
D	0.373		0.30	201	34	13	4	24	275	592

- 2) Basis : 50% reduction in the 1996 catches relative to the agreed 1996 TAC for fleet a and 50% reduction in F for other fleets in 1996.

Catch (96,a)= 156; $F(96,a)=0.27$; $F(96,other)=0.5F(95,other)$; Catch(96): Fleet a = 156; b = 44; c = 30; d = 10; e = 58; Total catch = 298 (unit: '000 t)

	F(97) multiplier rel. to F(95) for all fleets			Catch (97) by fleet					Total catch	SSB (97)
			$F_{2.6}(97)$	a	b	c	d	e		
A	0		0	0	0	0	0	0	0	798
B	0.125		0.10	83	12	6	2	11	115	747
C	0.249		0.20	159	24	11	3	21	218	700
D	0.373		0.30	227	35	16	5	28	311	655

Medium-term considerations:

The results of simulation exercises based on three medium-term scenarios are described below and shown graphically on the following pages.

- i) A continuation of the fishery at the present level of fishing mortality has a high probability of leading to a collapse of the stock.
- ii) A rapid rebuilding of the stock, associated with a high probability that the SSB will be above MBAL in 1998, requires a significant reduction in fishing mortality. The scenario illustrated shows stock development with a reduction in fishing mortality on all fleets (75%) corresponding to an overall fishing mortality ($F_{2.6}$) of 0.2 in 1997 and onwards and a 50% reduction in 1996.
- iii) A less rapid recovery, where there is a high probability that SSB will reach MBAL by about the year 2000, would require a sustained substantial reduction of the fishing mortality to 0.3 in the human consumption fishery and a 50% reduction of fishing mortality in the fisheries exploiting juvenile herring. However, due to the higher probability of low recruitment at low SSB, such a scenario is associated with an increased risk of stock collapse in the interim period.

Management advice for 1996 and 1997: ICES recommends that rapid action be taken to rebuild the spawning stock and reduce fishing mortality.

Specifically ICES recommends:

- i) that the total catch of North Sea herring in 1996 should not be allowed to exceed 298,000 t and that catches by all fleets exploiting this stock should be counted against this figure. This recommendation corresponds to a 50% reduction in the 1996 catch compared with the agreed TAC for fleet a) and a 50% reduction in the fishing mortality expected for other fleets.
- ii) that the fishing mortalities in 1997 of all fleets be reduced from the 1995 level by the percentage (75%) that corresponds to an overall fishing mortality ($F_{2.6}$) of 0.2. The corresponding catches are given in the forecast table 2 above.
- iii) that, if the catch in 1996 is not reduced in accordance with the advice given in item i), no fishing on North Sea herring should take place in 1997.

Special comments:

The spawning stock is at a low level, which historically has been associated with low recruitment, and the fishing mortality is very high. The North Sea herring stock has a history of collapse under such circumstances and the most

recent development in stock parameters resembles a repetition of the development in the late 1960s-early 1970s which led up to the collapse in the second half of the 1970s. Immediate action should be taken to rebuild the SSB above MBAL in the short term (by 1998). A closure of all fisheries exploiting herring is the safest route to follow in this case. However, although impaired recruitment from spawning stock levels below MBAL has been documented in the past, recent observed recruitment seems to have been near average and will allow rebuilding of the SSB if rapid action is taken. Medium-term forecasts indicate that a low (0.2) fishing mortality on these average year classes is compatible with the objective of attaining a high probability of SSB being above MBAL in the short term.

Short-term forecasts indicate that even a complete cessation of all fisheries on North Sea herring in 1997 is insufficient to bring the SSB back above MBAL in 1997. ICES therefore recommends that action be taken already in 1996. If no action is taken in 1996 a cessation of fishing on the North Sea herring in 1997 will be required.

If no rapid and significant action is taken in the present situation of an increased probability of low recruitment, there is a high probability that any decline in SSB will be accelerated by low recruitment. In that case even a complete cessation of all fisheries exploiting North Sea herring will be insufficient to rebuild the SSB within several years.

The present assessment gives a more pessimistic view of the resource than the previous assessment. This is the result of new information available from the 1995 fishery and surveys and is supported by data from the International Bottom Trawl Survey (IBTS) survey in 1996.

The high catch of juveniles (about 80% of the catch in number in recent years) is a reason for concern. ICES reiterates its advice from former years that a reduction of the catch of juveniles would speed up the recovery of the stock and improve potential yields.

By-catches of juvenile herring in the small-mesh sprat fishery, which reached high levels in 1992-1993, declined significantly in 1994. It is not clear whether this reduction was due to increased enforcement of existing by-catch regulations, an increased abundance of sprat or a decrease in the abundance of juvenile herring. Recent information indicates that the by-catches have increased again in 1995.

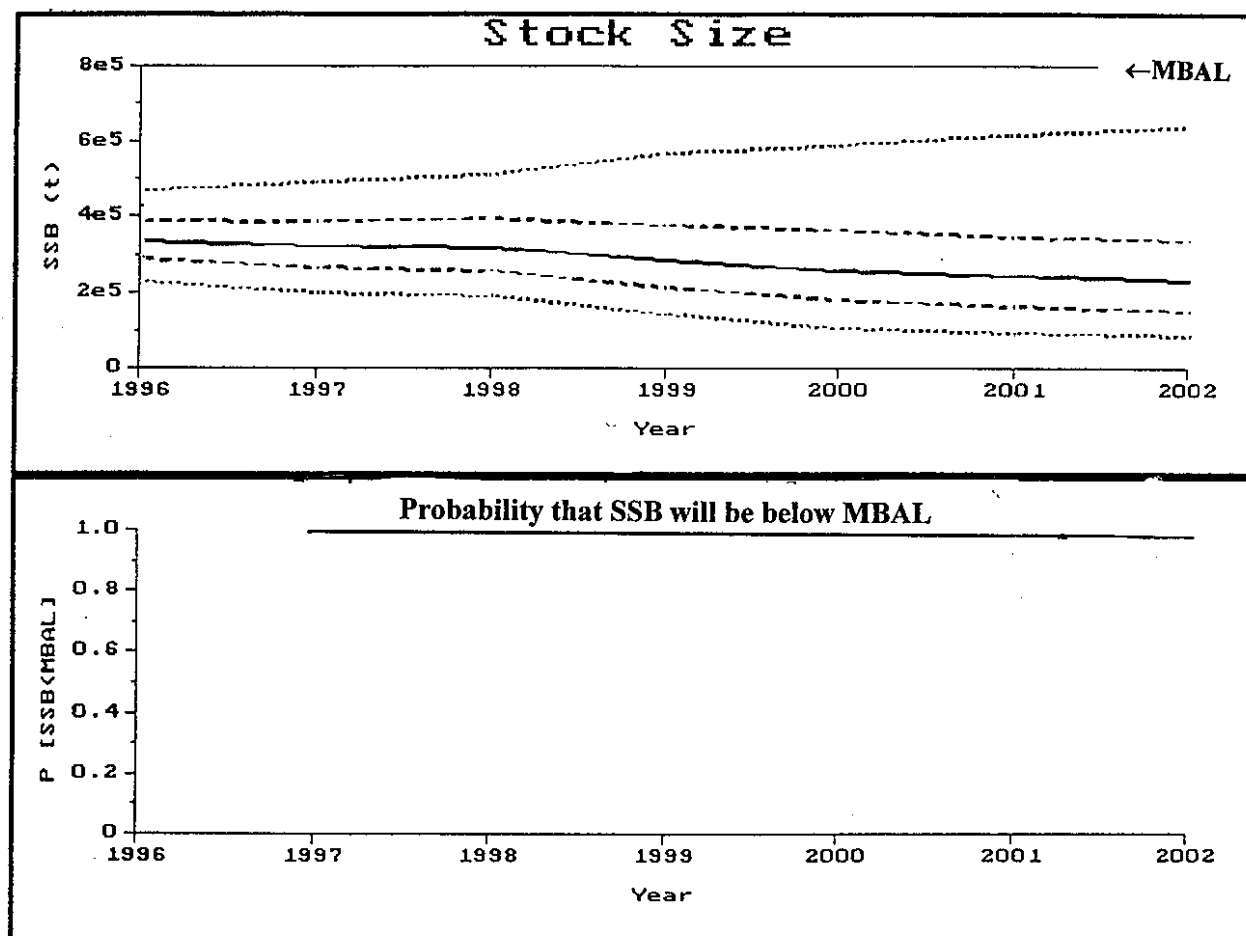
Data and assessment: Analytical assessment based on landings and surveys. No, or incomplete, discard data are available.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess: 10).

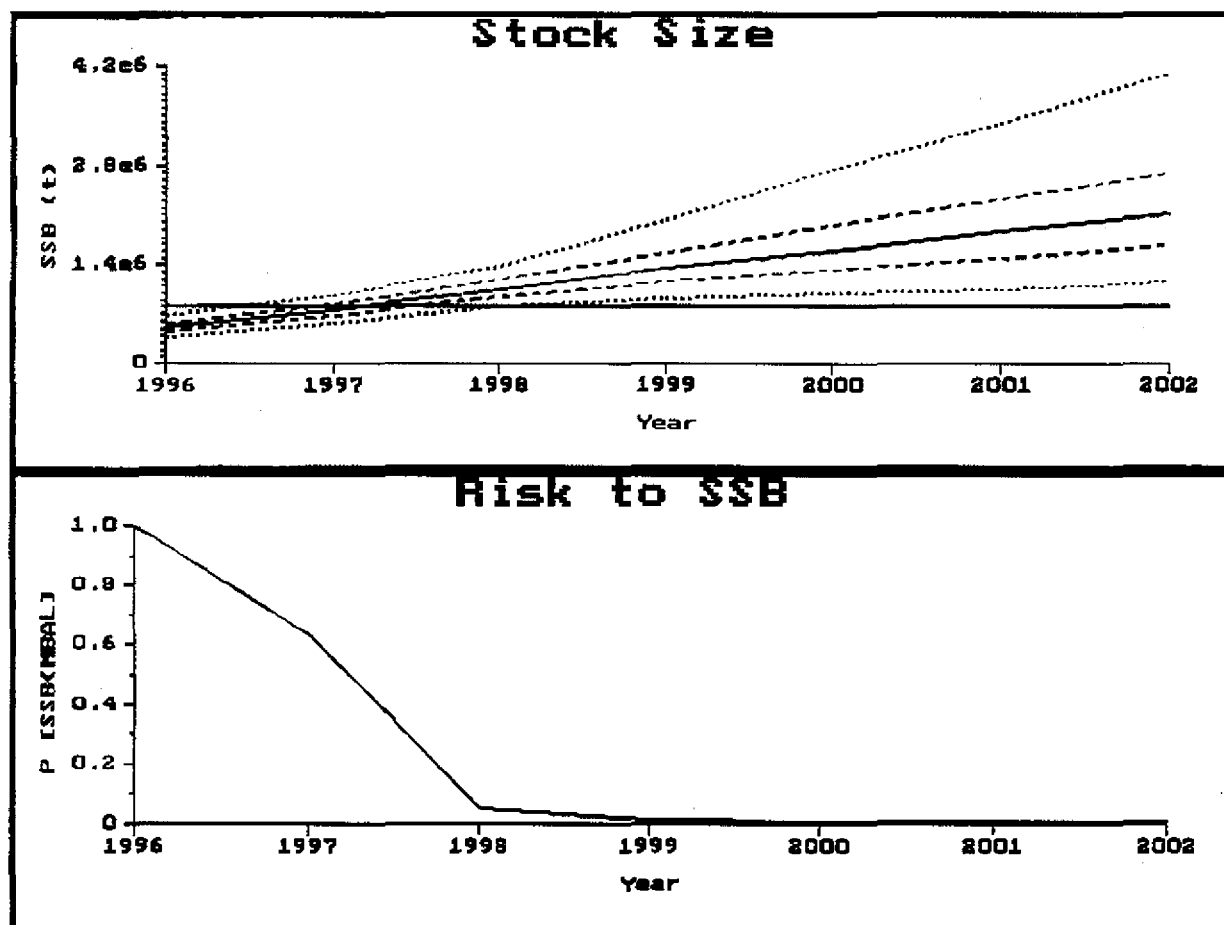
Medium-term projections in Sub-area IV, and Divisions VIIId and IIIa (Autumn Spawners)

In the diagrams below, dotted lines indicate the 5th and 95th percentiles, dashed lines the 25th and 75th percentiles, and the fine line the 50th percentile. The upper diagram shows the trajectory of spawning stock size, and the lower diagram the corresponding estimates of the probability that the spawning stock may fall below 800,000 t.

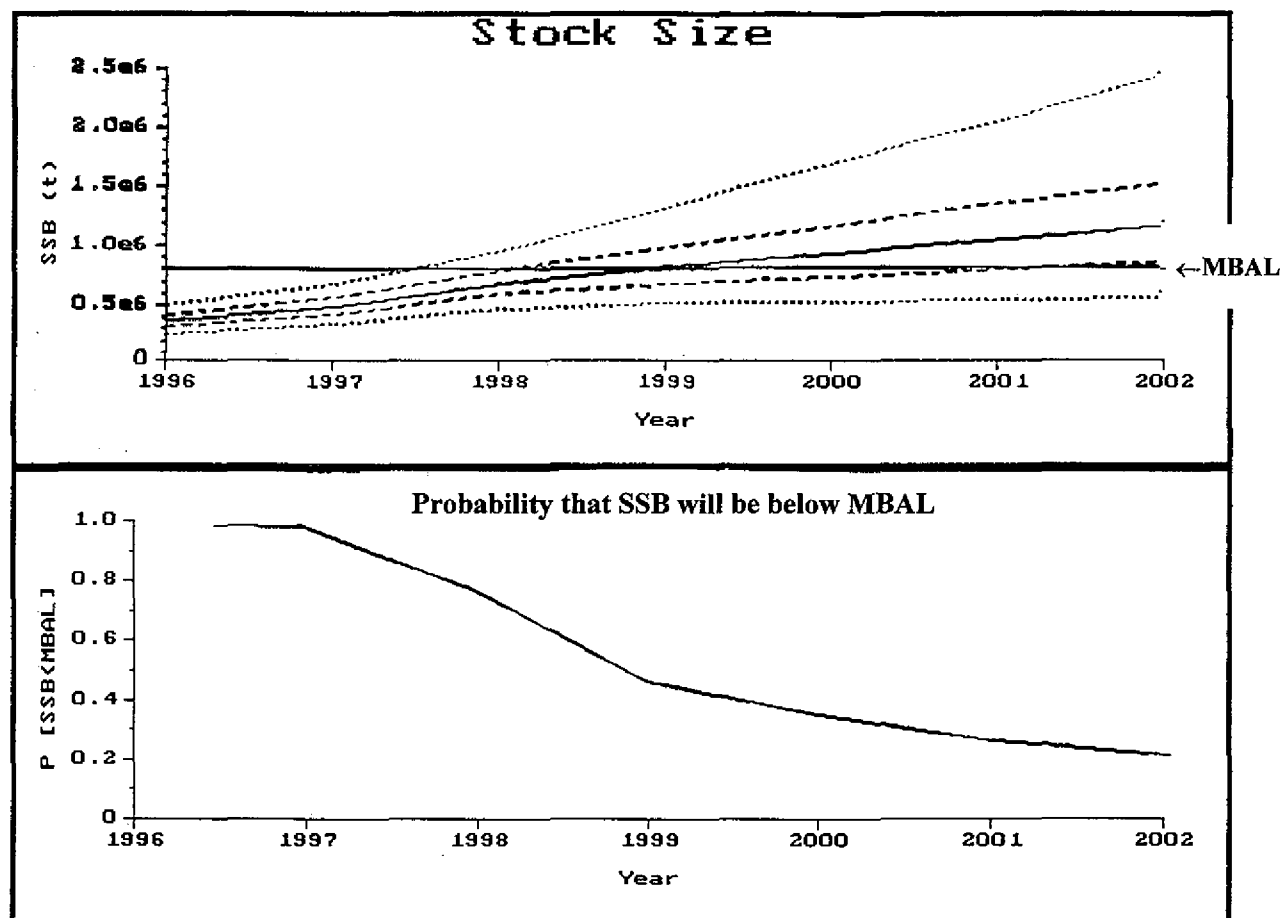
- i) Medium-term projections assuming fishing at *status quo* levels from 1997 to 2002, defined as the estimated fishing mortality in 1995 in all fleets.



- ii) Medium-term projections assuming for 1996 a catch of 156,000 t for fleet a and a 50% reduction in fishing mortality for the other fleets compared to 1995. For 1997 and onwards it is assumed that fishing mortality is reduced by 75% compared to 1995 for all fleets.



- iii) Medium-term projections assuming a fishing mortality of 0.3 in the directed fishery in the North Sea (fleet a), and fishing mortality at half the 1995 level in other fleets exploiting North Sea herring.



3.5.8.b Herring in Divisions IVc and VIIId (Downs herring)

Catch data: (Table 3.5.8.5)

Year	ICES advice	Corresp. catch ¹	Agreed TAC	Disc. slip.	ACFM catch
1987	TAC	10	40		45
1988	TAC	15	30		52
1989	TAC	30	30	1	79
1990	Precautionary TAC	30	30	5	61
1991	TAC	50-60	50	3	61
1992	TAC	50-60	50	2	74
1993	TAC	50	50	2	85
1994	TAC	50	50	2	74
1995	If required, TAC should be subtracted from total North Sea TAC	-	50		63
1996	Advice under total stock complex	-	50		

¹Included in catch recommended for IV and VIIId (See Section 3.5.8a). Weights in '000 t.

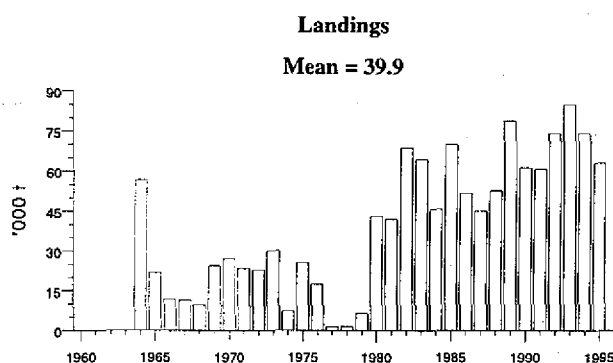
Historical development of the fishery: After the reopening of the fishery in 1981 catches increased to a peak in 1993 at the highest level since 1964. The catches have been higher than the agreed TAC since 1987 and in 1995 were about 26% above the agreed TAC. Catches are only taken for human consumption.

State of stock: The stock is considered to be outside safe biological limits. The larvae surveys suggest that SSB has declined in recent years to the lowest level since 1980 (Figure 3.5.8 b1).

Forecast for 1997: No separate forecast is made for this stock. The forecast for the total North Sea covers this area.

Management advice: ICES recommends that the fishing mortality on this stock component should be reduced to the lowest possible level and that no directed fishing for herring should be allowed in Divisions IVc and VIIId in 1996 and 1997.

Details in Table 3.5.8 b1.



Special comments: Historically, this component of the North Sea autumn-spawning herring stock has shown independent trends in exploitation rate and recruitment and advice is therefore given separately for this stock component.

Larval abundance surveys indicate a sharp decline in SSB of the Downs herring since 1991. This downward trend is more pronounced than the trend in SSB for the total North Sea stock, indicating that the situation for this stock component is more severe.

The agreed TAC for the Downs herring has been kept constant for the last six years at 50,000 t, even in 1996 when the agreed TAC for the total North Sea was reduced in accordance with a 20% reduction in fishing mortality. Moreover, the TACs for this stock component have been exceeded by a significant amount in all years. This can only result in a disproportionate increase in fishing pressure.

The fishery is concentrated on the spawning aggregations in a restricted area, which makes this stock component particularly vulnerable to excessive fishing pressure.

Data and assessment: Catch-at-age data were provided, but no assessment was made as catches of this population cannot be separated from others in the North Sea. The only suitable fishery-independent index of abundance is obtained from the herring larvae surveys.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).

3.5.8c Additional medium-term consideration for North Sea herring

Introduction

ICES received a request from the European Commission Directorate General for Fisheries and the Government of Norway to respond to the following requests:

Request A

"ICES is requested to predict for the North Sea autumn-spawning herring stock in 1997 to 2002 the development of SSB in 1997 to 2002, the catches of adult herring defined as *mature herring*, and the catches of juvenile herring defined as *immature herring*, based on assumed recruitment of 0.1, 0.5 and 1.0 of average recruitment, and with stochastic recruitment around the conventional stock-recruitment relationship for the stock; and levels of exploitation of:

$F(\text{juv})$: 0.0, 0.02, 0.05, 0.1, 0.2 and *status quo*
 $F(\text{adult})$: 0.3"

Request B

"ICES is also requested to analyse various harvest strategies including and excluding exploitation of juveniles that will bring the SSB of the stock to 1.5 and 2.0 million tonnes in 2002 with a probability equal to or greater than 50% assuming stochastic recruitment around the conventional stock-recruitment relationship for the stock."

Request C

In addition, an informal request was received for medium-term simulations illustrating the likely outcome of an in-season reduction in the North Sea herring TAC for 1996, and significant reductions in fishing mortality thereafter.

Methods and Interpretation

Starting data for the projections are taken from the assessment of the herring stock made by ICES (1996). The following parameters were estimated using the assessment model and were used together with the variance-covariance matrix of these estimates:

Fishing mortality at age 4 in 1995
Selection relative to age 4
Stock abundance by age-group in 1995
Expected recruitment in 1996

Additional information used was:

For 1996, catch by fleet 'a' was constrained = 313,000 t.
Fishing mortality by the other fleets was set equal to the value estimated for 1995.

In order to reconcile the form of the request with the usual form of ICES fleet-disaggregated projection model, some

restructuring of the problem was necessary. To this end, the following assumptions were made:

1. $F(\text{juv})$ was redefined as the fishing mortality (reference age 1) by fleets b-e.
2. $F(\text{adult})$ was redefined as the arithmetic mean fishing mortality from age 2 to age 6 rings exerted by fleet 'a'.

Because of some overlap in the selection patterns by fleet 'a' and the other fleets, fishing mortality is about 0.014 at age 1 when $F(\text{juv})$, defined as above, is equal to zero. Also for non-zero $F(\text{juv})$, actual mean F (ages 2 to 6) is somewhat higher than 0.3 when $F(\text{adult}) = 0.3$. For example, when $F(\text{juv}) = F(1995)$, then mean F (ages 2 to 6) = 0.315. This discrepancy is not reconcilable without changing ICES estimates of selection by fleet.

In order to achieve different levels of $F(\text{juv})$, the fishing mortalities on fleets b-e were varied together so that the sum of the partial F at age 1 exerted by these fleets reached the levels listed in the Request.

Results of the Simulations

On account of the large number of options requested, only a summary of the estimated trajectory of the stock and of catches of mature and immature fish is given here. Graphs of the estimated risk to the spawning stock (as the probability of falling below the MBAL by year) are also given.

Request A

These trajectories, for the 24 options requested, are given in Figures 3.5.8.c.1-24 and summarised results are shown in Tables 3.5.8.c.1-4. Note there is little appreciable difference between the options $F(\text{juv}) = 0.0$, $F(\text{juv}) = 0.02$ and $F(\text{juv}) = 0.05$, as might be expected at these low levels of F .

Request B

The strategy assumed in Figure 3.5.8.c.12 will bring the SSB of the stock to 1.5 million tonnes in 2002 with a probability of 50%. The corresponding strategy is fishing at $F = 0.3$ by the human consumption fleet in the North Sea (fleet a), and zero fishing mortality by the other fleets. Figure 3.5.8.c.28 shows a case where the SSB of the stock reaches 2.0 million tonnes in 2002 with a probability of about 75%. Then the strategy is fishing at $F = 0.1$ by the human consumption fleet in the North Sea (fleet a), and a 50% reduction of fishing mortality (compared to F in 1995) for all other fleets.

Request C

Three additional options assuming a reduction by 50% of the North Sea human consumption TAC in 1996 (but *status quo* fishing mortality by the other fleets) were calculated. The three options modelled for the subsequent years were:

- A Closure of all fisheries catching herring
- B $F = 0.3$ on adult fish and $F(\text{juv}) = 0.5 F(1995)$
- C $F = 0.1$ on adult fish and $F(\text{juv}) = 0.5 F(1995)$

For these simulations the Beverton-Holt stock recruitment function with autocorrelated errors was used. Results of these three additional simulations are given in Figures 3.5.8.c.25-27.

Fleet Disaggregation

For separation of the yield of juveniles on fleets, the proportion of the total catch of juveniles in the years 1991-1995 is calculated in the text table below for fleets b-e, i.e., the fleets which harvest juvenile herring in significant amounts. Catches of juvenile fish by fleet a are not included.

Year	Fleet b	Fleet c	Fleet d	Fleet e
1991	0.63	0.12	0.06	0.18
1992	0.45	0.17	0.08	0.30
1993	0.43	0.19	0.11	0.27
1994	0.31	0.34	0.10	0.25
1995	0.38	0.15	0.05	0.32
Mean	0.46	0.19	0.08	0.26
St. Dev.	0.12	0.08	0.02	0.05

The relative catch of juvenile autumn spawning herring in these fleets (b-e) varies somewhat. This variability may be due to shifts in the geographical distribution of the immature fish and changes in the relative abundances of herring and of the other target species (sprat, sandeel and Norway pout). Because of this variability the mean proportion in the catch by fleet over the last 5 years is calculated and may be used for the separation of the juvenile catch by fleet in the medium-term projections.

Reference

ICES, 1996. Report of the Herring Assessment Working Group for the Area South of 62°N. ICES CM 1996/Assess:10.

3.5.9 Sprat in the North Sea (Sub-area IV)

Catch data (Table 3.5.9.1)

Year	ICES advice	Corresp. catch	Agreed TAC ¹	Official landings	ACFM catch
1987	Catch at lowest practical level	0	57	78	33
1988	TAC < recent catches, preferably zero	0	57	93	87
1989	No advice	-	59	50	63
1990	No advice	-	59	49	71
1991	No advice	-	55	92	110
1992	No advice	-	55	72	124
1993	No advice	-	114	127	200
1994	No advice for sprat; maintain by-catch regulations	-	114	184	324
1995	No advice	-	175	194	357
1996	No advice	-	200		

¹EU zone. Weights in '000 t.

Historical development of the fishery: Sprat is mainly taken by Danish pelagic pair-trawlers and Norwegian purse seiners for industrial purposes. Landings peaked in the 1970s but decreased to a low of 16 thousand t in 1986. There has been a considerable increase since 1986 and catches in 1995 were the highest since the mid 1970s.

State of stock: The state of the stock is not known. However, surveys indicate that both recruitment and biomass appear to be low at present.

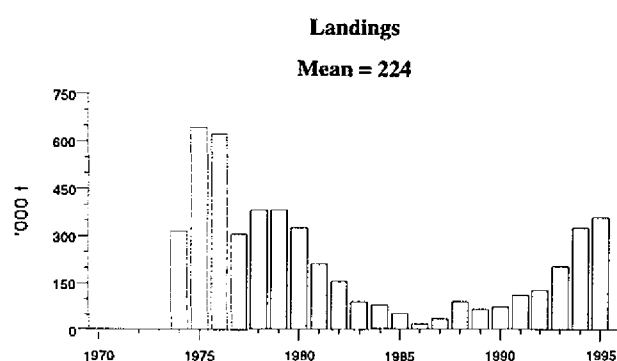
Management advice: To be consistent with the advice for North Sea herring (Section 3.5.8) ICES recommends that the existing measures to regulate the by-catches particularly for herring (closed areas, by-catch regulations) should be strictly enforced. If it is not possible to avoid significant by-catches of juvenile herring in the fisheries for sprat, ICES recommends that the sprat fishery should be closed.

Special comments: TAC's have been exceeded by about 100% in recent years, indicating that the existing management measures have not been effective. A large amount of juvenile North Sea herring is caught as by-catch in the sprat fishery.

Data and assessment: Survey data available.

Details in Table 3.5.9.2.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).



3.5.10 Mackerel (North Sea component)

Evaluation of the North Sea mackerel component is given in Section 3.12.3 dealing with the combined mackerel assessment.

3.5.11 North Sea horse mackerel (*Trachurus trachurus*) (Division IIIa (eastern part), Divisions IVb,c, VIId)

Catch data (Tables 3.5.11.1-2):

Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	ACFM catch ²
1987	Not assessed	-	30	12
1988	No advice	-	50	24
1989	No advice	-	45	33
1990	No advice	-	40	19
1991	No advice	-	45	12
1992	No advice	-	55	15
1993	No advice	-	60	14
1994	No advice	-	60	6
1995	No advice	-	60	17
1996	No advice	-	60	

¹Division IIa and Sub-area IV (EU waters only). ²Catch of North Sea stock (See Table 3.5.11.2). Weights in '000 t.

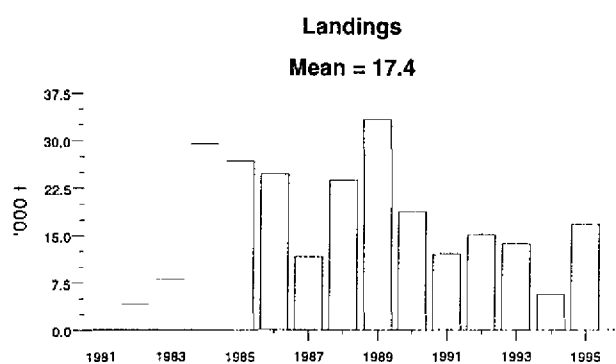
Historical development of the fishery: North Sea horse mackerel are caught predominantly in Divisions IIIa (the Kattegat and eastern part of the Skagerrak), IVb,c and VIId. In earlier years the majority of the catch was taken as by-catch in the small-mesh industrial fishery, but in 1995 the catches from the directed fishery for horse mackerel were at least 70% of the total catch.

Data and assessment: Only a small proportion of the catch is being sampled and as a result it is not possible to do an assessment of this stock.

Source of information: Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, August 1996 (CM 1997/Assess:3).

State of stock: Egg surveys from 1989 to 1991 indicated a spawning stock biomass of about 240,000 t. There is no information as to the present state of the stock.

Landings and discards of North Sea stock (Table 3.5.11.2)



3.5.12 Norway pout in Sub-area IV and Division IIIa

Catch data (Tables 3.5.12.1-2):

North Sea (Sub-area IV)					
Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Off. Indgs.	ACFM catch ²
1987	No advice	-	200	215	149
1988	No advice	-	200	187	110
1989	No advice	-	200	276	173
1990	No advice	-	200	216	152
1991	No advice	-	200	223	193
1992	No advice	-	200	335	300
1993	No advice	-	220	241	182
1994	No advice	-	220	214	179
1995	Can sustain current F	-	180	289	241
1996	Can sustain current F; take by-catches into account		220		

¹IIa(EU), IIIa, IV(EU). ² IVa, IVb and IIIa. Weights in '000 t.

Division IIIa

Year	ICES advice	ACFM catch
1987	No advice	2
1988	No advice	8
1989	No advice	5
1990	No advice	12
1991	No advice	38
1992	No advice	45
1993	No advice	8
1994	No advice	7
1995	No advice	50
1996	No advice	

Weights in '000 t.

Historical development of the fishery: The fishery expanded during the early 1970s and is prosecuted largely by Danish and Norwegian vessels using small mesh trawls. The fishery targets both Norway pout and juvenile blue whiting. The fishery declined during the 1980s following a decline in the stock size of Norway pout. Most fishing takes place during the winter. There is a by-catch of protected species, mostly other gadoids and particularly whiting. The "Norway pout box", which excludes fishing for this species, was introduced in the 1980s to reduce the by-catch of juvenile protected fish species in the northern North Sea.

State of stock: The stock is considered to be within safe biological limits. Recruitment is highly variable and can influence the SSB rapidly due to the short life span of the species. The 1994 year class is very strong. SSB has increased in recent years and is at a high level in 1996.

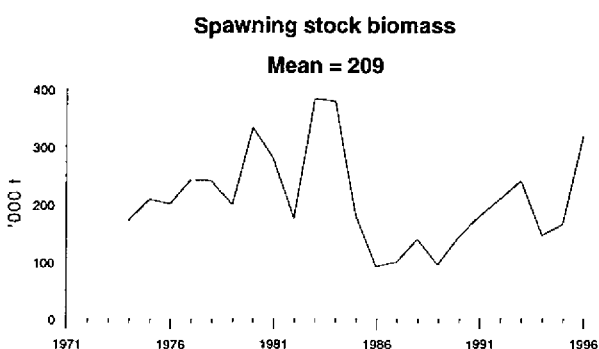
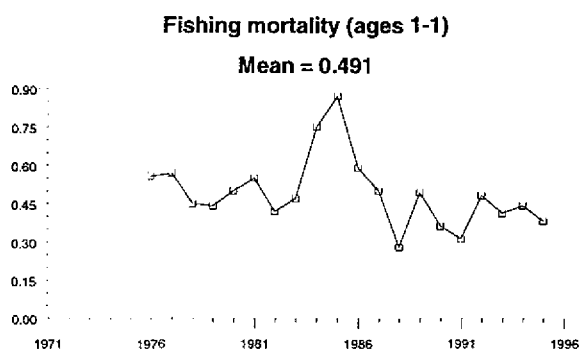
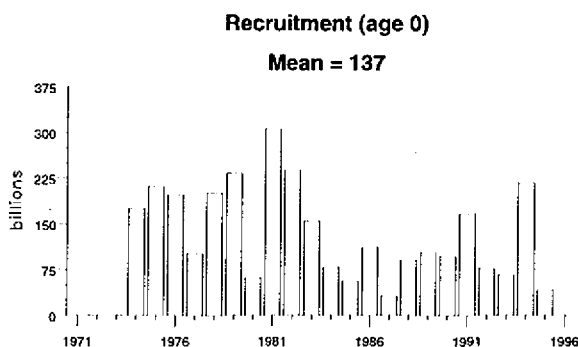
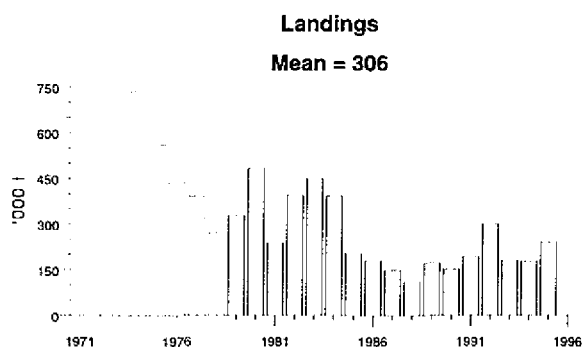
Details given in Table 3.5.12.3.

Management advice: In managing this stock, by-catches of protected species should be taken into account.

Special comments: The by-catch of protected species in this fishery has an impact on the catches of these species in the human consumption fisheries, particularly whiting.

Data and assessment: Catch-at-age data available except for 1990. Standardized effort and survey data available. The assessment is considered adequate to indicate trends in the stock.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, (ICES CM 1997/Assess:6).



3.5.13 Sandeel

Catches for the whole of the North Sea are given by country in Table 3.5.13.1 and by the sub-areas shown in Figure 3.5.13.1 in Table 3.5.13.2.

3.5.13.a Sandeel in Sub-area IV

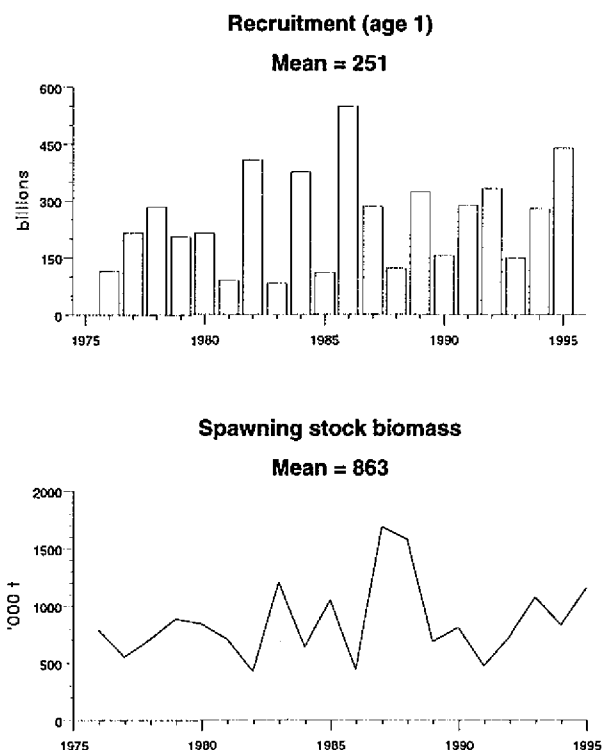
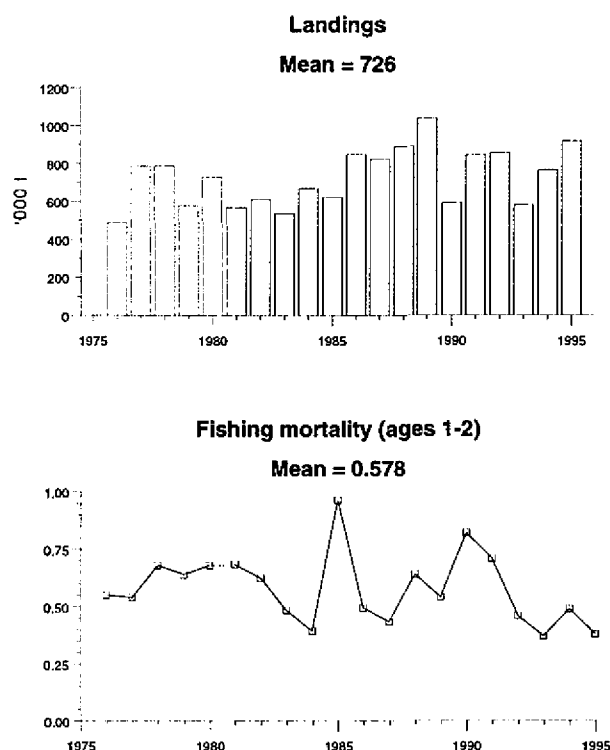
Catch data (Tables 3.5.13.1-2):

Year	ICES advice	ACFM catch
1987	No advice ¹ ; No advice ²	825
1988	No advice ¹ ; No advice ²	893
1989	No advice ¹ ; No advice ²	1039
1990	No advice ¹ ; No advice ²	591
1991	No advice ¹ ; No advice ²	843
1992	No advice ¹ ; No advice ²	855
1993	No advice ¹ ; No advice ²	579
1994	No advice ¹ ; No advice ²	766
1995	Can sustain current F ¹ ; No advice ²	918
1996	Can sustain current F	

¹Southern stock component. ²Northern stock component Weights in '000 t.

Historical development of the fishery: This small mesh trawl fishery developed in the 1970s. The fishery began in the areas around the Dogger Bank and later expanded northwards. The fishery is seasonal, taking place mostly in the spring and summer with most catches being taken in April-July.

State of stock: The stock appears to be within safe biological limits. For the last 20 years, SSB and recruitment have fluctuated without any particular trend. The spawning stock has fluctuated between 400,000 and 1,200,000 t except in 1987 and 1988 when the strong 1985 year class brought the SSB up to around 1,700,000 t.



Details in Table 3.5.13.3.

Special comments: The fishery in the early part of the season concentrates mostly on 1-group fish while later in the summer (August) the fishery exploits 0-group fish. Most of the catch consists of *Ammodytes marinus* and there is little by-catch of protected species, (see Table 3.5.13.3).

Sandeels are largely stationary after settlement and the North Sea sandeel must be considered as a complex of local populations. Recruitment to local areas may not be directly related to the local stock as interchange between areas seems to take place during the early phases of life before settlement.

The Shetland sandeel stock is still assessed as a separate unit (see Section 3.5.13.b).

A request for advice on sandeels from the Government of the United Kingdom is dealt with in Section 3.5.13.c.

Data and assessment: Catch-at-age data available except for 1990. Standardized effort data available. No survey data.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

3.5.13.b Sandeel in the Shetland area

Catch data (Catches in the total North Sea are given in Table 3.5.13.1 and for this assessment area in Table 3.5.13.4):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	No advice	-		7.2
1988	No advice	-		4.7
1989	No advice	-		3.5
1990	No advice	-		2.3
1991	Low fishing	-		+
1992	No fishing prudent	-		-
1993	No fishing prudent	-		-
1994	TAC	3		-
1995	TAC	3		1.2
1996	No advice		3	1.0

Weights in '000 t.

Historical development of the fishery: The fishery started at a low level in 1974 by small local vessels at Shetland working close inshore grounds. The fishery expanded in the 1980s and included large multipurpose vessels fishing during the seasonal closure of pelagic fisheries. Following a series of poor year classes in the mid to late eighties the fishery declined. A seasonal closure was introduced during the second half of 1989 and 1990. The fishery was completely closed at the start of 1991, but was re-opened at the start of 1995 with a multi-annual TAC of 3,000 t, limited access and seasonal closure.

State of stock: Spawning biomass has increased due to maturation of the strong 1991 year class and the protection afforded by the closure of the fishery, but the precise level is uncertain. The 1993 year class is above average. A survey index indicates that the 1996 year class is above average. The stock is probably within safe biological limits.

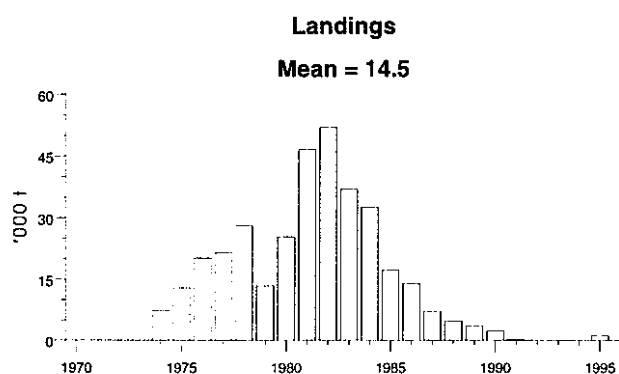
Special comments: Most of the recruitment to the Shetland population is of larvae from outside the area. This means it is not possible to define adequately an MBAL for the stock at Shetland. It also means that the fishing of spawning stocks outside the Shetland area could impact on recruitment to Shetland.

Sandeels at Shetland are assessed as a separate stock but are part of a complex of local populations throughout the North Sea.

A request for advice on sandeels from the Government of the United Kingdom is dealt with in Section 3.5.13.c.

Data and assessment: Catch-at-age and standardized effort data are available. Trawl survey indices are available for 1984-1996. No reliable assessment is available.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES CM 1997/Assess:6).



3.5.13.c Response to request for advice on sandeels from the Government of the United Kingdom

The United Kingdom has requested ICES to advise on two issues in relation to sandeel management :

a) TACs: 'To give the widest possible scope for management decisions, the UK requests that ICES provides advice on appropriate levels for precautionary TACs for the sandeel stocks in the North Sea (IV), the Skagerrak (IIIa), and West of Scotland (VIa) and that advice be given on the practicality of providing annual estimates of TACs for sandeels based on the status of the stocks in that year.'

It is understood that the term "precautionary TAC" is used here in the traditional sense used in fisheries management as a catch limit based on historical catches rather than analytical assessments.

Precautionary TACs for sandeel have been set by the UK and have been in place for some years in Division VIa (12,000 t, see Section 3.7.10) and around Shetland (3,000 t, see Section 3.5.13.b). For the North Sea and Division IIIa total landings have over the last 10 years been in the range 600,000 - 1,100,000 t. The sandeel stock is considered to have been able to sustain the exploitation level in that period. The largest landings within the decade have not been associated with higher exploitation levels but with large year classes recruiting to the fishery, notably the 1985 and 1994 year classes. If the purpose of a TAC for the North Sea and Division IIIa is to impose an upper limit to fishing while enabling the fishery to harvest large year classes it could be about 1,100,000 t. Lower TACs require reliable predictions or real-time monitoring of recruitment to the fishery.

Such predictions would normally be based on so-called analytical assessments, as used as the basis for TACs for many human consumption fisheries. In the case of sandeel, the fisheries depend heavily on 0, 1 and 2-group fish and these are not well estimated in conventional analytical assessments. This occurs for a variety of reasons related to the data available, the biology of the species and the variable nature of the fishery. The ability to predict recruiting year classes for sandeel is even worse than average because sandeel is a complex of local populations and the fleets change their area of operation from year to year and over the season. The catch data will thus reflect variable mixtures of removals from local populations. Furthermore, the amount of effort deployed may depend on the amount of active processing capacity at fishmeal plants as much as on the availability of the resource.

Preliminary work has been done to develop prediction models for sandeel in the North Sea. It has proved possible to reduce the time ahead for forecasting to 6 months by using data for the first half of the assessment year and a preliminary probabilistic model has been developed to forecast catches and stock size. However, such predictions are unlikely to be of extensive use in formulating TACs in the

usual way for the reasons stated above. If TAC management is to be considered, then alternative approaches to arriving at an appropriate catch constraint will have to be considered. Rather than trying to predict a catch it may be better to consider the possible effects on the stock and the fishery of various management regimes such as management based on real-time monitoring or fixed or limited flexibility TAC or effort controls. This would require a different approach to the normal ICES assessment procedure. It would be necessary to construct a stochastic simulation model which considered in a probabilistic way the outcomes of potential management actions. Such an exercise would mean establishing an appropriate management procedure and would require the building of a realistic operational model. This is a fairly large undertaking and would take some time to develop.

b) Need to protect local aggregations of sandeel in sensitive areas: 'The UK also requests that ICES should take account of the need to protect local aggregations of sandeels in sensitive areas close to important wildlife assemblages such as seabird colonies, by considering seasonal and localised catch regulations.'

To provide the most useful advice on the biological consequences of seasonal and localised catch regulations for sandeel fisheries in sensitive areas close to wildlife assemblages ICES would require precise statements of the objectives intended to be achieved by the regulations.

Wildlife assemblages may — beyond seabird colonies — include areas where sea mammals occur and other marine life including fish could be considered wildlife as well. The concept of *sensitive areas* must be qualified in terms of potential interactions between fisheries activities and well defined aspects of the local system which may be of concern to management. An evaluation can only be made if potential interactions and specific local areas of concern are identified.

In general, because sandeels are largely sedentary after settlement, any closures would be expected to reduce mortality on standing stocks of sandeels in the closed area, for the duration of the closure. A reduction in mortality (and hence the enhancement of biomass) would be dependent on the ratio between removals by the fisheries and total mortality. Recruitment to local sandeel populations is not thought to depend solely on the local spawning biomass, however. Therefore, any local increase in standing stock that might result from a local closure would not alter the probability distribution of future recruitment levels to the local populations.

To use these general considerations in evaluating the possible consequences of a closure in any specific area would require several types of information, including:

- a) the expected fishing harvest in the area were it not closed,
- b) the expected biomass of sandeels removed by predators in the area,

- c) the level of mortality from other sources,
- d) the standing stock of sandeels in the area.

Moreover, delineating the properties of a closure would also require information on, among other things:

- e) the fisheries which would be operating in the area if it were open,
- f) the times and areas used by the wildlife predators,

Progress is being made in acquiring the necessary information for some areas which are considered sensitive (Skov *et al.* 1995, the ICES Study Group on Seabird/Fish Interactions, now reestablished as the ICES Working Group on Seabird Ecology, research projects underway).

ICES could be asked to provide advice on more specific scenarios including clear specification of objectives and areas. However, such advice might require a directed research programme to obtain the information needed for evaluation.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Skov, H., Durinck, J., Leopold, M. F. and Tasker, M. L. (1995). Important Bird Areas for seabirds in the North Sea. Birdlife International, Cambridge.

3.5.14 *Pandalus borealis*

3.5.14.a *Pandalus borealis* in Division IVa Fladen Ground

Catch data (Table 3.5.14.a.1):

Year	ICES advice	ACFM landings
1987	Not assessed	8.0
1988	Large fluctuations in stock at current F and mesh size	1.2
1989	Large fluctuations in stock at current F	3.0
1990	No advice	2.1
1991	No advice	0.5
1992	No advice	1.6
1993	No advice	2.1
1994	No advice	1.2
1995	No advice	5.3
1996	No advice	

(Weights in '000 t).

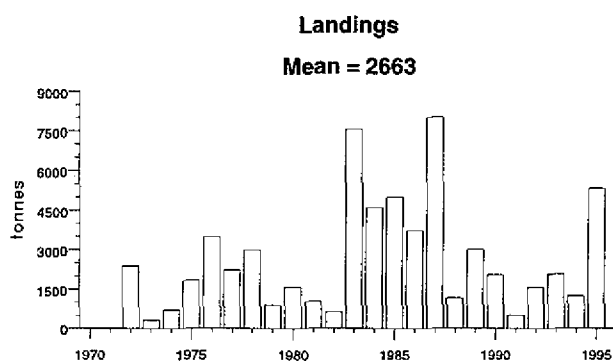
The catches have fluctuated widely.

Historical development of the fishery: This stock is exploited mainly by Danish and Scottish shrimp trawlers. The catches have been very variable during the last 20 years. The highest catch (8,000 t) was taken in 1987 whereas catches less than 1,000 t have been recorded for some years. Market conditions for shrimp and alternative fishing opportunities influence the variability in the effort exerted on this stock.

State of stock: Not known.

Data and assessment: Catch data were updated. No assessment has been presented for this stock since 1992.

Source of information: Report by Correspondence of the *Pandalus* Assessment Working Group. ICES CM 1996/Assess:17.



3.5.14.b *Pandalus borealis* in Division IVb Farn Deep

Catch data (Table 3.5.14.b.1):

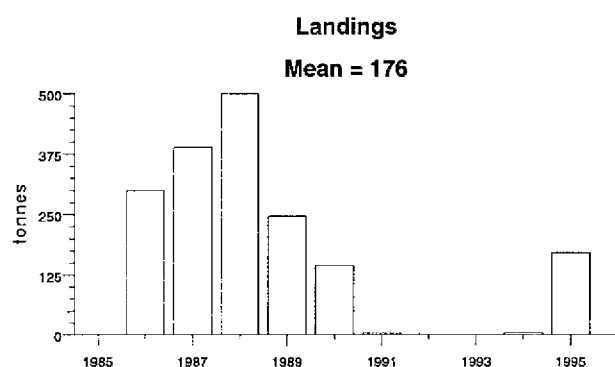
Year	ICES advice	ACFM Landings
1987	Not assessed	0.39
1988	Not assessed	0.50
1989	Not assessed	0.25
1990	No advice	0.14
1991	No advice	+
1992	No advice	+
1993	No advice	0
1994	No advice	+
1995	No advice	0.17
1996	No advice	

(Weights in '000 t)

Historical development of the fishery: This stock is exploited sporadically. Catches have never been reported to exceed 500 t. Practically no catches since 1990.

Source of information: Report by Correspondence of the *Pandalus* Assessment Working Group. ICES CM 1996/Assess:17.

Data and assessment: Few data are available and no assessments were attempted.



3.6 Stocks in the Eastern English Channel (Division VIId)

3.6.1 Overview

Major fleets

A large proportion of the Eastern Channel is in the coastal zone (12 miles zone) which is exploited by small scale fisheries. The major fleets operating in this area are: a French inshore fleet, mainly comprising small vessels using various gears, an English inshore fleet using fixed gear, English and Belgian offshore beam trawlers and French offshore otter trawlers.

Both beam trawl fleets mainly target sole and take a significant amount of plaice as a by-catch. Sole is also taken in directed inshore UK fisheries using trammels and in French fisheries using trammels and otter trawl. The major part of the plaice landings originates from a seasonal fishery in winter by French offshore otter trawlers taking sole as by-catch. The major part of the cod landings originates from French offshore trawlers and inshore gill netters. It is a by-catch in the other fisheries. Whiting are caught by inshore and offshore French trawlers in the Channel in mixed fisheries.

A pelagic trawl fishery takes place in the winter during the herring spawning season.

Effort directed at flatfish increased consistently and considerably in all fleets from 1975 and reached a peak during 1989-1990, after which it has stabilised.

Stock identity and relevant aspects of management

Up to and including 1995, cod, whiting, plaice and sole in Division VIId were assessed as separate stocks.

ICES reviewed the stock identity of these species in 1995. Tagging data for plaice indicate that there is substantial movement of plaice between various management areas. These data need to be further analysed to evaluate the appropriate assessment units. The available information on sole justifies an assessment of the stock in this area separately.

With regard to cod and whiting all available evidence (tagging experiments, egg surveys, recruitment patterns)

suggests that both species in the eastern Channel have strong links with the stocks in the southern North Sea and that there is little interchange between this area and the western Channel (Division VIIe). Following this review of the stock identity, cod and whiting in Division VIId are considered to be closely associated with the North Sea stocks and have now been assessed together with these. For cod Division IIIa is included in the assessment as well. Plaice and sole in Division VIId are still assessed as separate stocks.

There are no separate TAC's for cod and whiting in Division VIId but they are part of a total TAC for the whole of Sub-area VII excluding Division VIIa. Sole is managed by a TAC for the Division and plaice is managed by a TAC which includes Division VIIe. TAC's for cod, whiting, plaice and sole in recent years have generally not been restrictive.

Stock status

Cod and whiting are assessed together with the North Sea stocks; reference is made to Sections 3.5.1, 3.5.2 and 3.5.4.

In plaice, the spawning stock has declined from a peak in the late 1980's. The sole spawning stock has recovered due to above-average recruitment in the period 1990-1992 and increased considerably in 1994 to a record level in the time series. It is expected to remain at or above average in the short term.

Pelagic fisheries

Pelagic species caught in Division VIId are herring (Downs herring), horse mackerel, mackerel, and sprat. These species are subject to TAC's set over larger areas. There are no separate estimates of the state of the stocks in this area. Also no separate statistics on catches and landings are available.

3.6.2 Cod in Division VIId (Eastern English Channel)

See Section 3.5.2.

3.6.3 Whiting in Division VIId (Eastern English Channel)

See Section 3.5.4.

3.6.4 Sole in Division VIIId (Eastern English Channel)

Catch data (Table 3.6.4.1)

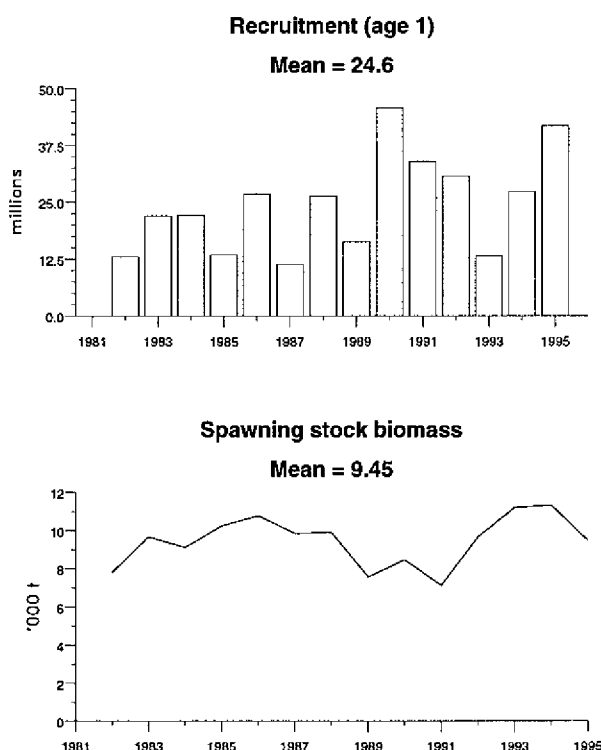
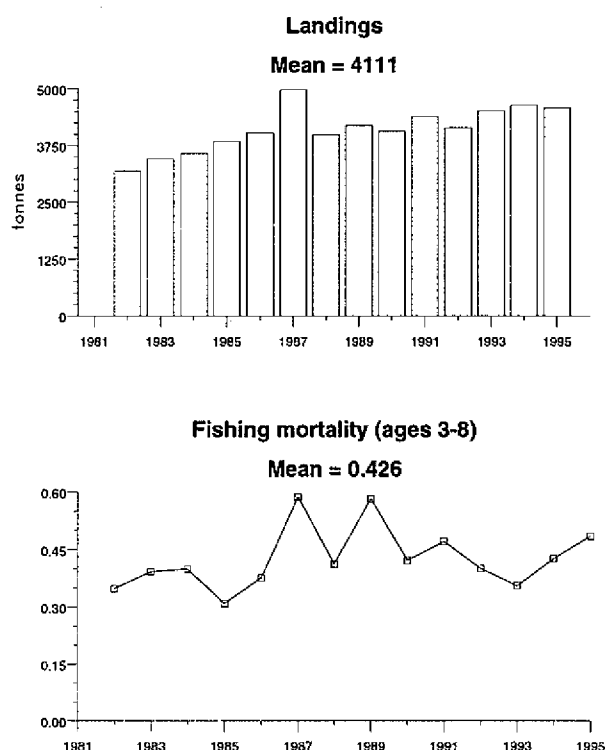
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Off. Indgs.	ACFM catch
1987	Precautionary TAC	3.1	3.85	3.8	5.0
1988	Status quo (Shot) TAC	3.4	3.85	3.3	4.0
1989	Status quo (Shot) TAC	3.8	3.85	2.9	4.2
1990	No effort increase; TAC	3.7	3.85	3.0	4.1
1991	Status quo F; TAC	3.4	3.85	3.8	4.4
1992	TAC	≤2.7	3.5	3.8	4.1
1993	70% of F(91)~2,800 t	2.8	3.2	3.4	4.5
1994	Reduce F	<3.8	3.8	3.7	4.6
1995	No increase in F	3.8	3.8	3.5	4.5
1996	No long-term gain in increasing F	4.7	3.5		

Weights in '000 t.

Historical development of the fishery: There are five main commercial fleets fishing for sole in Division VIIId: Belgian and English offshore beam trawlers which target sole, offshore French trawlers taking sole as a by-catch, and numerous inshore <10m boats on the English and French coasts fishing with mainly fixed nets and targeting sole in the spring and autumn. Overall effort has more than doubled since the early 1980s, reaching a peak in the early 1990s, and seems to have stabilised in recent years.

State of stock: The stock is considered to be within safe biological limits. Spawning stock biomass is above the average of a series that starts in 1982. Most year classes from 1989 onwards have been good.

Further details in Table 3.6.4.2.



Forecast for 1997:

SSB(96) = 9.54, F(96) = 0.485, Basis: F(96) = F(95),
Catch(96) = 5.02, Landings (96) = 5.02

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4 F ₉₅	0.194	11.0	2.39	2.39	12.6
B	0.6 F ₉₅	0.291		3.42	3.42	11.6
C	0.8 F ₉₅	0.388		4.37	4.37	10.6
D	1.0 F ₉₅	0.485		5.23	5.23	9.76
E	1.2 F ₉₅	0.582		6.01	6.01	8.97

Weights in '000 t.

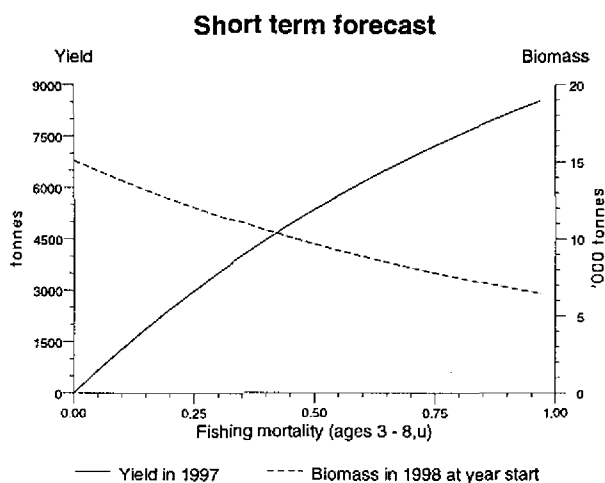
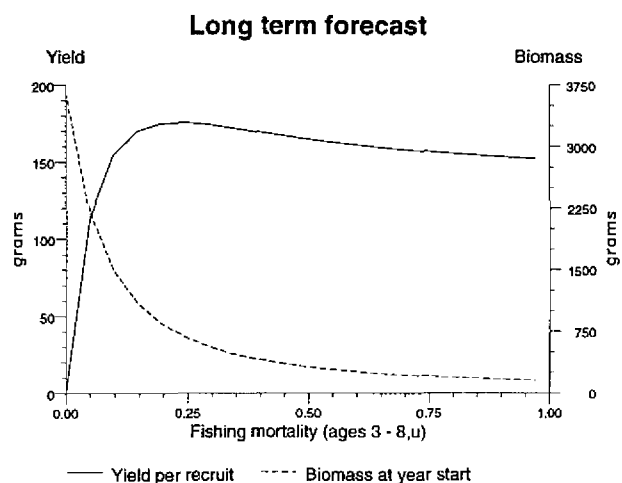
At present levels of fishing mortality, SSB is expected to remain stable.

Medium-term considerations: At present levels of exploitation, yield and SSB are expected to remain relatively stable in the medium term with an 80% probability of remaining above the minimum historical level of 7,000 t (see graph on next page).

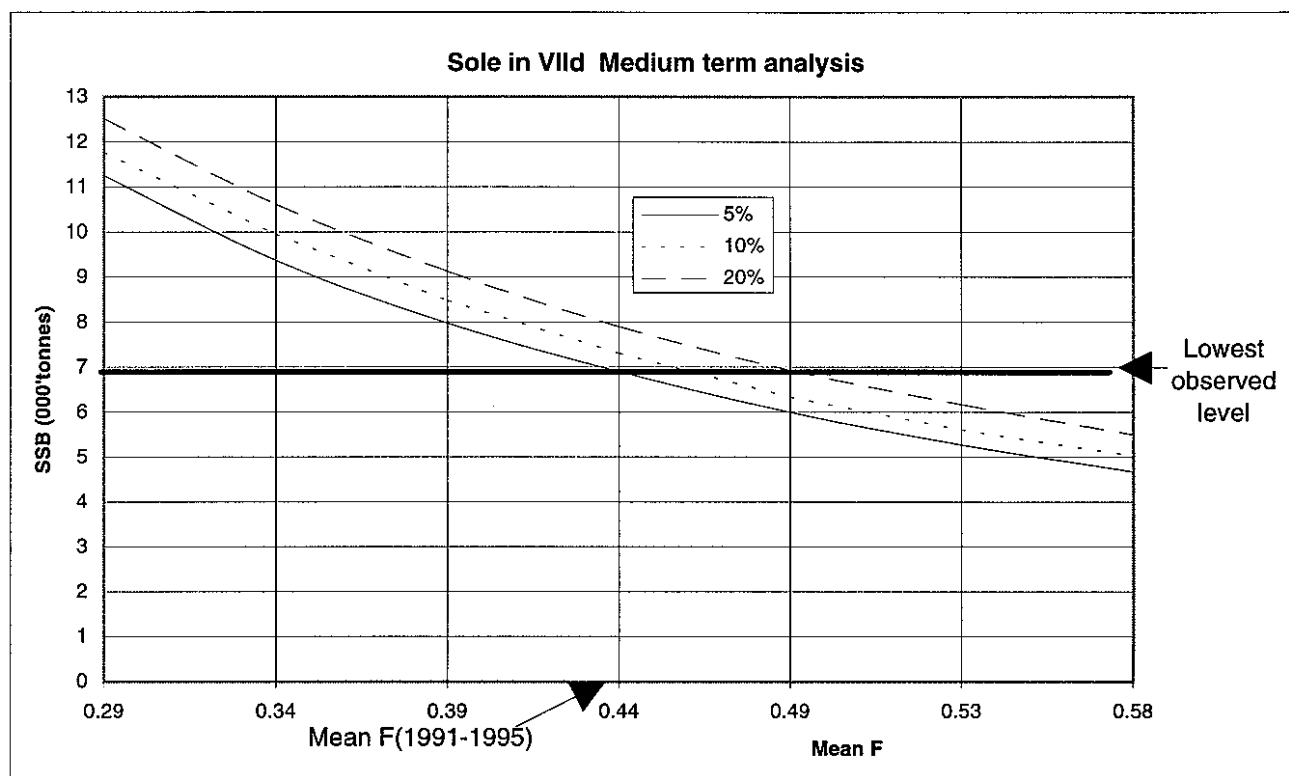
Data and assessment: Analytical assessment, using catch and effort data.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Yield and Spawning Stock Biomass



Medium term predictions showing 5, 10 and 20 percent probabilities that SSB in 2005 will be below given levels at different levels of F.



3.6.5 Plaice in Division VIId (Eastern English Channel)

Catch data (Table 3.6.5.1) :

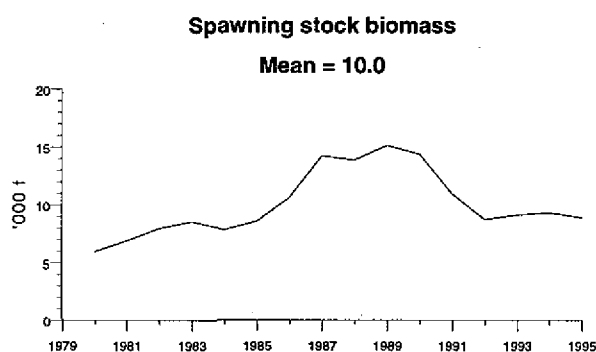
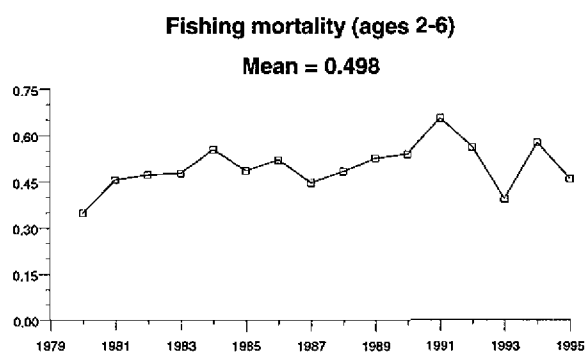
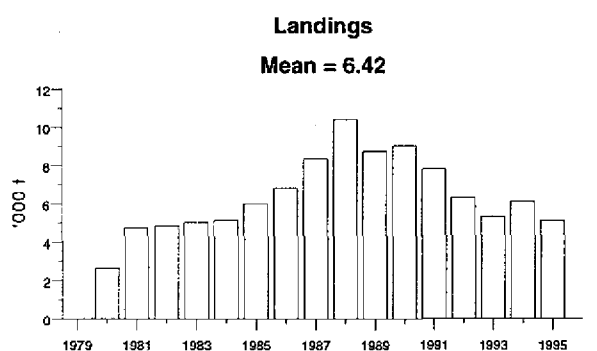
Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Off. landgs.	ACFM catch
1987	Precautionary TAC ¹	6.8 ¹	8.3	7.9	8.4
1988	Precautionary TAC ¹	6.9 ¹	9.96	9.1	10.4
1989	No increase in effort ¹	11.7 ¹	11.7	6.7 ²	8.8
1990	No increase in F; TAC	10.7	10.7	7.8 ²	9.0
1991	TAC	8.8	10.7	7.4 ²	7.8
1992	S.q F gives mean SSB	7.6 ³	9.6	5.9 ²	6.3
1993	Within safe biological limits	6.4 ³	8.5	4.4 ²	5.3
1994	No long-term gains in increased F	-	9.1	5.2 ²	6.1
1995	No increase in F	5.6	8.0	4.3 ²	5.1
1996	No long-term gains in increasing F	6.5	7.53		

¹TACs for Divisions VIId,e. ²For France Division VIId landings are estimated by ACFM. ³Catch at *status quo* F. Weights in '000 t.

Historical development of the fishery: In the Channel, plaice are taken mainly in a mixed flatfish fishery by otter and beam trawlers. French offshore otter trawlers have a directed fishery in winter. Large numbers of plaice are discarded.

State of stock: The stock is considered to be within safe biological limits. SSB increased rapidly until 1989 following recruitment of the strong 1985 year class. Fishing mortality has decreased somewhat in recent years but shows large variations. Recent recruitment has been close to average.

Further details in Table 3.6.5.2.



Forecast for 1997

SSB(96)=8.6 F(96)=F(95)Basis: F(96)=F(95) Catch(96)= -,
Landings (96) = 5.7

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4 F ₉₅	0.18	9.2	-	2.7	12.6
B	0.6 F ₉₅	0.28		-	3.9	11.6
C	0.8 F ₉₅	0.37		-	5.0	10.6
D	1.0 F ₉₅	0.46		-	6.0	9.7
E	1.2 F ₉₅	0.55		-	6.9	8.9

Weights in '000 t.

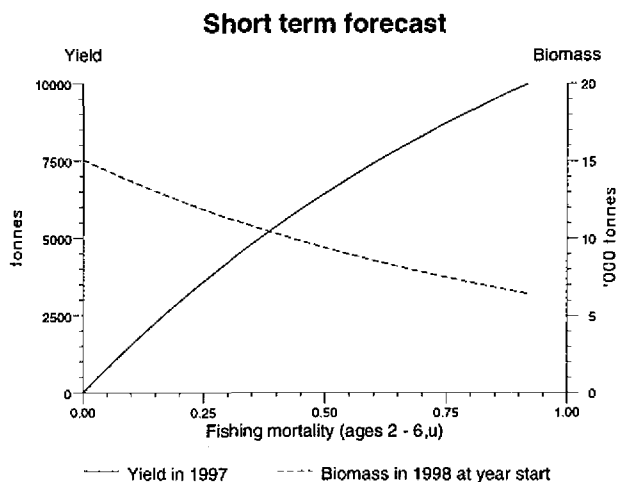
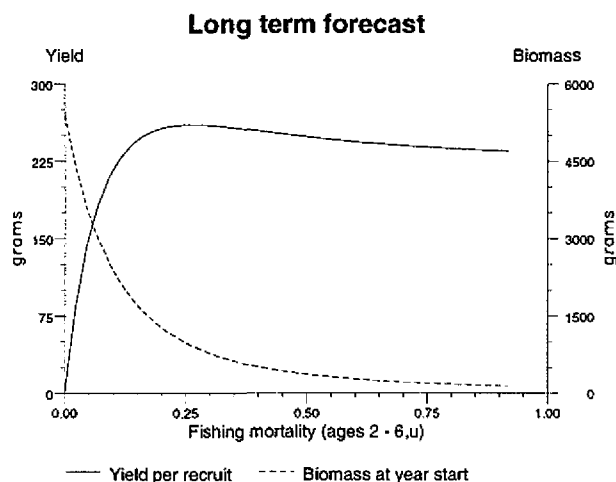
At the current level of fishing mortality, SSB is expected to be stable.

Special Comment: The TAC is set for Divisions VIIId and VIIe combined. The Division VIIe stock is considered to be outside safe biological limits. The management of the Division VIIId stock, whose catch dominates the total catch from the two areas, needs to take this into account.

Data and assessment: Analytical assessment using CPUE data from 3 commercial fleets and 4 surveys. The time series is short, however, and data prior to 1985 are considered to be unreliable. Discards are not included in the assessment.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).

Yield and Spawning Stock Biomass



3.7 Stocks in Sub-area VI

3.7.1 Overview

Fisheries

The demersal fisheries in Division VIa are predominantly conducted by otter-trawlers fishing for cod, haddock and whiting, with by-catches of saithe, anglerfish, megrim and lemon sole. These trawlers use mesh sizes of 80–100 mm depending on area and may at times discard considerable amounts of young haddock and whiting. The majority of these vessels are locally-based Scottish trawlers using 'light-trawls', but trawlers from Northern Ireland, England, France and Germany also participate in this fishery. The importance of Scottish seiners essentially targeted at haddock has been declining in recent years as many of these vessels have been converted to trawlers. The larger Scottish trawlers opportunistically operate in a haddock fishery at Rockall when occasional good year classes recruit to the Division VIb stock. Although young saithe are caught by coastal trawlers, the fishery for saithe essentially takes place offshore to the west and northwest of Scotland. Traditionally, this fishery has largely been operated by the larger deep-sea French trawlers. However, the number of these vessels has declined in recent years due to economic difficulties. In the late 1980s, some of these vessels diverted their activity toward deep-sea species, notably orange roughy, but this fishery has become less profitable recently. To a large extent, the roundfish fishery in Division VIa is an extension of the similar fishery in the North Sea.

Some 200 Scottish trawlers also take part in fisheries for *Nephrops* on inshore grounds, using 70 mm mesh with 80 mm square mesh panel. These boats also land small quantities of haddock, cod, whiting and small saithe, but discard larger numbers of whiting and haddock.

The pelagic fishery for herring is mainly operated by UK vessels in the north, and by Irish vessels in a roe fishery in the south. Substantial misreporting of catches occurs from the North Sea and between the northern and southern stocks. The Clyde herring fishery has declined sharply in recent years as the stock has suffered from a series of low recruitments. Recent TACs have not been taken and the catches have been less than 1,000 t since 1991.

There is a directed trawl fishery for mackerel and horse mackerel in the area. The mackerel fishery mainly takes place in the fourth and first quarter of the year, when the mackerel is returning from the feeding area to the spawning area. The horse mackerel is mainly fished in the second half of the year. In addition, there are fisheries for blue whiting and argentinies in the area.

The industrial fisheries in Division VIa are much smaller than in the North Sea. The Scottish sandeel fishery started in the early 1980s, peaking in 1986 and 1988. It is irregular, depending on the availability of the resource and of processing facilities at Shetland, Hebrides and Faroe. By-catches in this fishery are very small. The Norway pout

fishery is mainly conducted by Danish vessels and is an extension of the North Sea fishery.

State of stocks

The assessments of demersal and herring stocks in Sub-area VI continued to be hampered by the poor quality of catch data due to misreporting. Estimates of misreported catches were available or derived by analysis of survey data for Division VIa cod, haddock and whiting in 1992–1995. The distribution of reported catch data were also examined to estimate the likely extent of misreporting of herring between the North Sea and Division VIaN.

It is likely that the stocks of haddock and saithe in Division VIa are closely related to those of the same species in the North Sea. The depletion of the saithe stock in Division VIa is closely mirrored by the trends in the North Sea stock, whilst the pattern of haddock recruitment in the two areas is very similar.

The state of the cod stock in 1995 is very uncertain due to poor knowledge of the actual level of the commercial catch. The stocks of both cod and saithe in 1995 were still close to their lowest recorded spawning stock levels, and they are considered to be outside safe biological limits.

The haddock spawning stocks in Divisions VIa and VIb increased in 1995 to about double the low values recorded in 1991. The spawning biomass in Division VIb in 1995 was close to the average for the short series available, whilst the Division VIa stock remained below the long-term average.

This year's assessment of the whiting stock in Division VIa includes estimates of both discarding and misreporting, and indicates that all year classes since 1990 have been above average. The spawning stock has been above average since 1993 and in 1995 was almost four times larger than the historical low level in 1989. Although the assessment remains very uncertain because of poor knowledge of the actual level of catch, the overall assessment is broadly in accordance with the trends given by the research vessel surveys.

Fishing mortality on cod and saithe continues to fluctuate about high levels. The saithe stock has been depleted to a level at which recruitment has been reduced on average, and all year classes since 1984 have been close to or below average.

Management advice concerning the roundfish stocks still points to the need to reduce fishing effort, as the considerable misreporting which took place in recent years clearly indicates that controls on landings via TACs are not effective in achieving the reduction in fishing mortality required to rebuild the stocks.

Data are not sufficient yet to assess the stock status of megrim and anglerfish in Sub-area VI. A directed fishery for these species has developed in recent years and this

expansion is further accelerated by fishing effort being diverted onto these stocks due to restrictions on the fisheries for other stocks in the area.

The assessment of the stock of herring in Division VIa North, after correction of landings for misreporting, indicates that the stock is only lightly exploited. The spawning stock increased progressively during the 1980s and stabilized in the 1990s. The state of the herring stock in Division VIaS is more uncertain, and the fishery appears to be dependent on occasional strong year classes. There are indications that this stock may have declined considerably in recent years, and that levels of fishing mortality may be comparatively high. There is evidence that the Clyde herring stock remains very low.

The level of exploitation on sandeel is moderate and the SSB of this stock appears to be high. The stock is, however, subject to large variations depending on recruitment.

The fisheries for mackerel and horse mackerel exploit the western components of these stocks seasonally. The state of, and advice for, these widely distributed stocks are presented in Sections 3.12.3 and 3.12.4. The mackerel stock is at its lowest size since 1972, and catches have been decreasing recently. The EU and Norway have agreed to exploit mackerel at an F of 0.15, which is expected to stabilise SSB above its historical minimum. Following the outstanding 1982 year class, which still contributes over 50% of the catches, recruitment of horse mackerel has been weak. SSB is bound to decline as this year class is fished out at the current high exploitation rate.

The *Nephrops* stocks are now assessed every two years. The overall catches of *Nephrops* from Division VIaN have remained stable since the mid 1980s, and catch-rates of the different stocks have fluctuated without trend.

3.7.2 Cod

3.7.2.a Cod in Division VIa (West of Scotland)

Catch data (Table 3.7.2.a.1):

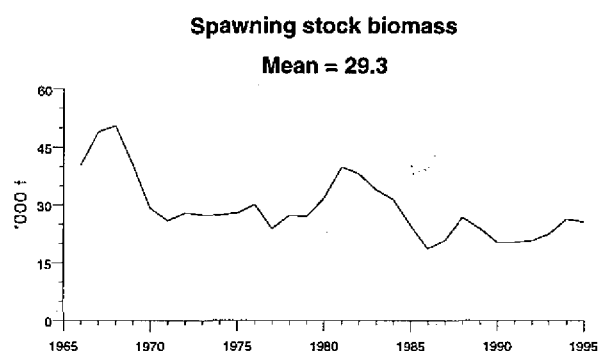
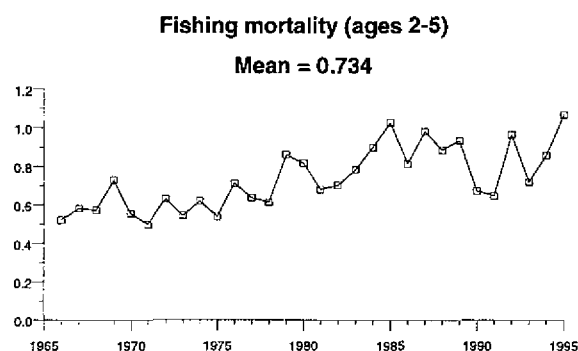
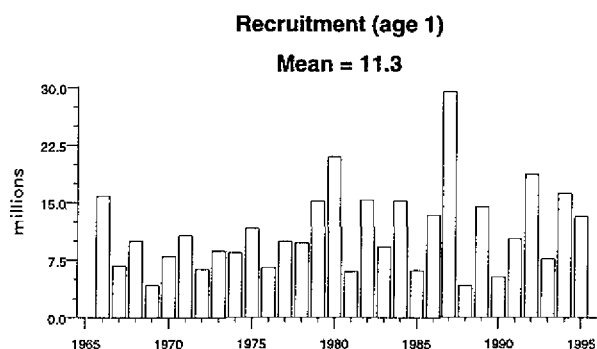
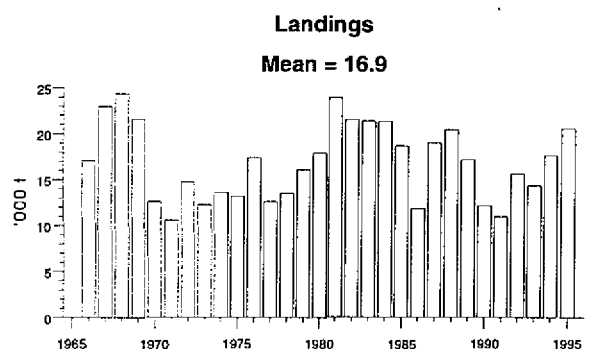
Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Official Landings	ACFM catch
1987	Reduce F towards F_{max}	18.0	22.0	19.2	19.0
1988	No increase in F; TAC	16.0	18.4	19.2	20.4
1989	80% of F(87); TAC	16.0	18.4	15.4	17.2
1990	80% of F(88); TAC	15.0	16.0	11.8	12.2
1991	70% of effort (89)	-	16.0	10.6	10.9 ³
1992	70% of effort (89)	-	13.5	9.0	15.6 ⁴
1993	70% of effort (89)	-	14.0	10.5	14.3 ⁴
1994	30% reduction in effort	-	13.0	9.8	17.6 ⁴
1995	Significant reduction in effort	-	13.0	9.1	20.5 ⁴
1996	Significant reduction in effort	-	13.0		

¹TAC is for the whole of Sub-area VI. ³Not including misreporting. ⁴Including ACFM estimates of misreporting. Weights in '000 t.

Historical development of the fishery: Cod is mainly taken in a mixed fishery directed at cod, haddock and whiting. This fishery is dominated by Scottish trawlers. Cod is also taken as a by-catch in a French directed saithe fishery. Catch restrictions in recent years have led to considerable misreporting.

State of stock: ICES considers this stock to be outside safe biological limits. High levels of misreporting make the

current estimates of exploitation rate and SSB very uncertain. Notwithstanding that uncertainty, the high exploitation rate estimated at present ($F > 1.0$) means there is a high probability that the SSB will decline below the lowest historically calculated level in the medium term. Although recruitment levels have not been reduced in the range of SSB observed so far, cod stocks generally are vulnerable to high exploitation rates and exhibit low recruitment at low stock sizes.



Details in Table 3.7.2.a.2.

Forecast for 1997: Not provided due to uncertainties in recent catch levels. A *status quo* forecast indicates landings of 15,000 t in 1997.

Management advice: ICES recommends that the fishing effort in 1997 in the directed fisheries on cod, haddock and whiting in Division VIa be reduced significantly, and on a sustained basis, relative to effort levels in the most recent years.

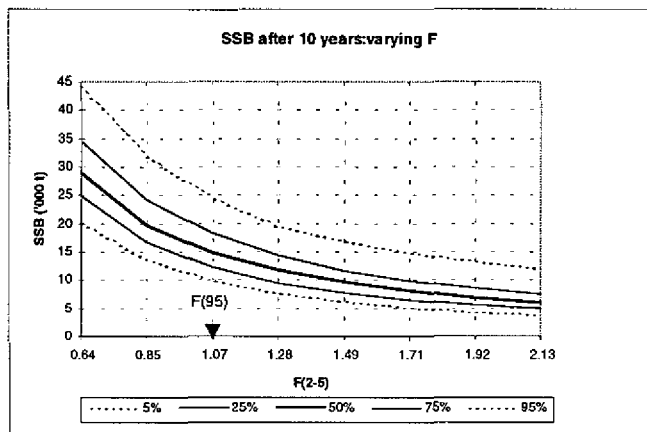
Special comments: ICES recommended for several years that fishing effort in the directed fisheries for cod, haddock and whiting in Division VIa be reduced to 70% of the level in 1989. This was because of the low levels of spawning biomass in all these stocks and because continued fishing,

after restrictive TACs are exhausted, would cause discarding or under-reporting.

Estimates of biomasses and fishing mortality in the recent period have been significantly revised as a result of the inclusion of misreporting data in the assessment. This is partly based on a survey which shows increasing F and a recent decline in SSB.

Data and assessment: Analytical assessment based on landings-at-age, commercial CPUE and survey CPUE data. Misreporting estimates based on survey indices are included in the catch data for 1992–1995, but the true level of catch remains uncertain.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).



3.7.2.b Cod in Division VIb (Rockall)

Catch data (Table 3.7.2.b.1):

Special comments: There is no information on the stock status of Division VIb cod and recent catches are considered unreliable due to misreporting. Official catch data are also incomplete. If a TAC is required for this Division, to be

combined with management measures agreed for Division VIa, it should be based on the more reliable catches reported earlier which were about 1,000 t per year.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).

3.7.3 Haddock

3.7.3.a Haddock in Division VIa (West of Scotland)

Catch data (Tables 3.7.3.a.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Off. Indgs	ACFM Indgs	Disc. slip.	ACFM catch
1987	Reduce F towards F_{max}	20.0	32.0	27	27.0	16.2	43.2
1988	No increase in F; TAC	25.0	35.0	21	19.1	9.0	28.0
1989	80% of F(87); TAC	15.0	35.0	24	16.7	3.2	19.9
1990	80% of F(88); TAC	14.0	24.0	13	10.1	5.4	15.5
1991	70% of effort (89)	-	15.2	10	10.6	9.2	19.8
1992	70% of effort (89)	-	12.5	7	11.4 ³	9.4 ³	20.8 ³
1993	70% of effort (89)	-	17.6	13	19.1 ³	16.9 ³	36.0 ³
1994	30% reduction in effort	-	16.0	10	14.2 ³	11.2 ³	25.4 ³
1995	Significant reduction in effort	-	21.0	13	12.4	8.8	21.1
1996	Significant reduction in effort	-	22.9				

¹TAC is set for Divisions VIa and VIb combined with restrictions on quantity that can be taken in VIa from 1990. ³Adjusted for misreporting. Weights in '000 t.

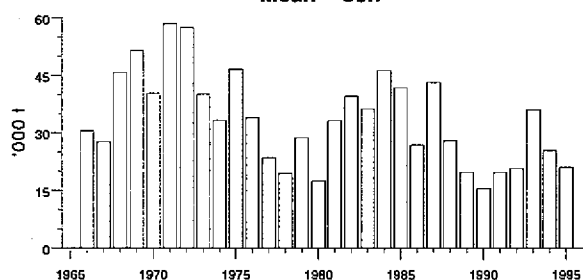
Historical development of the fishery: Haddock is mainly taken in a mixed fishery directed at cod, haddock and whiting. This fishery is dominated by Scottish trawlers. Catch restrictions in recent years have led to considerable misreporting.

State of stock: ICES considers the stock to be within safe biological limits. Despite a number of uncertainties due to

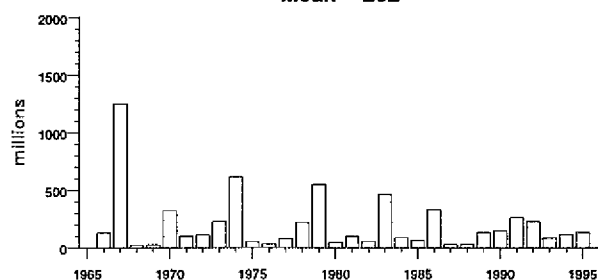
misreporting, the assessment indicates that at recent levels of fishing mortality there is a high probability that the SSB will remain above the lowest historically calculated level in the medium term. Recent recruitment has been near to average and there is no evidence of lower recruitment at the lowest observed SSBs.

Details in Table 3.7.3.a.2.

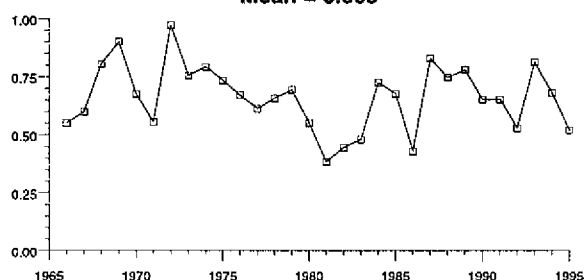
Landings
Mean = 33.7



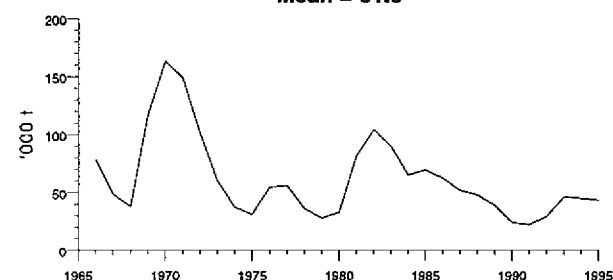
Recruitment (age 0)
Mean = 202



Fishing mortality (ages 2-6)
Mean = 0.663



Spawning stock biomass
Mean = 61.6



Forecast for 1997: Not provided due to uncertainties in 1992–1994 catch levels. However, *status quo* forecasts indicate landings of 14,000 t in 1997.

Management advice: Haddock is taken in mixed fisheries with cod, and management decisions should take into account the reduction in fishing effort recommended for cod.

ICES recommends that the fishing effort in 1997 in the directed fisheries on cod, haddock and whiting in Division VIa be reduced significantly, and on a sustained basis, relative to effort levels in the most recent years.

Special comments: The effort reduction recommended for the mixed fishery for cod, haddock and whiting is justified by the state of the cod stock. However, the implied reduction of fishing mortality on haddock would have positive effects for

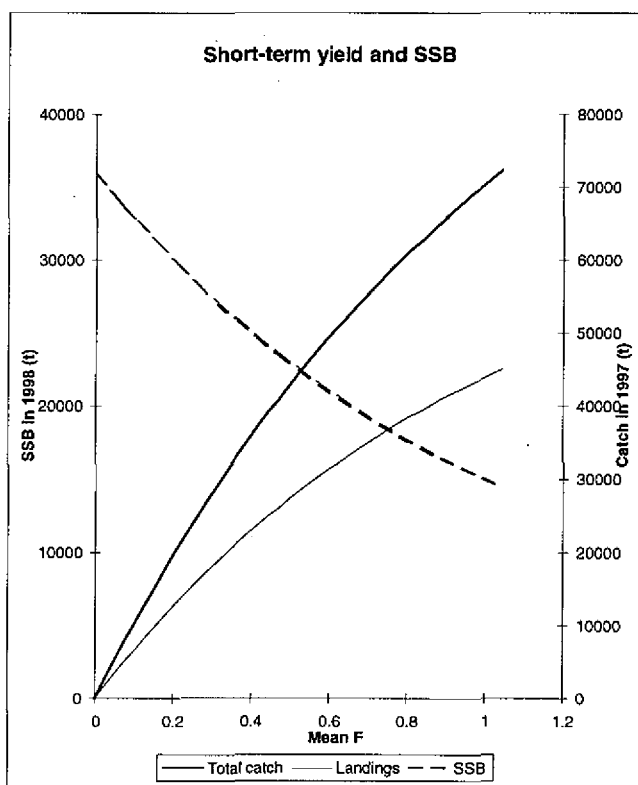
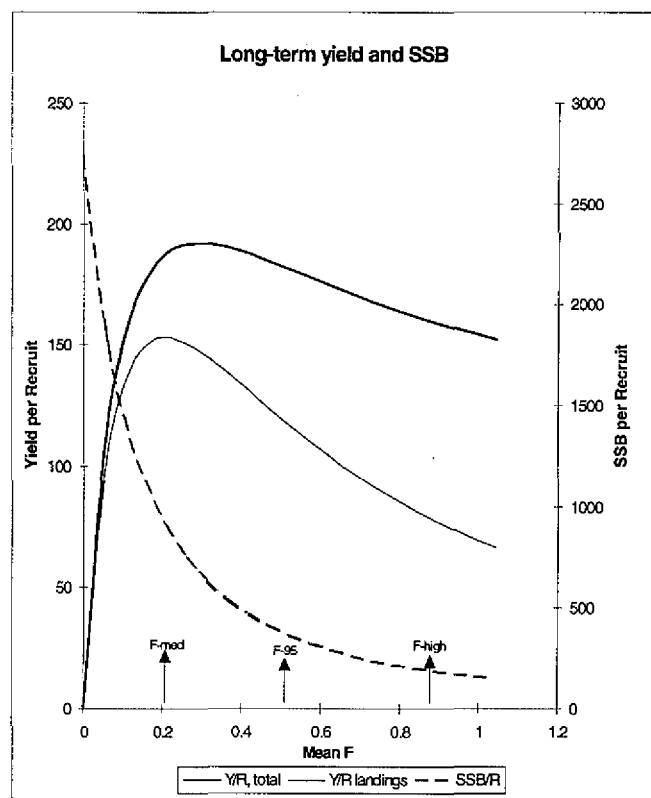
this stock, such as increased long-term yields and reduced variations of the stock due to fluctuations in recruitment.

The fisheries and stocks in Divisions VIa and IVa,b are also closely linked.

Discards constitute an important part of the catch of haddock. Any measure to reduce discards would be beneficial for yield.

Data and assessment: Analytical assessment based on catch, effort and survey data. Estimates of misreporting and non-reporting of landings (up to 60% of recorded landings) in 1992–1994 included in assessment. Continued uncertainty about the true level of catch and effort.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).



3.7.3.b Haddock in Division VIb (Rockall)

Catch data (Table 3.7.3.b.1):

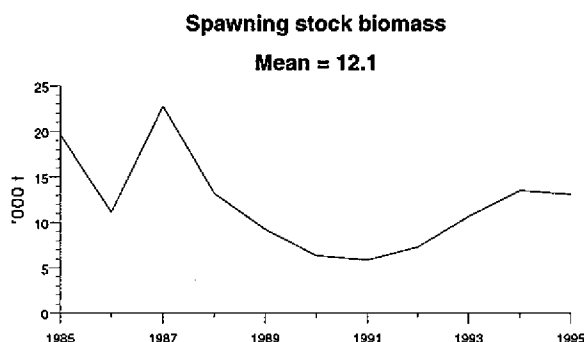
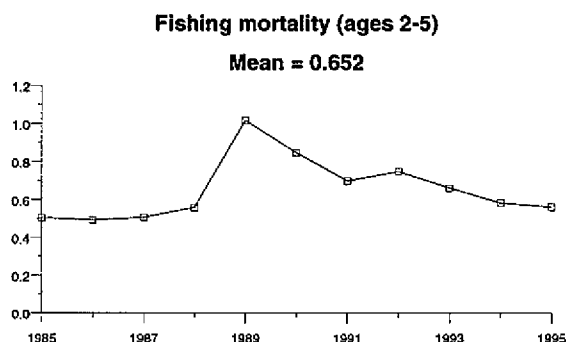
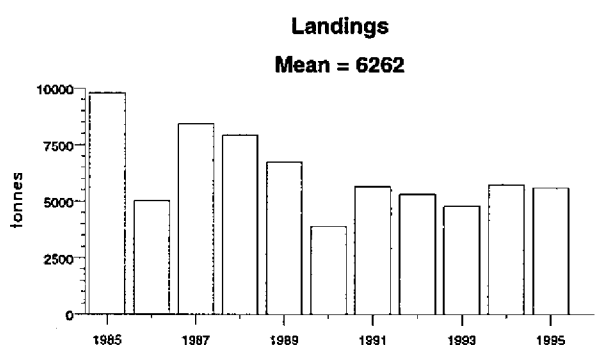
Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Official Landings	ACPM catch
1987	Precautionary TAC	10.0		8.0	8.4
1988	Precautionary TAC	10.0		7.6	7.9
1989	Status quo F; TAC	18.0		6.6	6.7
1990	Precautionary TAC	5.5		8.2	3.9
1991	Precautionary TAC	5.5		5.9	5.7
1992	Precautionary TAC	3.8		4.5 ⁷	5.3
1993	80% of F(91)	3.0		4.1 ⁷	4.8
1994	If required, precautionary TAC	-		3.7 ⁷	5.7 ⁴
1995	No long-term gain in increasing F	5.1 ⁵		5.5 ⁷	5.6
1996	No long-term gains in increasing F	6.9 ⁵			

¹TAC is set for Divisions VIa and VIb combined with restrictions on quantity that can be taken in VIa from 1990. ⁴Including misreporting. ⁵Landings at status quo F. ⁷Incomplete data. Weights in '000t.

Historical development of the fishery: The Rockall fishery is presently dominated by Scottish vessels. The fishery is to a large degree opportunistic and takes place in the summer if fishing at Rockall is more profitable than in the North Sea or West of Scotland. There is a growing tendency for some vessels to exploit this stock on a more regular basis.

State of stock: Although the short time series of data makes it difficult to define safe biological limits for this stock, it is probably within safe biological limits.

Details in Table 3.7.3.b.2.



Forecast for 1997:

SSB(96) = 13.1, F(96) = 0.56, Basis:F(96) = F(95),
Catch(96) = Landings (96) = 6.1

Option	Basis	F (97)	SSB (97)	Catch (97)	Landings (97)	SSB (98)
A	0.4 F ₉₅	0.22	13.4	2.9	2.9	17.9
B	0.6 F ₉₅	0.34		4.0	4.0	16.6
C	0.8 F ₉₅	0.45		5.1	5.1	15.5
D	1.0 F ₉₅	0.56		6.0	6.0	14.5
E	1.2 F ₉₅	0.67		6.8	6.8	13.6

Weights in '000 t.

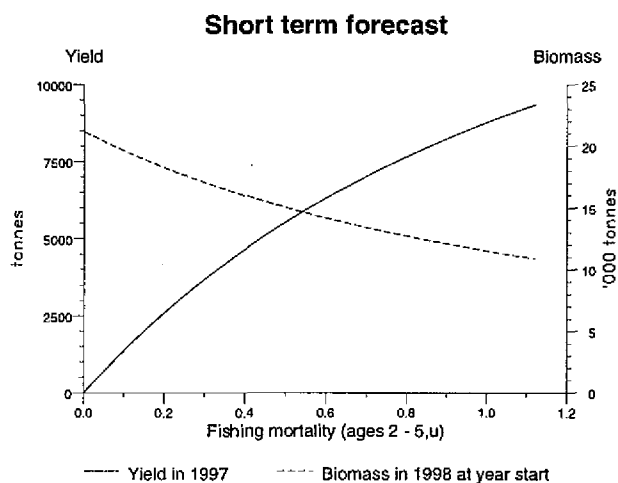
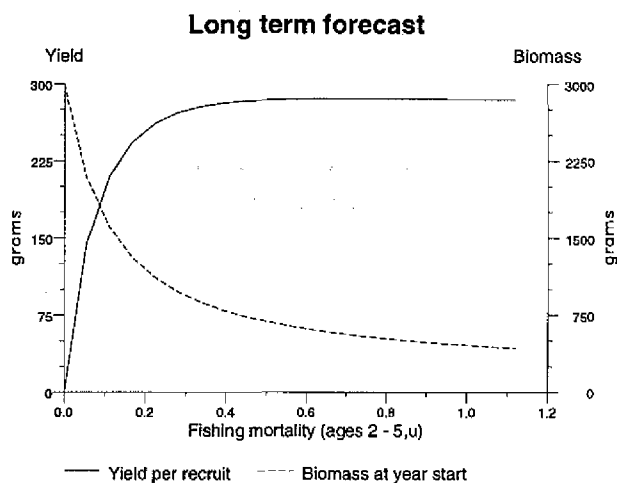
For all options SSB is predicted to increase compared to 1996.

Special comments: The fishery in Division VIb is closely associated with fisheries in Division VIa and the fishery at Rockall is to a considerable extent opportunistic. This makes it difficult to predict actual fishing mortality levels as fishing fleet behaviour will be dependent on fishing opportunities elsewhere.

Data and assessment: Analytical assessment based on landings, effort and survey data. Continued uncertainty about the true level of catch and effort due to misreporting of landings. Estimates of misreporting included for 1994. No information available on discards.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June-July 1996 (CM 1997/Assess:2). ACFM Working Paper for updated forecasts.

Yield and Spawning Stock Biomass



3.7.4 Whiting

3.7.4.a Whiting in Division VIa (West of Scotland)

Catch data (Tables 3.7.4.a.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Official landings	ACFM landings	Discards Slip	ACFM catch
1987	No increase in F	15.0	16.4	12.4	11.5	38.0	49.5
1988	No increase in F; TAC	15.0	16.4	11.9	11.4	11.8	23.1
1989	No increase in F; TAC	13.0	16.4	7.7	7.5	4.1	11.6
1990	No increase in F; TAC	11.0	11.0	6.0	5.6	4.4	10.0
1991	70% of effort (89)	-	9.0	6.9	6.7 ³	5.3	12.0
1992	70% of effort (89)	-	7.5	6.0	9.7 ⁴	15.2	24.9
1993	70% of effort (89)	-	8.7	6.8	10.2 ⁴	12.6	22.7
1994	30% reduction in effort	-	6.8	6.0	12.9 ⁴	19.4	32.3
1995	Significant reduction in effort	-	6.8	6.4	13.8 ⁴	17.2	31.0
1996	Significant reduction in effort	-	10.0				

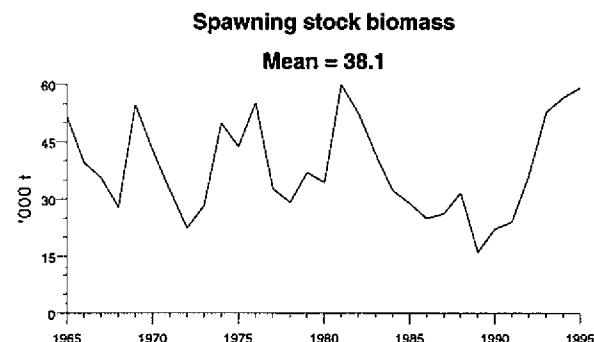
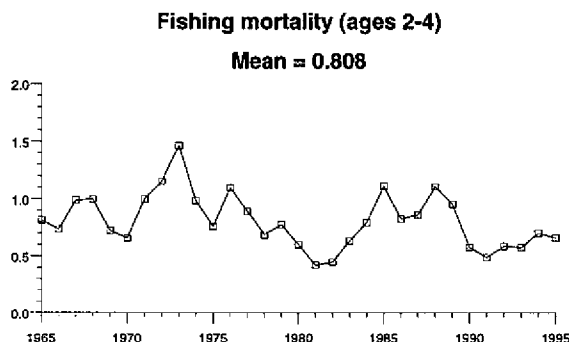
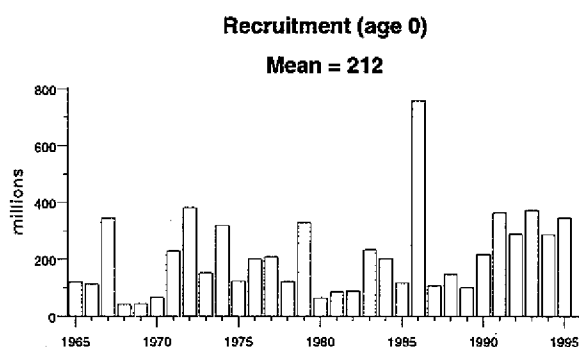
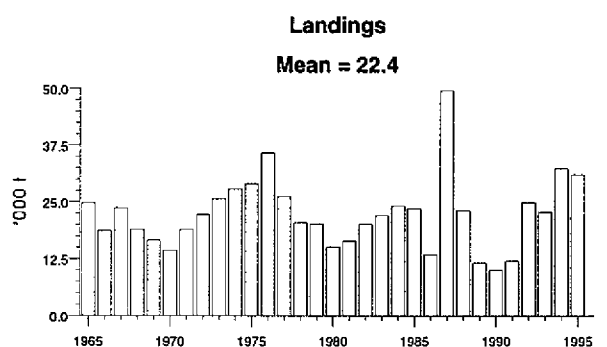
¹TAC is set for Divisions VIa and VIb combined. ³Not including misreporting. ⁴Including ACFM estimates of misreporting. Weights in '000 t.

Historical development of the fishery: Whiting is mainly taken in a mixed fishery directed at cod, haddock and whiting. This fishery is dominated by Scottish trawlers.

medium term. Recent recruitment has been above average and there is no evidence of lower recruitment at the lowest observed SSBs.

State of stock: ICES considers the stock to be within safe biological limits. Despite a number of uncertainties due to misreporting, the assessment indicates that at recent levels of fishing mortality there is a high probability that the SSB will remain above the lowest historically calculated level in the

Details in Table 3.7.4.a.2.



Forecast for 1997: Not presented due to uncertainties in recent catch levels. A *status quo* forecast indicates landings of 15,000 t in 1997.

Management advice: Whiting is taken in mixed fisheries with cod, and management decisions should take into account the reduction in fishing effort recommended for cod.

ICES recommends that the fishing effort in 1997 in the directed fisheries on cod, haddock and whiting in Division VIa be reduced significantly, and on a sustained basis, relative to effort levels in the most recent years.

Special comments: The effort reduction recommended for the mixed fishery for cod, haddock and whiting is justified by the state of the cod stock. However, the implied reduction of

fishing mortality on whiting would have positive effects for this stock, such as increased spawning stock biomasses and reduced discarding.

Discards constitute an important part of the catch of whiting. Any measure to reduce discards would be beneficial for yield.

Data and assessment: Analytical age-based assessment, using landings-at-age data, CPUE from commercial fleets and indices from research vessel surveys. Estimates of misreporting and discarding have been included in the assessment, but the true level of catch remains uncertain.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).

3.7.4.b Whiting in Division VIb (Rockall)

Catch data (Tables 3.7.4.b.1):

Special comments: Landings of whiting from Division VIb are negligible.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).

3.7.5 Saithe in Sub-area VI (West of Scotland and Rockall)

Catch data (Table 3.7.5.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	ACFM catch
1987	F reduced towards F_{max}	19	27.8	32.5	31.4
1988	80% of F(86); TAC	35	35	32.8	34.2
1989	$F < 0.3$; TAC	20	30	22.4	25.6
1990	80% of F(88); TAC	24	29	18.0	19.9
1991	Stop SSB decline; TAC	21	22	17.9	17.0
1992	Avoid further reduction in SSB	<19	17	11.1 ⁴	11.8
1993	$F = 0.21$	6.3	14	15.5 ⁴	14.7
1994	Lowest possible F		14	14.3 ⁴	12.8
1995	Significant reduction in effort	-	16	11.5 ⁴	11.7
1996	No increase in F	10.2 ¹	13		

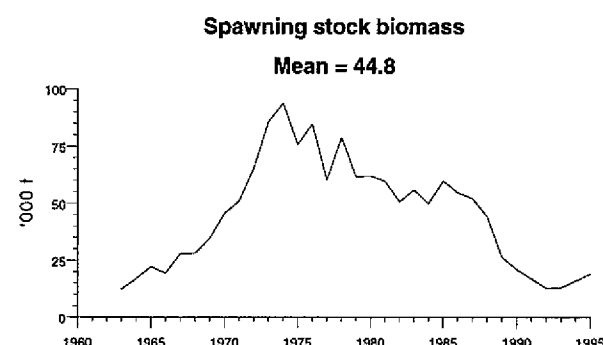
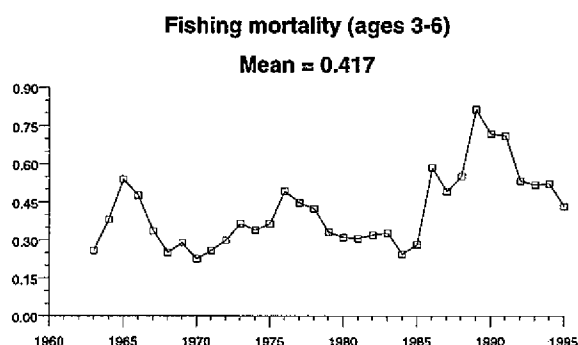
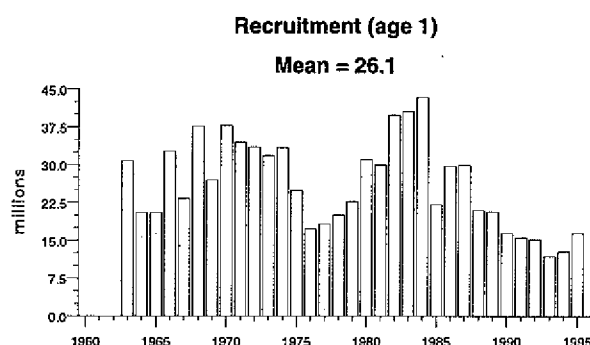
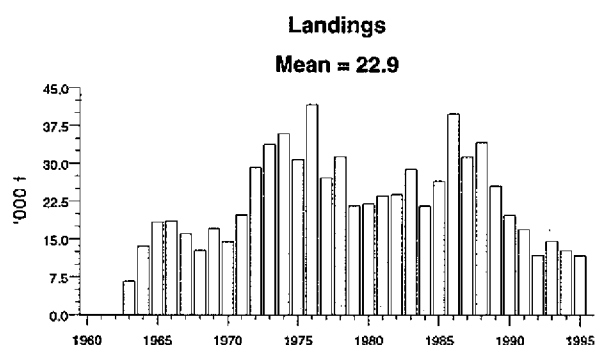
¹Status quo catch. ⁴Incomplete data. Weights in '000 t.

Historical development of the fishery: The fishery consists largely of a French fishery operating on the shelf edge and a Scottish fishery operating inshore. The directed fishery started in the early 1970s. The number of French deep-sea trawlers participating in this fishery has declined in recent years. The fishery is linked to similar fisheries in the North Sea.

The spawning biomass is close to the lowest recorded level. All year classes since that of 1986 are estimated to have been below average with the 1992 year class being the lowest recorded. The assessment indicates that low recruitments are produced by spawning stock biomasses below 20,000 t.

Details in Table 3.7.5.2.

State of stock: ICES considers that this stock is outside safe biological limits.



Forecast for 1997:

SSB(96) = 15.2, $F(96) = 0.43$, Basis: $F(96) = F(95)$,
Catch(96) = 11.0, Landings (96) = 11.0

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4 F_{95}	0.17	15	5.2	5.2	20
B	0.6 F_{95}	0.26		7.5	7.5	18
C	0.7 F_{95}	0.30		8.5	8.5	17
D	0.8 F_{95}	0.35		9.6	9.6	16
E	1.0 F_{95}	0.43		11.6	11.6	15
F	1.2 F_{95}	0.52		13.4	13.4	14

Weights in '000 t.

With fishing mortalities near *status quo* levels, there is a high probability of SSB declining below the lowest observed. A 60% reduction of F in 1997 (option A) is required to rebuild SSB to 20,000 t by 1998.

Management advice: A significant reduction in fishing mortality is required to rebuild SSB to levels at which higher recruitment may be expected. This can be achieved in one year by an F in 1997 of 0.4 times F in 1995 (0.17) or in two years by an F in 1997 and 1998 of 0.7 times F in 1995 (0.30).

Special comments: The assessment indicates that at F levels in the region of F_{med} (0.37) the SSB was stable at about 50,000 t. When F levels exceeded 0.4 the stock showed a tendency to decline rapidly. Maintaining the exploitation rate at or below F_{med} therefore seems to be an appropriate provisional target value.

This stock is associated with the North Sea stock, both in terms of stock distribution and in terms of some of the fisheries exploiting the stocks. Trends in SSB and recruitment are similar in both stocks.

This assessment indicates significantly higher fishing mortalities in recent years than last year's estimates, resulting in a much higher *status quo* F being used in the forecasts. This is because the 1994 catch and effort data for a major component of the fishery, the French Brittany fleet, which were missing last year have now been taken into account.

Caution should be exercised in the interpretation of time series of fishing mortality and SSB prior to 1970 since the catch data for this earlier period are of poor quality.

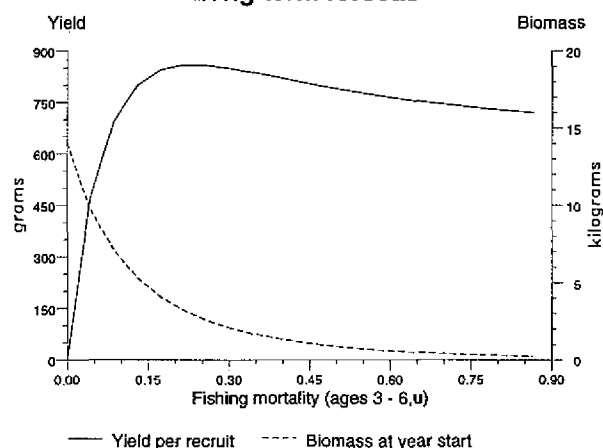
Data and assessment: Analytical assessment of landings-at-age data using commercial CPUE series. Tuning data set include the 1994 and 1995 data available for France. No independent estimates of recruitment.

The recruitment of year classes 1993–1995 assumed in forecasts is an average for the recent period (year classes 1988–1993) during which recruitment has been consistently low. Since maturity takes place at age 5, the SSBs predicted in the short term are not sensitive to the values used for incoming recruitments.

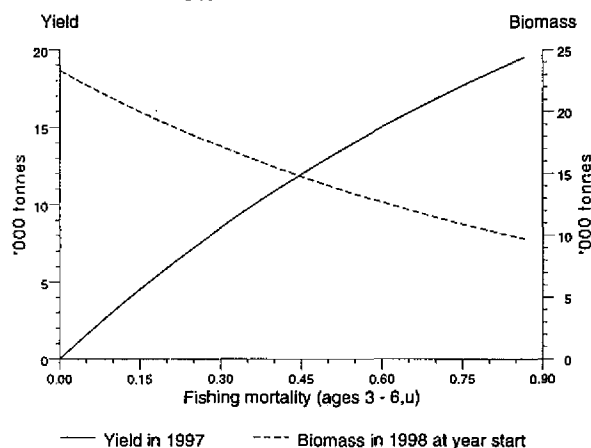
Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).

Yield and Spawning Stock Biomass

Long term forecast



Short term forecast



3.7.6 Megrin in Sub-area VI

Catch data (Table 3.7.6.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Official landings	ACFM catch ²
1987	Not assessed	-	4.4	3.9	-
1988	Not assessed	-	4.84	4.5	-
1989	Not assessed	-	4.84	2.7	-
1990	Not assessed	-	4.84	2.7	2.9
1991	No advice	-	4.84	3.2	2.7
1992	No advice	-	4.84	2.5 ³	2.3
1993	No long-term gain in increased F	-	4.84	2.4 ³	2.3
1994	No long-term gain in increased F	-	4.84	2.4 ³	n/a
1995	No advice	-	4.84	2.5 ³	n/a
1996	No advice	-	4.84		

¹Vb(EC), VI, XII and XIV. ²Division VIa only. ³Incomplete data. Weights in '000 t.

Historical development of the fishery: Until recently megrim was mainly taken as a by-catch in bottom trawl groundfish fisheries but a directed fishery has developed in recent years. Restrictive TACs for other species in Division VIa have led to increased fishing pressure on megrim in that area.

State of stock: When last assessed in 1994, the stock was considered to be fully exploited.

Special comments: The megrim in Sub-area VI consists of two species, *Lepidorhombus whiffiagonis* and *L. boscii*,

which are not distinguished in the catches. The majority of the landings are *L. whiffiagonis*.

Data and assessment: Length frequency and age composition data are only available for 1990–1993. Incomplete data were available for 1994 or 1995. Data are insufficient to permit an assessment.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).

3.7.7 Anglerfish in Sub-area VI

Catch data (Table 3.7.7.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC ¹	Official landings (VI)	ACFM catch ² (VIa)
1987	Not assessed	-	7.8	5.2	-
1988	Not assessed	-	8.6	7.7	-
1989	Not assessed	-	8.6	6.0	-
1990	Not assessed	-	8.6	6.4	5.8
1991	No advice	-	8.6	6.0	5.4
1992	No advice	-	8.6	6.3 ³	4.6
1993	No long-term gain in increased F	-	8.6	6.0 ³	5.0
1994	No long-term gain in increased F	-	8.6	6.2 ³	n/a
1995	A precautionary TAC not exceeding recent catch levels	-	8.6	6.3 ³	n/a
1996	A precautionary TAC not exceeding recent catch levels	-	8.6		

¹Vb(EC), VI, XII and XIV. ²Division VIa only. ³Incomplete data. Weights in '000 t.

Historical development of the fishery: Until recently anglerfish was mainly taken as a by-catch in bottom trawl groundfish fisheries but a directed fishery has developed in recent years. Restrictive TACs for other species in Division VIa have led to increased fishing pressure on anglerfish in that area.

State of stock: When last assessed in 1994, the stock was considered to be fully exploited. The increased fishing effort and the rapid decline in catches of older fish may be indicative of heavy exploitation and/or a shift in exploitation pattern. Biology suggests that anglerfish are very vulnerable to high exploitation rates.

Management advice: Indications are that the exploitation of this stock is increasing rapidly and that the stock is being

affected accordingly. Current catches may not be sustainable, and fishing effort should be reduced.

Special comments: Two species of anglerfish are caught in Sub-area VI, *Lophius piscatorius* and *L. budegassa*, which are not distinguished in the landings. The majority of the landings are *L. piscatorius*.

Data and assessment: Length frequency and age composition data are only available for 1990–1993. Incomplete data were available for 1994 or 1995. No assessment carried out. There may be a misreporting problem, possibly due to a lack of catch restrictions on anglerfish in the adjacent North Sea.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).

3.7.8 Herring West of Scotland

3.7.8 a Herring in Division VIa (North)

Catch data (Table 3.7.8 a1):

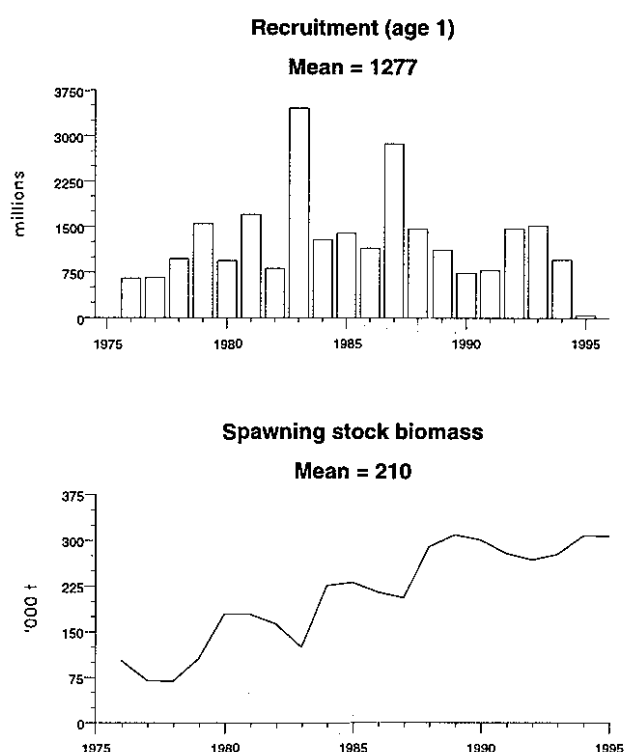
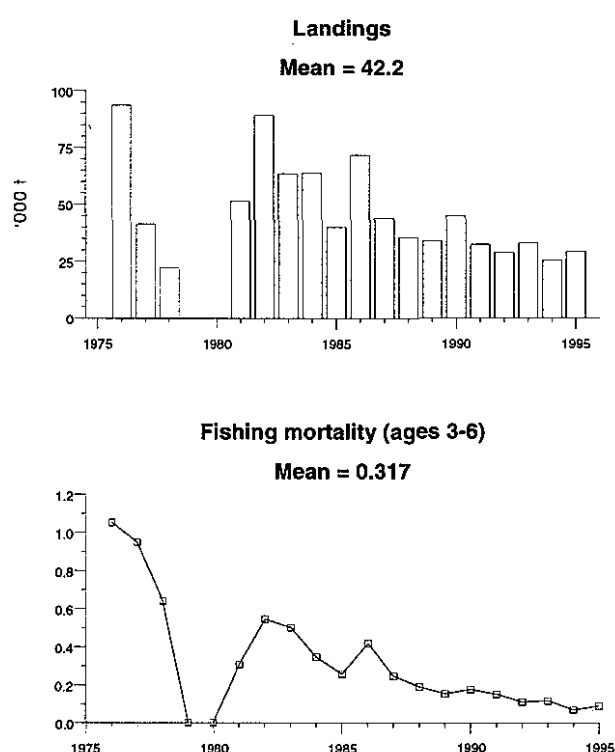
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Disc. slip.	ACFM catch ¹
1987	Reduce F to $F_{0.1}$ /status quo F	38-55	49.7		44
1988	TAC	46	49.8		36
1989	TAC	58	58	1.6	34
1990	TAC	61	75	1.3	45
1991	TAC	57	62	1.2	33
1992	TAC	62	62	0.2	29
1993	Catch at status quo F	54-58	62	0.8	33
1994	Catch at status quo F	50-60	62	0.7	25
1995	No specific advice	60 ²	77		29
1996	No advice because of misreporting	-	83.57		

¹Adjusted for misreporting. ²Catch at status quo F. Weights in '000 t.

Historical development of the fishery: Herring is fished in this area by several countries. Exploitation has decreased since the mid-1980s, with reported catches remaining approximately constant during a period of good recruitment. In recent years an increasing proportion of the officially reported catches is due to misreported landings from Division IVa into this area.

State of stock: The stock is considered to be within safe biological limits. The exact level of the stock is uncertain but it is lightly exploited.

Details in Table 3.7.8 a2.



Forecast for 1997: Basis $F(96) = F(95) = 0.09$. Recruitment in 1996, 1997 = 10 year geometric mean. Catch(96) = 28.4, SSB(96) = 327

Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	1.0F(95)	0.09	339	29.6	348

Weights in '000 t.

Medium-term considerations: The assessment has been based on catches adjusted for assumed misreported catches. At the present level of exploitation the stock is expected to remain within safe biological limits in the medium term (see figure on next page).

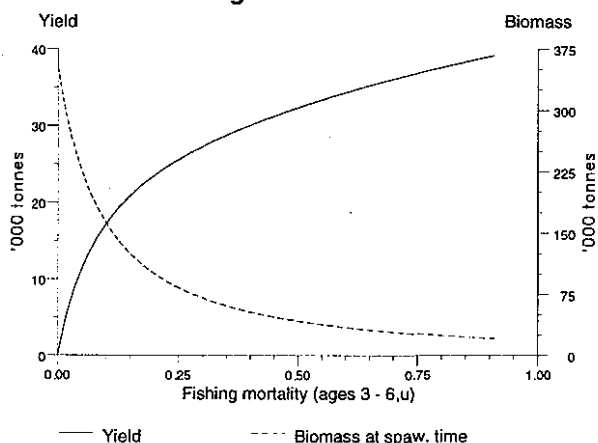
Management advice: ICES recommends a precautionary TAC based on the expected catch levels to discourage misreporting from other areas.

Data and assessment: Assessment based on estimated catches, acoustic survey and larval surveys. Misreporting is believed to be around 50% of reported catches. For this stock, age refers to number of winter-rings, which is one year less than the true age.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).

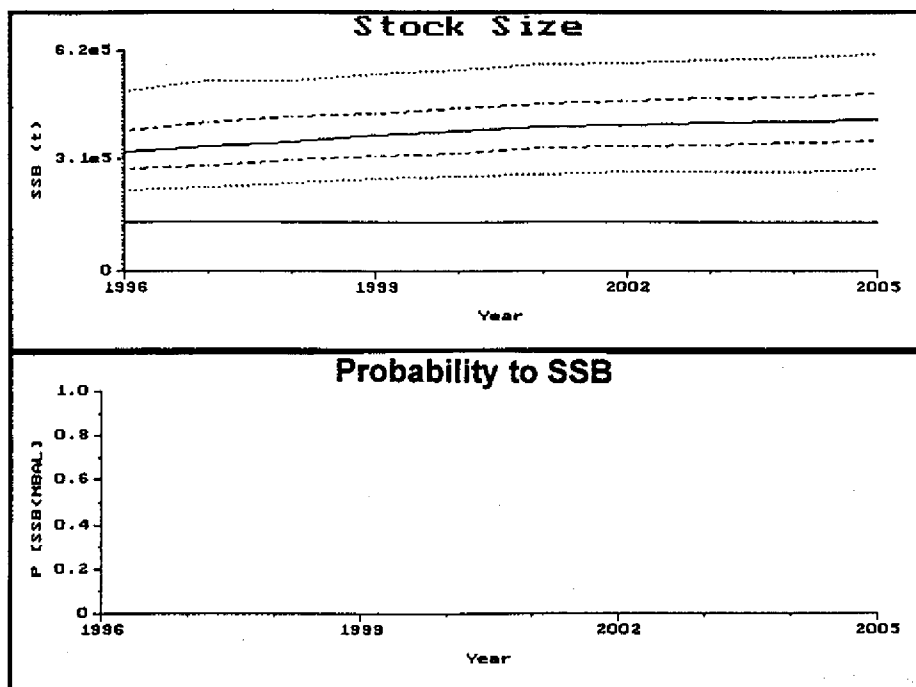
Yield and Spawning Stock Biomass

Long term forecast



Herring in Division VIa (N)

Summary results of medium-term projections assuming a fishing mortality from 1996-2005 constrained at the fishing mortality estimate for 1995 (0.09). **Upper panel:** Solid line, 50th percentile; dashed lines, 25th and 75 percentiles; dotted line, 5th and 95th percentiles; straight horizontal line, MBAL of 135,000 t. **Lower panel:** The probability that the stock may fall below MBAL (effectively zero in all years).



3.7.8 b Clyde herring (Division VIa)

Catch data (Table 3.7.8.b 1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Disc. slip.	ACFM catch
1987	Fishing at $F_{0.1}$	3.5	3.5	0.4	3.6
1988	TAC	3.2	3.2	0.2	1.9
1989	Stabilise catch at recent levels	2.9-3.4	3.2		2.3
1990	TAC	2.6	2.6		2.3
1991	TAC	2.9	2.9		0.7
1992	TAC	1.6	2.3		0.9
1993	Lowest possible level	-	1.0		0.9
1994	Lowest possible level	-	1.0		0.6
1995	Lowest possible level	-	1.0		0.4
1996	Lowest possible level	-	1.0		

Weights in '000 t.

Historical development of the fishery: There are two stock components present on the fishing grounds, resident spring-spawners and immigrant autumn-spawners. The spring-spawning stock supported a strong and locally-important fishery from 1955-1974 at catch levels ranging from 4,000 to 15,000 t. A TAC of 3,000 t was set in 1984 increasing to a maximum of 3,500 t in 1987 subsequently reducing to 1,000 t by 1993. Estimated catches, including discards, exceeded the TAC for the first four years. Since then catches have declined to below the TAC. Recent TACs have not been taken and there has not been great interest in fishing during the periods it has been permitted.

State of stock: In the absence of surveys, and no stock separation of catches, nothing is currently known about the state of the spring-spawning stock or the immigrant autumn-spawning component. There are no signs that the spring-spawning stock has returned to its former high levels. The fishing mortality level is not known.

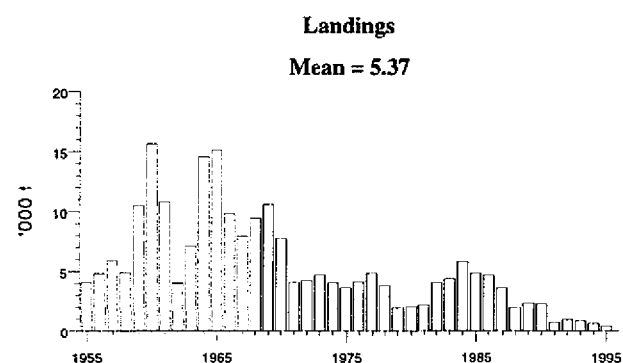
Management advice: ICES recommends that, until recruitment has improved, the fishery should be at the lowest possible level.

Special comments: When last assessed the SSB was at a very low level, and there is no new information that the situation has changed in recent years. ACFM therefore reiterates its advice of last year.

An assessment of the Clyde herring is complicated by the mixture of a severely depleted spring-spawning component and autumn-spawners from adjacent areas. Nothing is currently known about the proportions of these two components in the catches or in the stock. There are indications of improved recruitment of 2-ringers but it is not possible to determine whether this is generated by the spring or the autumn-spawning components.

Data and assessment: No assessment possible. Catch at age data are available but not separately by stock component. No independent survey data are available from recent years.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).



3.7.9 Norway pout in Division VIa

Catch data (Table 3.7.9.1):

Year	ICES advice	Off. Indgs.
1987	No advice	38.3
1988	No advice	6.7
1989	No advice	28.2
1990	No advice	3.3
1991	No advice	4.3
1992	No advice	5.2
1993	No advice	7.3
1994	No advice	14.1
1995	No advice	24.4
1996	No advice	

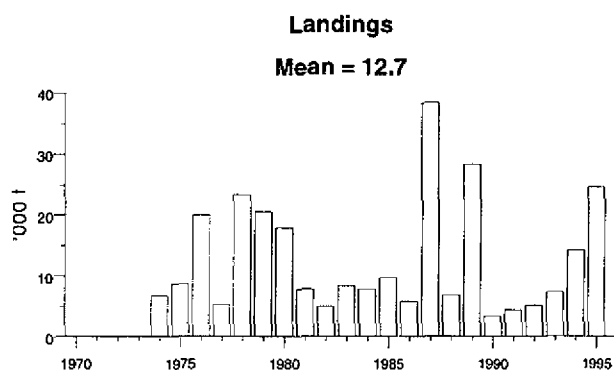
Weights in '000 t.

Historical development of the fishery: This is a small mesh trawl fishery operated by Danish, UK and Faroese vessels. Catches are highly variable.

State of stock: Not known.

Data and assessment: The only data available are official landings statistics. No assessment.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1996 (CM 1997/Assess:6).



3.7.10 Sandeel in Division VIa

Catch data (Table 3.7.10.1):

Year	ICES advice	Off. Indgs	ACFM catch
1987	No advice	14.5	14.5
1988	No advice	24.5	24.5
1989	No advice	18.8	18.8
1990	No advice	16.5	16.5
1991	No advice	8.5	8.5
1992	No advice	4.9	4.9
1993	No advice	6.2	6.2
1994	No advice	10.6	10.6
1995	No advice	7.1	7.1
1996	No advice		

Weights in '000 t.

Historical development of the fishery: The fishery started in 1980 and is operated predominantly by local Scottish vessels during the summer months. Effort has declined since 1989 and is currently at a very low level partially due to the lack of a local processing outlet. The fishery is managed with a multi-annual precautionary TAC of 12,000t and entry limited to licensed vessels.

State of stock: The stock appears to be within safe biological limits. SSB is at a high level and fishing mortality at a low level.

Special comment: A request from the UK government seeks advice on a precautionary TAC for sandeels in Division VIa

and the practicality of providing annual estimates of TACs based on the status of stocks in that year. There is already a precautionary TAC for this stock and the assessment provides no basis to change this. The assessment is subject to large annual revisions and is not adequate for the purposes of making forecasts on which to base analytical TACs.

The request for advice on sandeels from the Government of the United Kingdom is dealt with in Section 3.5.13.c.

Data and assessment: Catch-at-age and effort data available since 1983. The assessment is uncertain and only indicative of the broad trends in the stock.

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak October 1996 (CM 1997/Assess:6).

Details in Table 3.7.10.1.

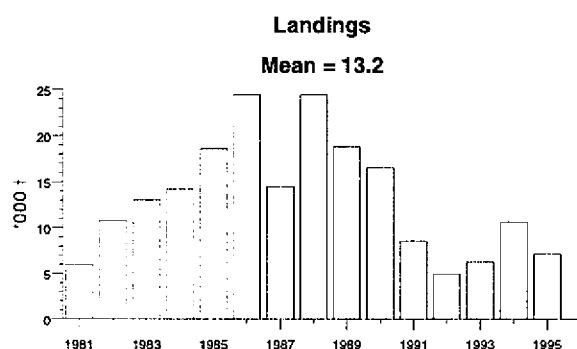


Table 3.1.2.a.1 North-East Arctic COD. Total catch (t) by fishing areas and unreported catch. (Data provided by Working Group members.)

Year	Sub-area I	Division IIa	Division IIb	Unreported catches	Total catch
1961	409,694	153,019	220,508		783,221
1962	548,621	139,848	220,797		909,266
1963	547,469	117,100	111,768		776,337
1964	206,883	104,698	126,114		437,695
1965	241,489	100,011	103,430		444,983
1966	292,253	134,805	56,653		483,711
1967	322,798	128,747	121,060		572,605
1968	642,452	162,472	269,254		1,074,084
1969	679,373	255,599	262,254		1,197,226
1970	603,855	243,835	85,556		933,246
1971	312,505	319,623	56,920		689,048
1972	197,015	335,257	32,982		565,254
1973	492,716	211,762	88,207		792,685
1974	723,489	124,214	254,730		1,102,433
1975	561,701	120,276	147,400		829,377
1976	526,685	237,245	103,533		867,463
1977	538,231	257,073	109,997		905,301
1978	418,265	263,157	17,293		698,715
1979	195,166	235,449	9,923		440,538
1980	168,671	199,313	12,450		380,434
1981	137,033	245,167	16,837		399,037
1982	96,576	236,125	31,029		363,730
1983	64,803	200,279	24,910		289,992
1984	54,317	197,573	25,761		277,651
1985	112,605	173,559	21,756		307,920
1986	157,631	202,688	69,794		430,113
1987	146,106	245,387	131,578		523,071
1988	166,649	209,930	58,360		434,939
1989	164,512	149,360	18,609		332,481
1990	62,272	99,465	25,263	25,000	212,000
1991	70,970	156,966	41,222	50,000	319,158
1992	124,219	172,792	86,483	130,000	513,494
1993	195,771	269,383	66,457	50,000	581,611
1994	353,425	306,417	86,244	25,000	771,086
1995 ¹	256,855	312,137	170,966		739,958

¹ Provisional figures.

Table 3.1.2.a.2 North-East Arctic COD. Nominal catch (t) by countries (Sub-area I and Divisions IIa and IIb combined). (Data provided by Working Group members.)

Year	Faroe Islands	France	German Dem. Rep.	Fed. Rep. Germany	Norway	Poland	United Kingdom	Russia ²	Others	Total all countries
1961	3,934	13,755	3,921	8,129	268,377	-	158,113	325,780	1,212	783,221
1962	3,109	20,482	1,532	6,503	225,615	-	175,020	476,760	245	909,266
1963	-	18,318	129	4,223	205,056	108	129,779	417,964	-	775,577
1964	-	8,634	297	3,202	149,878	-	94,549	180,550	585	437,695
1965	-	526	91	3,670	197,085	-	89,962	152,780	816	444,930
1966	-	2,967	228	4,284	203,792	-	103,012	169,300	121	483,704
1967	-	664	45	3,632	218,910	-	87,008	262,340	6	572,605
1968	-	-	225	1,073	255,611	-	140,387	676,758	-	1,074,084
1969	29,374	-	5,907	5,543	305,241	7,856	231,066	612,215	133	1,197,226
1970	26,265	44,245	12,413	9,451	377,606	5,153	181,481	276,632	-	933,246
1971	5,877	34,772	4,998	9,726	407,044	1,512	80,102	144,802	215	689,048
1972	1,393	8,915	1,300	3,405	394,181	892	58,382	96,653	166	565,287
1973	1,916	17,028	4,684	16,751	285,184	843	78,808	387,196	276	792,686
1974	5,717	46,028	4,860	78,507	287,276	9,898	90,894	540,801	38,453	1,102,434
1975	11,309	28,734	9,981	30,037	277,099	7,435	101,843	343,580	19,368	829,377
1976	11,511	20,941	8,946	24,369	344,502	6,986	89,061	343,057	18,090	867,463
1977	9,167	15,414	3,463	12,763	388,982	1,084	86,781	369,876	17,771	905,301
1978	9,092	9,394	3,029	5,434	363,088	566	35,449	267,138	5,525	698,715
1979	6,320	3,046	547	2,513	294,821	15	17,991	105,846	9,439	440,538
1980	9,981	1,705	233	1,921	232,242	3	10,366	115,194	8,789	380,434
Spain										
1981	12,825	3,106	298	2,228	277,818	14,500	5,262	83,000	-	399,037
1982	11,998	761	302	1,717	287,525	14,515	6,601	40,311	-	363,730
1983	11,106	126	473	1,243	234,000	14,229	5,840	22,975	-	289,992
1984	10,674	11	686	1,010	230,743	8,608	3,663	22,256	-	277,651
1985	13,418	23	1,019	4,395	211,065	7,846	3,335	62,489	4,330	307,920
1986	18,667	591	1,543	10,092	232,096	5,497	7,581	150,541	3,505	430,113
1987	15,036	1	986	7,035	268,004	16,223	10,957	202,314	2,515	523,071
1988	15,329	2,551	605	2,803	223,412	10,905	8,107	169,365	1,862	434,939
1989	15,625	3,231	326	3,291	158,684	7,802	7,656	134,593	1,273	332,481
1990	9,584	592	169	1,437	88,737	7,950	3,412	74,609	510	187,000
1991	8,981	975	Greenland	2,613	126,226	3,677	3,981	119,427 ³	3,278	269,158
1992	11,663	262	3,337	3,911	168,460	6,217	6,120	182,315	Iceland 1,209	383,494
1993	17,435	3,572	5,389	5,887	221,051	8,800	11,336	244,860	9,374 3,907	531,611
1994	22,826	1,962	6,882	8,283	318,395	14,929	15,579	291,925	36,737 28,568	746,086
1995 ¹	22,954	4,912	7,061	7,550	319,536	15,505	16,329	296,155	34,214 15,742	739,958

¹ Provisional figures.

² USSR prior to 1991.

³ Includes Baltic countries.

Table 3.1.2.a.3 Cod in the North-East Arctic (Fishing Areas I and II)

Year	Recruitment Age 3	Spawning Stock Biomass	Fishing Landings Mortality Age 5-10
1946	729.76	2,585.41	706.00 0.193
1947	419.95	1,805.12	882.02 0.313
1948	440.69	1,355.20	774.30 0.352
1949	466.66	1,153.49	800.12 0.370
1950	705.51	1,197.24	731.98 0.365
1951	1,085.89	1,271.43	827.18 0.398
1952	1,190.84	876.07	876.80 0.539
1953	1,592.01	760.08	695.55 0.360
1954	644.33	643.24	826.02 0.401
1955	272.94	708.24	1,147.84 0.550
1956	440.23	835.95	1,343.07 0.643
1957	805.06	771.02	792.56 0.506
1958	497.10	894.00	769.31 0.512
1959	684.73	731.96	744.61 0.560
1960	790.43	527.35	622.04 0.473
1961	918.95	462.19	783.22 0.623
1962	729.96	430.03	909.27 0.752
1963	473.30	291.64	776.34 0.970
1964	338.96	196.78	437.70 0.669
1965	778.09	190.41	444.93 0.539
1966	1,582.38	317.62	483.71 0.508
1967	1,292.66	400.39	572.61 0.526
1968	169.75	416.15	1,074.08 0.552
1969	111.97	409.27	1,197.23 0.809
1970	197.05	453.14	933.25 0.728
1971	404.98	756.08	689.05 0.588
1972	1,015.59	727.53	565.25 0.674
1973	1,818.30	446.44	792.69 0.594
1974	525.33	238.15	1,102.43 0.561
1975	622.07	191.53	829.38 0.620
1976	614.20	234.94	867.46 0.646
1977	347.74	309.70	905.30 0.835
1978	639.62	402.00	698.72 0.929
1979	198.96	245.00	440.54 0.718
1980	140.41	164.40	380.43 0.716
1981	158.19	167.68	399.04 0.805
1982	157.84	401.80	363.73 0.740
1983	168.72	320.60	289.99 0.738
1984	382.15	259.07	277.65 0.891
1985	495.95	201.41	307.92 0.798
1986	1,015.54	161.39	430.11 0.913
1987	272.17	143.15	523.07 1.011
1988	207.02	145.47	434.94 0.886
1989	162.15	167.51	332.48 0.695
1990	214.43	295.90	212.00 0.282
1991	450.18	648.84	319.16 0.327
1992	869.91	852.49	513.49 0.417
1993	1,283.49	747.59	581.61 0.505
1994	924.44	624.50	771.09 0.674
1995	717.71	570.22	739.96 0.577
Average	623.33	582.14	678.38 0.607
Unit	Millions	1000 tonnes	1000 tonnes -

Table 3.1.2.b.1 Landings of Coastal cod in:

A) Norway in Division IIa -areas 00, 05, 06 and 07 (in '000 tonnes).

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
43	32	30	40	46	24	29	33	47	52
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
49	*)	*)	*)	*)	*)	*)	*)	*)	*)
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
40	49	42	38	33	28	26	31	22	17
1990	1991	1992	1993	1994	1995	*) No data			
24	25	35	44	48**)	40**)	**) Provisional data			

B) Russian/USSR data in Division I (in '000 tonnes).

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
71	108	114	127	63	52	73	79	118	122
1970	1971	1972	1973	1974					
70	48	23	122	99					

Table 3.1.3.1 North-East Arctic HADDOCK. Total nominal catch (t)
by fishing areas. (Data provided by Working
Group members)

Year	Sub-area I	Division IIa	Division IIb	Total
1960	125,657	27,925	1,854	155,434
1961	165,165	25,642	2,427	193,234
1962	160,972	25,189	1,727	187,888
1963	124,774	21,031	939	146,744
1964	79,056	18,735	1,109	98,900
1965	98,505	18,640	939	118,079
1966	124,115	34,892	1,614	160,621
1967	108,066	27,980	440	136,486
1968	140,970	40,031	725	181,726
1969	88,960	40,208	1,341	130,509
1970	59,493	26,611	497	86,601
1971	56,300	21,567	435	78,302
1972	221,183	41,979	2,155	265,317
1973	283,728	23,348	2,989	320,065
1974	159,037	47,033	5,068	221,138
1975	121,686	44,330	9,726	175,742
1976	94,065	37,566	5,649	137,279
1977	72,159	28,452	9,547	110,158
1978	63,965	30,478	979	95,422
1979	63,841	39,167	615	103,623
1980	54,205	33,616	68	87,889
1981	36,834	39,864	455	77,153
1982	17,948	29,005	2	46,955
1983	7,550	13,872	185	21,607
1984	4,000	13,247	71	17,318
1985	30,385	10,774	111	41,270
1986	69,865	26,006	714	96,585
1987	109,429	38,182	3,048	150,659
1988	43,990	47,086	668	91,744
1989	31,265	23,502	355	55,122
1990	15,138	10,375	304	25,817
1991	18,772	14,417	416	33,605
1992	30,746	22,177	964	53,887
1993	47,658	26,761	3,037	77,355
1994	70,773	43,707	6,885	121,365
1995 ¹	70,251	53,999	14,073	138,323

¹ Provisional figures.

Table 3.1.3.2 North-East Arctic HADDOCK. Nominal catch (t) by countries

Sub-area I and Divisions IIa and IIb combined. (Data provided by Working Group members)

Year	Faroe Islands	France	German Dem. Rep.	Fed. Rep. Germany	Norway	Poland	United Kingdom	Russia ²	Others	Total
1960	172	-	-	5,597	46,263	-	45,469	57,025	125	155,651
1961	285	220	-	6,304	60,862	-	39,650	85,345	558	193,234
1962	83	409	-	2,895	54,567	-	37,486	91,910	58	187,438
1963	17	363	-	2,554	59,955	-	19,809	63,526	-	146,224
1964	-	208	-	1,482	38,695	-	14,653	43,870	250	99,158
1965	-	226	-	1,568	60,447	-	14,345	41,750	242	118,578
1966	-	1,072	11	2,098	82,090	-	27,723	48,710	74	161,778
1967	-	1,208	3	1,705	51,954	-	24,158	57,346	23	136,397
1968	-	-	-	1,867	64,076	-	40,129	75,654	-	181,726
1969	2	-	309	1,490	67,549	-	37,234	24,211	25	130,820
1970	541	-	656	2,119	37,716	-	20,423	26,802	-	87,257
1971	81	-	16	896	45,715	43	16,373	15,778	3	78,905
1972	137	-	829	1,433	46,700	1,433	17,166	196,224	2,231	266,153
1973	1,212	3,214	22	9,534	86,767	34	32,408	186,534	2,501	322,626
1974	925	3,601	454	23,409	66,164	3,045	37,663	78,548	7,348	221,157
1975	299	5,191	437	15,930	55,966	1,080	28,677	65,015	3,163	175,758
1976	536	4,459	348	16,660	49,492	986	16,940	42,485	5,358	137,265
1977	213	1,510	144	4,798	40,118	-	10,878	52,210	287	110,158
1978	466	1,411	369	1,521	39,955	1	5,766	45,895	38	95,422
1979	343	1,198	10	1,948	66,849	2	6,454	26,365	454	103,623
1980	497	226	15	1,365	61,886	-	2,948	20,706	246	87,889
1981	381	414	22	2,398	58,856	Spain	1,682	13,400	-	77,153
1982	496	53	-	1,258	41,421	-	827	2,900	-	46,955
1983	428	-	1	729	19,371	139	259	680	-	21,607
1984	297	15	4	400	15,186	37	276	1,103	-	17,318
1985	424	21	20	395	17,490	77	153	22,690	-	41,270
1986	893	33	75	1,079	48,314	22	431	45,738	-	96,585
1987	464	26	83	3,106	69,333	99	563	76,980	-	150,654
1988	1,113	116	78	1,324	57,273	72	435	31,293	41	91,745
1989	1,218	125	26	171	31,825	1	853	20,903	-	55,122
1990	875	-	5	128	17,634	-	569	6,605	-	25,816
1991	1,117	60	Greenland	219	19,285	-	514	12,388	22	33,605
1992	1,093	151	1,719	387	30,203	38	596	19,699	1	53,887
1993	546	1,215	880	1,165	36,590	76	1,794	34,700	654	77,619
1994	2,761	678	770	2,412	64,688	22	4,339	44,484	1,211	121,365
1995 ¹	2,833	598	1,097	2,663	72,773	14	2,560	54,536	1,269	138,323

¹ Provisional figures.² USSR prior to 1991.

Table 3.1.3.3 HADDOCK in the North-East Arctic (Fishing Areas I and II).

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-7
1950	66.39	139.64	131.73	0.835
1951	552.72	110.18	120.06	0.627
1952	62.34	64.04	127.66	0.733
1953	1,030.21	80.68	123.45	0.533
1954	122.54	122.37	156.45	0.387
1955	52.29	176.68	202.75	0.516
1956	169.09	236.73	213.28	0.443
1957	53.25	195.31	122.71	0.445
1958	68.98	154.84	112.67	0.533
1959	324.53	133.34	88.18	0.394
1960	242.53	128.20	155.45	0.499
1961	109.13	135.53	193.23	0.649
1962	240.73	122.89	187.89	0.825
1963	274.82	91.06	146.74	0.888
1964	320.33	62.71	98.90	0.654
1965	100.30	91.42	118.08	0.509
1966	240.26	126.20	160.62	0.620
1967	290.55	160.74	136.49	0.432
1968	19.92	180.29	181.73	0.518
1969	17.20	176.94	130.51	0.405
1970	163.91	157.66	86.60	0.357
1971	95.48	177.92	78.30	0.255
1972	1,017.75	141.91	265.32	0.705
1973	269.62	122.91	320.07	0.580
1974	53.68	191.86	221.14	0.495
1975	48.51	233.83	175.74	0.512
1976	55.68	189.25	137.28	0.692
1977	113.81	131.88	110.16	0.840
1978	170.04	100.33	95.42	0.667
1979	134.05	81.12	103.62	0.739
1980	18.88	68.10	87.89	0.561
1981	5.65	122.30	77.15	0.615
1982	7.95	97.00	46.96	0.507
1983	4.75	61.85	21.61	0.422
1984	9.21	36.93	17.66	0.333
1985	260.74	32.59	41.27	0.436
1986	524.83	47.35	96.59	0.483
1987	85.40	32.29	150.66	0.533
1988	42.21	53.82	91.74	0.491
1989	16.36	65.77	55.12	0.379
1990	23.17	68.99	25.82	0.175
1991	81.54	82.91	33.61	0.254
1992	264.15	101.05	53.89	0.323
1993	955.30	149.60	77.36	0.420
1994	350.30	82.97	121.37	0.567
1995	104.36	157.64	138.32	0.333
Average	200.77	119.12	122.59	0.524
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.1.4.1 North-East Arctic SAITHE. Nominal catch (t) by countries (Sub-area I and Divisions IIa and IIb combined) as officially reported to ICES.

Year	Faroe Islands	France	Germany Dem. Rep.	Germany Fed. Rep.	Norway	Poland	Portugal	Russia ³	Spain	UK (England & Wales)	UK (Scotland)	Others ⁵	Total
1960	23	1,700	-	25,948	96,050	-	-	-	-	9,780	-	14	133,515
1961	61	3,625	-	19,757	77,875	-	-	-	-	4,595	20	18	105,951
1962	2	544	-	12,651	101,895	-	-	912	-	4,699	-	4	120,707
1963	-	1,110	-	8,108	135,297	-	-	-	-	4,112	-	-	148,627
1964	-	1,525	-	4,420	184,700	-	-	84	-	6,511	-	186	197,506
1965	-	1,618	-	11,387	165,531	-	-	137	-	6,741	5	181	185,600
1966	-	2,987	813	11,269	175,037	-	-	563	-	13,078	-	41	203,788
1967	-	9,472	304	11,822	150,860	-	-	441	-	8,379	-	48	181,326
1968	-	-	70	4,753	96,641	-	-	-	-	8,781	2	-	110,246
1969	20	193	6,744	4,355	115,140	-	-	-	-	13,585	-	23	140,033
1970	1,097	-	29,362	23,466	151,759	-	-	43,550	-	15,469	221	-	264,924
1971	215	14,536	16,840	12,204	128,499	6,017	-	39,397	13097	10,361	106	-	241,272
1972	109	14,519	7,474	24,595	143,775	1,111	-	1,278	13125	8,223	125	-	210,456
1973	7	11,320	12,015	30,338	148,789	23	-	2,411	2115	6,593	248	-	213,769
1974	46	7,119	29,466	33,155	152,699	2,521	-	38,931	7075	3,001	103	5	264,121
1975	28	3,156	28,517	41,260	122,598	3,860	6,430	13,389	11397	2,623	140	55	233,453
1976	20	5,609	10,266	49,056	131,675	3,164	7,233	9,013	21661	4,651	73	47	242,486
1977	270	5,658	7,164	19,985	139,705	1	783	989	1327	6,853	82	-	182,817
1978	809	4,345	6,484	18,190	121,069	35	203	381	121	2,790	37	-	154,464
1979	1,117	2,601	2,435	14,823	141,346	-	-	3	685	1,170	-	-	164,180
1980	532	1,016	-	12,511	128,878	-	-	43	780	794	-	-	144,554
1981	236	194	-	8,431	166,139	-	-	121	-	395	-	-	175,498
1982	339	82	-	7,224	159,643	-	-	14	-	731	1	-	168,034
1983	539	418	-	4,933	149,556	-	-	206	33	1,251	-	-	156,936
1984	503	431	6	4,532	152,818	-	-	161	-	335	-	-	158,786
1985	490	657	11	1,873	103,899	-	-	51	-	202	-	-	107,147
1986	426	308	-	3,470	66,152	-	-	27	-	54	21	-	67,396
1987	712	576	-	4,909	85,710	-	-	426	-	54	3	1	92,391
1988	441	411	-	4,574	108,244	-	-	130	-	436	6	-	114,242
1989	388	460 ²	-	606	119,625	-	-	506	-	702	23	-	122,310
1990	1,207	340 ²	-	1,143	92,397	-	-	52	-	681	28	-	95,848
1991	963	77 ²	Greenland	2,003	103,283	-	-	504 ⁴	-	449	42	5	107,326
1992	165	1,890 ²	734	3,451	119,765	-	-	964	6	516	25	-	127,606
1993	31	566 ²	78	3,687	139,288	-	1	9,509	4	408	7	5	153,584
1994 ¹	67	151 ²	15	1,863	137,298	-	1	1,640	655	548	9	6	142,253
1995 ¹	172 ²	222 ²	53	872	166,205	-	4	1,144	-	589	99	18	169,378

¹ Provisional figures.

² As reported to Norwegian authorities.

³ USSR prior to 1991.

⁴ Includes Estonia.

⁵ Includes Denmark, Netherlands, Iceland, Ireland and Sweden

Table 3.1.4.2 Saithe in the North-East Arctic (Fishing Areas I and II)

Year	Recruitment Age 2	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1966	241.05	562.88	201.86	0.277
1967	191.59	580.58	191.19	0.275
1968	367.54	612.64	107.18	0.161
1969	347.04	529.71	140.38	0.212
1970	379.36	621.20	260.40	0.330
1971	219.29	509.96	244.73	0.368
1972	277.41	477.41	210.51	0.423
1973	117.02	468.44	215.66	0.439
1974	206.04	448.85	262.30	0.633
1975	373.26	369.55	233.45	0.470
1976	304.51	247.10	242.49	0.688
1977	178.69	165.66	182.81	0.589
1978	283.62	171.55	154.47	0.547
1979	167.66	158.39	164.23	0.526
1980	356.57	141.71	154.38	0.558
1981	152.90	139.37	175.52	0.557
1982	140.09	121.72	170.90	0.628
1983	118.72	162.84	155.41	0.533
1984	137.82	148.66	158.80	0.739
1985	270.30	120.89	107.15	0.560
1986	203.21	89.63	70.46	0.403
1987	101.61	90.40	91.68	0.351
1988	77.03	125.57	114.51	0.415
1989	87.10	138.67	122.66	0.575
1990	278.77	120.58	95.39	0.500
1991	419.95	105.71	107.33	0.460
1992	311.66	100.31	127.61	0.483
1993	219.08	113.85	153.58	0.429
1994	127.90	176.96	142.25	0.440
1995	210.00	210.25	169.38	0.492
Average	228.89	267.70	164.29	0.469
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.1.5.1 REDFISH in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I, Divisions IIa and IIb combined as officially reported to ICES.

Year	Canada	Denmark	Faroe Islands	France	Germany ⁴	Green-land	Iceland	Ireland	Nether-lands	Norway	Portugal	Russia ⁵	Spain	UK (E & W)	UK (Scotland)	Total
1984	-	-	-	2,970	7,457	-	-	-	-	18,650	1,806	69,689	25	716	-	101,313
1985	-	-	-	3,326	6,566	-	-	-	-	20,456	2,056	59,943	38	167	-	92,552
1986	-	-	29	2,719	4,884	-	-	-	-	23,255	1,591	20,694	-	129	14	53,315
1987	-	+	450 ³	1,611	5,829	-	-	-	-	18,051	1,175	7,215	25	230	9	34,595
1988	-	-	973	3,349	2,355	-	-	-	-	24,662	500	9,139	26	468	2	41,494
1989	-	-	338	1,849 ¹	4,245	-	-	-	-	25,295	340	14,344	5 ²	259	13	46,716
1990	-	37 ³	386	1,821 ¹	6,741	-	-	-	-	34,090	830	18,918	-	332	1	63,161
1991	-	23	639	804 ¹	981	-	-	-	-	49,463	166	15,354	1	285	64	67,780
1992	-	9	58	1,301 ¹	530	614	-	-	-	23,451	977	4,335	16	447	34	31,777
1993	8 ³	4	152	956 ¹	685	15	-	-	-	17,755	1,040	7,573	65	733	1	28,987
1994 ¹	-	28	26	721 ³	1026	6	4	3	-	19,783	985	6,220	34	259	13	28,387
1995 ¹	-	-	30	651 ³	630 ²	6 ²	1	5	1	15,620	936	6,985	67	252	13	24,610

¹ Provisional figures.² Working Group figure.³ As reported to Norwegian authorities.⁴ Includes former GDR prior to 1991.⁵ USSR prior to 1991.

Table 3.1.5.a.1 *Sebastes mentella* in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I and Divisions IIa and IIb combined.

Year	Canada	Den- mark	Faroe Islands	France	Ger- many ³	Green- land	Ireland	Norway	Portugal	Russia ⁴	Spain	UK England and Wales	UK Scotland	Total
1986	-	-	-	-	1,252	-	-	1,274	1,273	17,815	-	84	-	23,112 ²
1987	-	-	200	63	1,321	-	-	1,488	1,175	6,196	25	49	1	10,518
1988	-	-	-	-	-	-	-	-	-	-	-	-	-	15,586
1989	-	-	335	1,093	3,833	-	-	4,633	340	13,080	5	166	9	23,494
1990	-	-	108	142	6,354	36	-	10,173	830	17,355	-	72	-	35,070
1991	-	-	487	85	-	23	-	33,592	166	14,302	1	57	17	48,730
1992	-	-	23	12	-	-	-	10,751	972	3,577	14	222	16	15,587
1993 ¹	8	4	13	50	35	1	-	4,787	963	6,260	57	293	-	12,471
1994 ¹	-	28	4	74	18	1	3	6,029	895	5,021	30	124	12	12,239
1995 ¹	-	-	3	16	153	2	4	2,744	927	6,364	67	93	4	10,359

¹ Provisional figures.

² Including 1,414 tonnes in Division IIb not split on countries.

³ Includes former GDR prior to 1991.

⁴ USSR prior to 1991.

Table 3.1.5.a.2 *Sebastes mentella* in Sub-areas I and II. Nominal catch (t) by countries in Sub-area 1.

Year	Faroe Islands	Germany ⁴	Norway	Russia ⁵	UK England & Wales	UK Scotland	Total
1986 ³	-	-	1,274	911	-	-	2,185
1987 ³	-	2	1,166	234	3	-	1,405
1988	No species specific data presently available						
1989	13	-	60	484	8 ²	1 ²	566
1990	2	-	-	100	-	-	102
1991	-	-	8	420	-	-	428
1992	-	-	561	408	-	-	969
1993 ¹	2 ²	-	23	588	-	-	613
1994 ¹	2 ²	2	37	308	-	-	349
1995 ¹	2 ²	-	22	203	-	-	227

¹ Provisional figures.

² Split on species according to reports to Norwegian authorities.

³ Based on preliminary estimates of species breakdown by area.

⁴ Includes former GDR prior to 1991.

⁵ USSR prior to 1991.

Table 3.1.5.a.3 *Sebastes mentella* in Sub-areas I and II. Nominal catch (t) by countries in Division IIa.

Year	Faroe Islands	France	Germany ⁴	Greenland	Ireland	Norway	Portugal	Russia ⁵	Spain	UK England & Wales	UK Scotland	Total
1986 ³	-	-	1,252	-	-	-	1,273	16,904	-	84	-	19,513
1987 ³	200	63	970	-	-	149	1,156	4,469	-	34	1	7,042
1988	No species specific data presently available											
1989	312 ²	1,065 ²	3,200	-	-	4,573	251	9,749	-	151 ²	6 ²	19,307
1990	98 ²	137 ²	1,673	-	-	8,842	824	6,492	-	9	-	18,075
1991	487 ²	72 ²	-	-	-	32,810	159 ²	7,596	-	19 ²	4 ²	41,147
1992	23 ²	7 ²	-	-	-	9,816	824 ²	1,096	-	25 ²	-	11,791
1993 ¹	11 ²	15 ²	35	1 ²	-	4,720	648 ²	5,328	-	2 ²	-	10,760
1994 ¹	2 ²	33 ²	16 ²	1 ²	2 ²	5,629	687 ²	4,692	8 ²	4 ²	-	11,074
1995 ¹	1 ²	163 ²	153 ²	2 ²	2 ²	2,332	715 ²	5,916	65 ²	41 ²	2 ²	9,245

¹ Provisional figures.

² Split on species according to reports to Norwegian authorities.

³ Based on preliminary estimates of species breakdown by area.

⁴ Includes former GDR prior to 1991.

⁵ USSR prior to 1991.

Table 3.1.5.a.4 *Sebastes mentella* in Sub-areas I and II. Nominal catch (t) by countries in Division IIb.

Year	Canada	Den- mark	Faroe Islands	France	Ger- many ⁵	Green- land	Ireland	Norway	Portugal	Russia ⁶	Spain	UK England and Wales	UK Scotland	Total
1986 ⁴	-	-	-	-	349	-	-	-	19	1,493	25	12	-	1,414
1987 ⁴	-	-	-	-	-	-	-	173	-	-	-	-	-	2,071
1988	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	10	28	633	-	-	-	89	2,847	5	7 ²	2 ²	3,621
1990	-	-	8 ²	5 ²	4,681	36 ²	-	1,331	6	10,763	-	63 ²	-	16,893
1991	-	-	-	13 ²	-	23	-	774	7	6,286	1	38 ²	13 ²	7,155
1992	-	-	-	5 ²	-	-	-	374	148 ²	2,073	14	197 ²	16 ²	2,827
1993 ¹	8 ²	4 ²	-	35 ²	-	-	-	44	315 ²	344	57 ³	291 ²	-	1,098
1994 ¹	-	28 ²	-	41 ²	-	-	1 ²	363	208 ²	21	22 ³	120 ²	12 ²	816
1995 ¹	-	-	-	-	-	-	2 ²	390	212 ²	227	2 ³	52 ²	2 ²	887

¹ Provisional figures.

² Split on species according to reports to Norwegian authorities.

³ Split on species according to the 1992 catches.

⁴ Based on preliminary estimates of species breakdown by area.

⁵ Includes former GDR prior to 1991.

⁶ USSR prior to 1991.

Table 3.1.5.a.5 *Sebastes mentella* in the North-East Arctic (Fishing Areas I & II).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 10-16
1965	156.70	551.84	15.66	0.018
1966	151.25	538.72	10.14	0.013
1967	164.48	992.29	6.24	0.005
1968	235.47	551.81	5.41	0.008
1969	356.31	608.93	6.84	0.010
1970	591.42	394.41	22.92	0.047
1971	594.21	408.66	45.06	0.077
1972	533.66	258.49	28.86	0.064
1973	434.54	251.83	38.38	0.068
1974	424.38	279.92	69.37	0.127
1975	498.97	323.08	239.07	0.441
1976	575.46	296.18	269.02	0.648
1977	574.15	219.30	146.37	0.565
1978	406.25	153.50	92.61	0.270
1979	277.81	180.24	87.15	0.277
1980	187.96	168.97	79.35	0.303
1981	113.71	175.47	81.55	0.308
1982	93.01	190.18	115.38	0.459
1983	104.77	150.97	105.27	0.784
1984	97.93	96.00	72.93	0.900
1985	83.77	67.53	63.07	0.679
1986	92.64	57.14	23.11	0.286
1987	95.16	52.41	10.52	0.121
1988	176.90	59.39	15.59	0.194
1989	124.66	67.33	23.49	0.199
1990	78.26	80.58	35.07	0.240
1991	54.31	73.21	48.73	0.299
1992	61.15	58.65	15.59	0.121
1993	89.88	90.65	12.47	0.096
1994	192.40	79.26	12.24	0.100
1995	110.38	72.44	10.36	0.076
Average	249.42	243.53	58.32	0.252
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.1.5.b.1 *Sebastes marinus* in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I and Divisions IIa and IIb combined.

Year	Faroe Islands	France	Germany ²	Greenland	Iceland	Ireland	Netherlands	Norway	Portugal	Russia ³	Spain	UK England & Wales	UK Scotland	Total
1986	29	2,719	3,369	-	-	-	-	21,680	-	2,350	-	42	14	30,203
1987	250	1,553	4,508	-	-	-	-	16,728	-	850	-	181	7	24,077
1988								No specific data presently available on countries						25,908
1989	3	784	412	-	-	-	-	20,662	-	1,264	-	93	4	23,222
1990	278	1,684	387	1	-	-	-	23,917	-	1,549	-	260	15	28,091
1991	152	719	981	-	-	-	-	15,872	-	1,052	-	228	47	19,051
1992	35	1,294	530	623	-	-	-	12,700	5	758	2	225	18	16,190
1993 ¹	139	906	650	14	-	-	-	12,968	77	1,313	8	440	1	16,516
1994 ¹	22	647	1,008	5	4	-	-	13,935	90	1,199	4	135	1	17,050
1995 ¹	27	635	477	4	1	1	1	12,923	9	639	-	159	9	14,885

¹ Provisional figures.² Includes former GDR prior to 1991.³ USSR prior to 1991.

Table 3.1.5.b.2 *Sebastes marinus* in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I.

Year	Faroe Islands	Germany ⁴	Iceland	Norway	Russia ⁵	UK England & Wales	UK Scotland	Total
1986 ³	-	50	-	2,972	155	32	3	3,212
1987 ³	-	8	-	2,013	50	11	-	2,082
1988	No species specific data presently available							
1989	-	-	-	1,763	110	4 ²	1 ²	1,878
1990	5	-	-	1,263	14	-	-	1,282
1991	-	-	-	1,993	92	-	-	2,085
1992	-	-	-	2,162	174	-	-	2,336
1993 ¹	24 ²	-	-	1,745	330	-	-	2,099
1994 ¹	12 ²	72	4	1,652	109	-	-	1,849
1995 ¹	19 ²	-	1	2,257	201	1	-	2,479

¹ Provisional figures.

² Split on species according to reports to Norwegian authorities.

³ Based on preliminary estimates of species breakdown by area.

⁴ Includes former GDR prior to 1991.

⁵ USSR prior to 1991.

Table 3.1.5.b.3 *Sebastes marinus* in Sub-areas I and II. Nominal catch (t) by countries in Division IIa.

Year	Faroe Islands	France	Germany ⁴	Greenland	Ireland	Netherlands	Norway	Portugal	Russia ⁵	UK England & Wales	UK Scotland	Total
1986 ³	29	2,719	3,319	-	-	-	18,708	-	2,195	10	11	26,991
1987 ³	250	1,553	2,967	-	-	-	14,715	-	800	170	7	20,462
1988						No species specific data presently available						
1989	3 ²	784 ²	412	-	-	-	18,833	-	912	89 ²	3 ²	21,036
1990	273	1,684	387	-	-	-	22,444	-	392	260	1	25,441
1991	152 ²	719 ²	678	-	-	-	13,835	-	534	228 ²	47 ²	16,193
1992	35 ²	1,294 ²	211	614	-	-	10,536	-	404	192 ²	18 ²	13,304
1993 ¹	115 ²	906 ²	473	14 ²	-	-	11,223	77 ²	940	430 ²	1 ²	14,179
1994 ¹	10 ²	647 ²	654 ²	5 ²	-	-	12,265	90 ²	1,030	129 ²	-	14,830
1995 ¹	8 ²	635 ²	289 ²	4 ²	1 ²	1	10,533	2 ²	405	158 ²	9 ²	12,045

¹ Provisional figures.² Split on species according to reports to Norwegian authorities.³ Based on preliminary estimates of species breakdown by area.⁴ Includes former GDR prior to 1991.⁵ USSR prior to 1991.

Table 3.1.5.b.4 *Sebastes marinus* in Sub-areas I and II. Nominal catch (t) by countries in Division IIb.

Year	Germany ⁵	Greenland	Norway	Portugal	Russia ⁶	Spain	UK England & Wales	UK Scotland	Total
1986									+
1987 ⁴	1,533	-	-	-	-	-	-	-	1,533
1988			No species specific data presently available						
1989	-	-	66	-	242	-	-	-	308
1990	-	1 ²	210	-	1,157	-	-	-	1,368
1991	303	-	44	-	426	-	-	-	773
1992	319	9 ²	2	5 ²	180	2	33 ²	-	550
1993 ¹	177	-	-	-	43	8 ³	10 ²	-	238
1994 ¹	282	-	18	-	60	4 ³	6 ²	1 ²	371
1994 ¹	188	-	133	7	33	-	-	-	361

¹ Provisional figures.² Split on species according to reports to Norwegian authorities.³ Split on species according to the 1992 catches.⁴ Based on preliminary estimates of species breakdown by area.⁵ Includes former GDR prior to 1991.⁶ USSR prior to 1991.

Table 3.1.5.b.5 *Sebastes marinus*
in the North-East Arctic
(Fishing Areas I & II)

Year	Landings
1965	24,313
1966	25,632
1967	17,734
1968	13,348
1969	24,071
1970	12,817
1971	13,816
1972	17,730
1973	21,436
1974	27,272
1975	39,125
1976	48,584
1977	39,509
1978	31,741
1979	26,475
1980	23,411
1981	20,826
1982	16,366
1983	19,260
1984	28,379
1985	29,484
1986	30,203
1987	24,077
1988	25,908
1989	23,222
1990	28,091
1991	19,051
1992	16,190
1993	16,516
1994	17,050
1995	14,885
Average	23,759
Unit	tonnes

Table 3.1.6.1 GREENLAND HALIBUT in Sub-areas I and II. Nominal catch (t) by countries (Subarea I, Divisions IIa and IIb combined) as officially reported to ICES.

Year	Denmark	Estonia	Faroe Islands	France	Fed. Rep. Germany	Greenland	Iceland	Ireland	Lithuania	Norway	Portugal	Russia ⁴	Spain	UK (England & Wales)	UK (Scotland)	Total
1984	-	-	-	138	2,165	-	-	-	-	4,376	-	15,181	-	23	-	21,883
1985	-	-	-	239	4,000	-	-	-	-	5,464	-	10,237	-	5	-	19,945
1986	-	-	42	13	2,178	-	-	-	-	7,890	-	12,200	-	10	2	22,875
1987	+	-	-	13	2,024	-	-	-	-	7,261	-	9,733	-	61	20	19,112
1988	-	-	186	67	744	-	-	-	-	9,076	-	9,430	-	82	2	19,587
1989	-	-	67	31	600	-	-	-	-	10,622	-	8,812	-	6	-	20,138
1990	-	-	163	49	954	-	-	-	-	17,243	-	4,764	2	10	-	23,183
1991	11	2,564	314	119	101	-	-	-	-	27,587	-	2,490	2	+	2	33,320
1992	-	-	16	111	13	13	-	-	-	8,313	31	718	23	7	3	9,253
1993	2 ²	-	61	40	22	8	56	-	-	10,366	43	1,235	-	16	-	11,879
1994	4	-	86	27	217	3	15	5	4	8,322	36	283	2	76	2	9,151
1995 ¹	-	-	12	-	34	12	25	2	-	9,192	84	788	2	115	7	11,028

¹ Provisional figures.

² Working Group figure.

³ As reported to Norwegian authorities.

⁴ USSR prior to 1991.

TABLE 3.1.6.2 GREENLAND HALIBUT in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I as officially reported to ICES.

Year	Estonia	Faroe Islands	Fed. Rep. Germany	Iceland	Norway	Russia ³	Spain	UK (England & Wales)	UK (Scotland)	Total
1984	-	-	-	-	593	81	-	17	-	691
1985	-	-	-	-	602	122	-	1	-	725
1986	-	-	1	-	557	615	-	5	1	1,179
1987	-	-	2	-	984	259	-	10	+	1,255
1988	-	9	4	-	978	420	-	7	-	1,418
1989	-	-	-	-	322 ²	482	-	+	-	804
1990	-	7	-	-	312 ²	321 ²	-	-	-	640
1991	164	-	-	-	2,033 ²	522 ²	-	-	-	2,719
1992	-	-	+	-	2,282 ²	467	-	-	-	2,749
1993	-	32	-	56	1,691 ²	867	-	-	-	2,646
1994	-	17	217	15	1,157 ²	175	-	+	-	1,581
1995 ¹	-	12	- ¹	25	1,316 ²	264 ²	57	-	-	1,674

¹ Provisional figures.

² Working Group figures.

³ USSR prior to 1991.

Table 3.1.6.3 GREENLAND HALIBUT in Sub areas I and II. Nominal catch (t) by countries in Division IIa as officially reported to ICES.

Year	Estonia	Faroe Islands	France	Fed. Rep. Germany	Greenland	Ireland	Norway	Portugal	Russia ⁵	UK (England & Wales)	UK (Scotland)	Total
1984	-	-	138	265	-	-	3,703	-	5,459	1	-	9,566
1985	-	-	239	254	-	-	4,791	-	6,894	2	-	12,180
1986	-	6	13	97	-	-	6,389	-	5,553	5	1	12,064
1987	-	-	13	75	-	-	5,705	-	4,739	44	10	10,586
1988	-	177	67	150	-	-	7,859	-	4,002	56	2	12,313
1989	-	67	31	104	-	-	6,933 ²	-	4,964	6	-	12,105
1990	-	133	49	12	-	-	8,224 ²	-	1,246 ²	1	-	9,665
1991	1,400	314	119 ¹	21	-	-	10,268 ²	-	305 ²	+	1	12,428
1992	-	16	108 ¹	1	13 ⁴	-	4,144 ²	15 ³	58	1	-	4,356
1993	-	29	38 ³	14	8 ⁴	-	7,989 ²	17	210	2	-	8,307
1994	-	68 ²	19 ³	23 ²	3 ⁴	4	6,390 ²	26	67	14	-	6,614
1995 ¹	-	-	-	29 ²	12 ^{2,4}	2	6,058 ²	60 ¹	227	83	2	6,473

¹ Provisional figures.

² Working Group figure.

³ As reported to Norwegian authorities.

⁴ Includes Division IIb.

⁵ USSR prior to 1991.

Table 3.1.6.4 GREENLAND HALIBUT in Sub-areas I and II. Nominal catch (t) by countries in Division IIb as officially reported to ICES.

Year	Den mark	Estonia	Faroe Islands	France	Fed. rep. Germany	Ireland	Lithu ania	Norway	Portugal	Russia ⁴	Spain	UK (England & Wales)	UK (Scotland)	Total
1984	-	-	-	-	1,900	-	-	80	-	9,641	-	5	-	11,626
1985	-	-	-	-	3,746	-	-	71	-	3,221	-	2	-	7,040
1986	-	-	36	-	2,620	-	-	944	-	6,032	-	+	-	9,632
1987	+	-	-	-	1,947	-	-	572	-	4,735	-	7	10	7,271
1988	-	-	-	-	590	-	-	239	-	5,008	-	19	+	5,856
1989	-	-	-	-	496	-	-	3,367 ²	-	3,366	-	-	-	7,229
1990	-	-	23 ²	-	942	-	-	8,707 ²	-	3,197 ²	-	9	-	12,878
1991	11	1,000	-	-	80	-	-	15,286 ²	-	1,663 ²	132	+	1	18,173
1992	-	-	-	3 ²	12	-	-	1,892 ²	16 ²	193	23	6	3	2,148
1993	2 ³	-	-	2 ³	8	-	30 ³	686 ²	26	158	-	14	-	926
1994	4	-	1 ³	8 ³	46 ²	1	4 ³	775 ²	10	41	2 ²	62	2	956
1995	-	-	-	-	5 ¹	-	-	1,818 ²	24 ¹	297	700	32	5	2,881

¹ Provisional figures.

² Working Group figure.

³ As reported to Norwegian authorities.

⁴ USSR prior to 1991.

Table 3.1.6.5 Greenland halibut in the North-East Arctic (Fishing Areas I & II).

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 6-10
1970	45.41	240.44	89.48	0.420
1971	42.60	188.14	79.03	0.422
1972	36.21	151.92	43.06	0.302
1973	31.00	141.64	29.94	0.225
1974	30.58	136.68	37.76	0.278
1975	33.22	120.97	38.17	0.335
1976	29.20	98.30	36.07	0.423
1977	27.94	75.39	28.83	0.337
1978	27.21	64.11	24.62	0.359
1979	27.76	73.13	17.31	0.185
1980	33.03	63.51	13.28	0.166
1981	26.74	70.73	15.02	0.139
1982	25.63	68.36	16.79	0.204
1983	27.36	82.54	22.15	0.267
1984	27.40	76.46	21.88	0.297
1985	27.57	78.86	19.95	0.266
1986	32.95	78.50	22.88	0.295
1987	31.87	69.76	19.11	0.309
1988	26.99	63.07	19.59	0.411
1989	25.26	65.19	20.14	0.315
1990	23.90	63.72	23.18	0.403
1991	18.71	73.30	33.32	0.570
1992	11.05	39.89	9.25	0.183
1993	4.92	50.45	11.88	0.198
1994	1.86	47.91	9.15	0.136
1995	0.73	48.69	11.03	0.172
Average	26.04	89.68	27.42	0.293
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.1.7.1 Catches of Norwegian spring-spawning herring (tonnes) since 1972.

Year	A	B ¹	C	D	Total	Total catch as used by the Working Group
1972	-	9,895	3,266 ²	-	13,161	13,161
1973	139	6,602	276	-	7,017	7,017
1974	906	6,093	620	-	7,619	7,619
1975	53	3,372	288	-	3,713	13,713
1976	-	247	189	-	436	10,436
1977	374	11,834	498	-	12,706	22,706
1978	484	9,151	189	-	9,824	19,824
1979	691	1,866	307	-	2,864	12,864
1980	878	7,634	65	-	8,577	18,577
1981	844	7,814	78	-	8,736	13,736
1982	983	10,447	225	-	11,655	16,655
1983	3,857	13,290	907	-	18,054	23,054
1984	18,730	29,463	339	-	48,532	53,532
1985	29,363	37,187	197	4,300	71,047	169,872
1986	71,122 ³	55,507	156	-	126,785	225,256
1987	62,910	49,798	181	-	112,899	127,306
1988	78,592	46,582	127	-	125,301	135,301
1989	52,003	41,770	57	-	93,830	103,830
1990	48,633	29,770	8	-	78,411	86,411
1991	48,353	31,280	50	-	79,683	84,683
1992	43,688	55,737	23	-	99,448	104,448
1993	117,195	110,212	50	-	227,457	232,457
1994	288,581	190,643	4	-	479,228	479,228
1995	320,731	581,495	0	-	902,226	902,226

A=catches of adult herring in winter

B=mixed herring fishery in remaining part of the year

C=by-catches of 0- and 1-group herring in the sprat fishery

D=USSR-Norway by-catch in the capelin fishery (2-group)

¹ Includes also by-catches of adult herring in other fisheries² In 1972, there was also a directed herring 0-group fishery³ Includes 26,000 t of immature herring (1983 year-class) fished by USSR in the Barents Sea

Table 3.1.7.2 Total catch of Norwegian spring-spawning herring (tonnes) since 1972. Data provided by Working Group members.

Year	Norway	USSR/ Russia	Denmark	Faroes	Iceland	Netherlands	Greenland	UK (Scotland)	Germany	Total
1972	13,161	-	-	-	-	-	-	-	-	13,161
1973	7,017	-	-	-	-	-	-	-	-	7,017
1974	7,619	-	-	-	-	-	-	-	-	7,619
1975	13,713	-	-	-	-	-	-	-	-	13,713
1976	10,436	-	-	-	-	-	-	-	-	10,436
1977	22,706	-	-	-	-	-	-	-	-	22,706
1978	19,824	-	-	-	-	-	-	-	-	19,824
1979	12,864	-	-	-	-	-	-	-	-	12,864
1980	18,577	-	-	-	-	-	-	-	-	18,577
1981	13,736	-	-	-	-	-	-	-	-	13,736
1982	16,655	-	-	-	-	-	-	-	-	16,655
1983	23,054	-	-	-	-	-	-	-	-	23,054
1984	53,532	-	-	-	-	-	-	-	-	53,532
1985	167,272	2,600	-	-	-	-	-	-	-	169,872
1986	199,256	26,000	-	-	-	-	-	-	-	225,256
1987	108,417	18,889	-	-	-	-	-	-	-	127,306
1988	115,076	20,225	-	-	-	-	-	-	-	135,301
1989	88,707	15,123	-	-	-	-	-	-	-	103,830
1990	74,604	11,807	-	-	-	-	-	-	-	86,411
1991	73,683	11,000	-	-	-	-	-	-	-	84,683
1992	91,111	13,337	-	-	-	-	-	-	-	104,448
1993	199,771	32,645	-	-	-	-	-	-	-	232,457
1994	380,771	74,400	-	2,911	21,146	-	-	-	-	479,228
1995 ¹	529,838	100,000	30,131	57,084	173,418	7,969	3,000	230	556	902,226

¹Preliminary

Table 3.1.7.3 Herring Norwegian Spring-spawners.

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 5-12
1950	10,161.40	9,302.04	933.00	0.075
1951	4,862.68	11,451.10	1,278.40	0.098
1952	2,823.49	6,361.69	1,254.80	0.106
1953	46,335.20	6,272.52	1,090.60	0.094
1954	7,455.96	7,182.91	1,644.50	0.168
1955	3,292.92	7,541.39	1,359.80	0.137
1956	3,164.69	9,234.33	1,659.40	0.166
1957	589.34	8,357.00	1,319.50	0.139
1958	496.88	7,157.44	986.60	0.120
1959	170.52	6,039.36	1,111.10	0.144
1960	252.02	4,901.50	1,101.80	0.155
1961	239.09	3,585.53	830.10	0.103
1962	21,104.00	2,809.75	848.60	0.107
1963	7,244.68	2,264.30	984.50	0.135
1964	2,134.71	2,771.67	1,281.80	0.207
1965	198.74	2,936.04	1,547.70	0.412
1966	8,271.68	2,568.86	1,955.00	0.880
1967	3,801.78	1,165.81	1,677.20	1.271
1968	107.71	226.03	712.20	1.652
1969	228.26	82.67	67.80	0.555
1970	15.97	35.06	62.30	1.239
1971	7.54	11.64	21.10	1.318
1972	241.15	4.23	13.16	2.180
1973	20.85	44.59	7.02	0.817
1974	0.94	48.14	7.62	0.388
1975	15.00	40.51	13.71	0.097
1976	837.33	102.53	10.44	0.060
1977	565.21	255.62	22.71	0.084
1978	195.69	336.86	19.82	0.107
1979	470.59	374.03	12.86	0.065
1980	296.30	447.30	18.58	0.114
1981	379.96	468.67	13.74	0.185
1982	798.90	472.11	16.66	0.114
1983	89.86	560.95	23.05	0.287
1984	142.73	612.15	53.53	0.078
1985	232.84	549.92	169.87	0.362
1986	29,773.70	475.36	225.26	0.882
1987	2,038.09	1,253.52	127.31	0.418
1988	1,622.83	4,037.15	135.30	0.467
1989	299.52	5,115.38	103.83	0.188
1990	308.23	5,208.90	86.41	0.239
1991	2,789.97	5,475.12	84.68	0.043
1992	6,761.17	4,856.41	104.45	0.267
1993	8,482.70	4,460.71	232.46	0.035
1994	21,610.50	4,954.50	479.23	0.100
1995	23,592.70	5,040.85	902.23	0.208
Average	4,881.00	3,205.53	578.52	0.371
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.1.8.1 Barents Sea CAPELIN. International catch ('000 t) as used by the Working Group.

Year	Winter				Summer-Autumn			Total
	Norway	Russia	Others	Total	Norway	Russia	Total	
1965	217	7	0	224	0	0	0	224
1966	380	9	0	389	0	0	0	389
1967	403	6	0	409	0	0	0	409
1968	460	15	0	475	62	0	62	537
1969	436	1	0	437	243	0	243	680
1970	955	8	0	963	346	5	351	1314
1971	1300	14	0	1314	71	7	78	1392
1972	1208	24	0	1232	347	13	360	1592
1973	1078	34	0	1111	213	12	225	1336
1974	749	63	0	812	237	99	336	1149
1975	559	301	43	903	407	131	538	1440
1976	1252	228	0	1480	739	368	1107	2587
1977	1441	317	2	1760	722	504	1227	2987
1978	784	429	25	1237	360	318	678	1915
1979	539	342	5	886	570	326	896	1783
1980	539	253	9	801	459	388	847	1648
1981	784	429	28	1240	454	292	746	1986
1982	568	260	5	833	591	336	927	1760
1983	751	373	36	1161	758	439	1197	2358
1984	330	257	42	629	481	368	849	1478
1985	340	234	17	590	113	164	278	868
1986	72	51	0	123	0	0	0	123
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	528	159	20	707	31	195	226	933
1992	620	247	24	891	73	159	232	1123
1993	402	170	14	586	0	0	0	586
1994	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0

Table 3.1.8.2 Barents Sea capelin (Sub-areas I and II, excluding Division IIa west of 5°W).
Weights in '000 t.

Year	Recruitment Age 1	Spawning stock biomass ¹	Landings
1965			224
1966			389
1967			409
1968			537
1969			680
1970			1314
1971			1392
1972			1592
1973	1175	1343	1336
1974	762	389	1149
1975	510	95	1440
1976	447	1147	2587
1977	789	919	2987
1978	857	475	1915
1979	553	579	1783
1980	592	21	1648
1981	487	1654	1986
1982	574	505	1760
1983	613	25	2358
1984	174	150	1478
1985	43	102	868
1986	11	13	123
1987	49	31	0
1988	21	14	0
1989	181	198	0
1990	700	187	0
1991	405	1794	933
1992	395	1072	1123
1993	3	663	586
1994	27	165	0
1995	8	57	0
1996	95	79	0 ²
Average	395	487	1019
Units	billions	'000 t	'000 t

¹ At 1 April

² Expected catch

Table 3.2.2.a1 Nominal catch (tonnes) of Cod in NAFO Sub-area 1, 1982-1995 as officially reported to NAFO.

Country	1982	1983	1984	1985	1986	1987	1988
Faroe Islands	-	1,339	-	-	-	-	-
Germany	8,139	10,158	8,941	2,170	41	55	6,574
Greenland	47,693	44,970	24,457	12,651	6,549	12,284	52,135
Japan	-	-	13	54	11	33	10
Norway	-	-	5	1	2	1	7
UK	-	1174	-	-	-	-	927
Total	55,832	57,641	33,416	14,876	6,603	12,373	59,653

Country	1989	1990	1991	1992 ¹	1993 ²	1994 ³	1995 ³
Faroe Islands	-	51	1	-	-	-	-
Germany	12,892	7,515	96	-	-	-	-
Greenland	92,152	58,816	20,238	5,723	1,924	2,115	1703
Japan	-	-	-	-	-	-	-
Norway	2	948	-	-	-	-	-
UK	3780	1,631	-	-	-	-	-
Total	108,826	68,961	20,335	5,723	1,924	2,115	1703
WG estimate ⁴	111,567	-	-	-	-	-	-

¹ Provisional data (NAFO SCS Doc, 93/22)² Provisional data (NAFO SCS Doc, 94/24)³ Provisional data as reported to Greenland authorities,⁴ Includes 3,000 t in 1988 and 2,741 t in 1989 reported to be from ICES Sub-area XIV,**Table 3.2.2.a2** Nominal catch (tonnes) of cod in ICES Sub-area XIV, 1982-1995 as officially reported to ICES,

Country	1982	1983	1984	1985	1986	1987	1988
Faroe Islands	-	368	-	-	86	-	12
Germany	8,940	8,238	7,035	2,006	4,063	5,358	12,049
Greenland	898	438	1,051	106	606	1,550	345
Iceland	-	-	-	-	-	1	9
Norway	-	-	794	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-
Total	9,838	9,044	8,880	2,112	4,755	6,909	12,415
WG estimate ¹	27,000	13,378	8,914	-	-	-	9,457 ²

Country	1989	1990	1991	1992	1993 ⁶	1994 ⁶	1995 ⁶
Faroe Islands	40	-	-	-	-	1	-
Germany	10,613	26,419	8,434	5,893	164	-	22
Greenland	3,715	4,442	6,677	1,283	241	73	5
Iceland	-	-	-	22	-	-	-
Norway	-	17	828	1,030	183	43	2
Russia	-	-	-	126	-	-	-
UK (Engl. and Wales)	1,158	2,365	5,832	2,532	162	-	-
UK (Scotland)	135	93	29	463	46	-	-
United Kingdom	-	-	-	-	-	296	232
Total	15,661	33,336	21,800	11,349	796	413	-
WG estimate	14,669 ³	33,513 ⁴	21,818 ⁵	-	-	437 ⁷	261

¹ Includes estimates of discards and catches reported in Sub-area XII.² Excluding 3,000 t assumed to be from NAFO Division 1F and including 42 t taken by Japan.³ Excluding 2,741 t assumed to be from NAFO Division 1F and including 1,500 t reported from other areas assumed to be from Sub-area XIV and including 94 t by Japan and 155 t by Greenland (Horsted, 1994).⁴ Includes 129 t by Japan and 48 t additional catches by Greenland (Horsted, 1994).⁵ Includes 18 t by Japan.⁶ Provisional data.⁷ Includes 24 t by Germany reported to Greenland authorities.

Table 3.2.2.a3 Landing of cod off Greenland total (East and West, inshore and offshore).

Year	Landings
1975	54
1976	46
1977	91
1978	99
1979	133
1980	66
1981	69
1982	83
1983	71
1984	42
1985	17
1986	11
1987	19
1988	69
1989	126
1990	102
1991	42
1992	17
1993	3
1994	3
1995	2
Average	56
Unit	1000 tonnes

Table 3.2.2.a4 Cod Offshore Component (Fishing area XIV and NAFO Area 1).

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 5-8
1955	153.80	1,817.48	253.27	0.109
1956	511.98	1,519.50	315.47	0.149
1957	104.90	1,331.26	256.30	0.210
1958	134.53	1,469.29	304.15	0.202
1959	463.65	1,042.38	226.23	0.189
1960	531.66	1,228.83	238.13	0.194
1961	226.87	1,083.45	332.12	0.257
1962	93.57	1,035.91	441.69	0.404
1963	409.56	1,020.36	427.59	0.369
1964	703.36	887.22	362.21	0.387
1965	286.69	716.21	359.01	0.411
1966	329.96	715.52	349.32	0.402
1967	105.57	828.65	425.93	0.414
1968	37.49	775.88	388.09	0.440
1969	39.07	572.01	210.31	0.379
1970	22.75	466.97	118.30	0.219
1971	87.98	378.34	138.66	0.398
1972	4.19	248.14	124.50	0.473
1973	9.18	109.53	62.88	0.431
1974	6.20	88.94	45.78	0.670
1975	24.60	54.79	47.06	0.906
1976	154.62	30.13	40.87	0.821
1977	16.62	20.60	31.81	0.764
1978	20.08	37.79	26.06	0.267
1979	26.79	78.82	20.09	0.294
1980	71.10	94.12	57.58	0.502
1981	14.25	71.08	40.27	0.414
1982	56.54	57.23	51.85	0.751
1983	7.71	46.59	44.33	0.913
1984	13.77	35.64	22.36	0.686
1985	1.99	29.87	8.50	0.241
1986	10.88	32.91	6.04	0.159
1987	265.71	36.17	10.84	0.099
1988	85.13	56.41	49.10	0.792
1989	1.41	83.62	85.95	0.828
1990	1.62	41.00	100.48	1.328
1991	0.63	30.23	22.97	0.699
1992	0.25	20.73	11.38	0.815
Average	132.54	478.78	159.41	0.473
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.2.2.b1 Nominal catch (tonnes) of COD in Division Va, by countries, 1982-1995, as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988
Belgium	236	188	254	207	226	597	365
Faroe Islands	5,297	5,626	2,041	2,203	2,554	1,848	1,966
Iceland	382,297	293,890	281,481	322,810	365,852	389,808	375,741
Norway	557	109	90	46	1	4	4
UK (Engl. and Wales)	-	-	2	1	-	-	-
Total	388,387	299,813	283,868	325,267	368,633	392,257	378,076
Working Group estimate	-	-	-	-	-	-	-

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Belgium	309	260	548	222	145	135	-
Faroe Islands	2,012	1,782	1,323	883	664	754	719
Iceland	353,985	333,348	306,697	266,662	251,170	175,296	168,685
Norway	3	-	-	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	+	-	-
Total	356,309	335,390	308,568	267,767	251,979	178,808	169,404
Working Group estimate	-	-	-	-	-	-	169,618 ²

1) Provisional.

2) Additional catch by Iceland of 214 t included.

Table 3.2.2.b2 Cod in the Iceland Grounds (Fishing Area Va).

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 5-10
1955	260.00	1,261.00	538.00	0.310
1956	307.00	1,199.00	481.00	0.260
1957	153.00	1,145.00	552.00	0.320
1958	191.00	1,034.00	509.00	0.320
1959	143.00	928.00	453.00	0.330
1960	163.00	825.00	465.00	0.380
1961	292.00	760.00	375.00	0.330
1962	255.00	729.00	387.00	0.400
1963	273.00	683.00	410.00	0.450
1964	328.00	569.00	434.00	0.540
1965	174.00	454.00	394.00	0.610
1966	255.00	412.00	357.00	0.540
1967	186.00	476.00	345.00	0.490
1968	178.00	594.00	381.00	0.670
1969	136.00	693.00	406.00	0.530
1970	303.00	684.00	471.00	0.560
1971	170.00	615.00	453.00	0.620
1972	265.00	477.00	399.00	0.710
1973	432.00	436.00	380.00	0.710
1974	143.00	329.00	375.00	0.760
1975	222.00	339.00	371.00	0.810
1976	246.00	283.00	348.36	0.760
1977	144.00	319.00	340.05	0.630
1978	143.00	375.00	328.22	0.480
1979	134.00	447.00	368.01	0.430
1980	226.00	602.00	435.04	0.450
1981	139.00	389.00	469.10	0.680
1982	144.00	266.00	388.39	0.780
1983	336.00	214.00	299.81	0.780
1984	335.00	219.00	283.87	0.620
1985	169.00	268.00	325.27	0.660
1986	82.00	268.00	368.63	0.780
1987	131.00	253.00	392.26	0.820
1988	103.00	193.00	378.08	0.960
1989	180.00	269.00	356.31	0.670
1990	182.00	344.00	335.39	0.710
1991	60.00	232.00	308.57	0.770
1992	115.00	244.00	267.77	0.790
1993	195.00	224.00	251.98	0.900
1994	85.00	276.00	178.81	0.640
1995	150.00	380.00	169.62	0.470
Average	198.24	505.05	378.77	0.596
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.2.3.1 Nominal catch (tonnes) of SAITHE in Division Va, by countries, 1981–1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988
Belgium	532	201	224	269	158	218	217	268
Faroe Islands	3,545	3,582	2,138	2,044	1,778	783	2,139	2,596
France	-	23	-	-	-	-	-	-
Iceland	54,921	65,124	55,904	60,406	55,135	63,867	78,175	74,383
Norway	3	1	+	-	1	-	-	-
UK (Engl. and Wales)	-	-	-	-	29	-	-	-
Total	59,001	68,931	58,266	62,719	57,101	64,868	80,531	77,247
Working Group estimate	-	-	-	-	-	66,376 ²⁾	-	-

Country	1989	1990	1991	1992	1993	1994	1995 ¹⁾
Belgium	369	190	236	195	104	30	-
Faroe Islands	2,246	2,905	2,690	1,570	1,562	975	1,184
France	-	-	-	-	-	-	-
Iceland	79,796	95,032	99,390	77,832	69,982	63,333	47,344
Norway	-	-	-	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	-	-
Total	82,411	98,127	102,316	79,597	71,648	64,338	48,528
Working Group estimate	-	-	102,737 ³⁾	-	-	-	-

1) Provisional.

2) Additional catch by Faroe Islands of 1,508 t included.

3) Additional catch by Iceland of 451 t included.

Table 3.2.3.2 Saithe in the Iceland Grounds (Fishing Area Va).

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-9
1961	32.74	129.87	50.83	0.218
1962	31.00	142.18	50.51	0.287
1963	84.11	144.61	48.01	0.304
1964	55.20	141.95	60.26	0.250
1965	94.06	166.00	60.18	0.231
1966	70.22	214.14	52.00	0.178
1967	68.33	279.29	75.71	0.237
1968	59.67	345.78	77.55	0.210
1969	88.75	395.28	115.85	0.295
1970	66.33	399.45	116.60	0.323
1971	50.64	381.38	136.76	0.443
1972	26.46	334.68	111.30	0.361
1973	26.11	313.69	110.89	0.345
1974	25.13	288.07	97.57	0.287
1975	25.93	264.70	87.95	0.278
1976	31.24	227.25	82.00	0.326
1977	21.67	186.68	62.03	0.282
1978	49.45	165.58	49.67	0.237
1979	55.31	159.55	63.50	0.245
1980	28.07	164.25	58.35	0.310
1981	19.56	167.92	58.99	0.311
1982	22.18	176.78	68.62	0.387
1983	33.64	191.39	58.27	0.340
1984	47.66	181.38	62.72	0.311
1985	34.40	169.21	57.10	0.250
1986	73.18	179.21	66.38	0.267
1987	110.37	173.11	80.56	0.368
1988	56.77	169.59	77.25	0.344
1989	32.20	177.22	82.43	0.278
1990	22.96	199.88	98.13	0.331
1991	31.96	198.52	102.74	0.375
1992	18.82	189.43	79.60	0.361
1993	32.69	174.81	71.65	0.360
1994	40.00	158.15	64.34	0.335
1995	40.00	178.73	48.53	0.301
Average	45.91	215.13	75.57	0.302
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.2.4.1 GREENLAND HALIBUT. Nominal catches (tonnes) by countries, in Sub-areas V and XIV 1981-1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988
Denmark	-	-	-	-	-	-	6	+
Faroe Islands	767	1,532	1,146	2,502	1,052	853	1,096	1,378
France	8	27	236	489	845	52	19	25
Germany	3,007	2,581	1,142	936	863	858	565	637
Greenland	+	1	5	15	81	177	154	37
Iceland	15,457	28,300	28,360	30,080	29,231	31,044	44,780	49,040
Norway	-	-	2	2	3	+	2	1
Russia	-	-	-	-	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-
Total	19,239	32,441	30,891	34,024	32,075	32,984	46,622	51,118
Working Group estimate	-	-	-	-	-	-	-	-

Country	1989	1990	1991	1992	1993	1994 ¹	1995 ¹
Denmark	-	-	-	-	-	-	-
Faroe Islands	2,319	1,803	1,566	2,128	4,405	6,241	3,615
France	-	-	-	3	2	-	16
Germany	493	336	303	382	415	648	808
Greenland	11	40	66	437	288	922	940
Iceland	58,330	36,557	34,883	31,955	33,987	27,778	27,385
Norway	3	50	34	285 ¹	908 ¹	826	1,537
Russia	-	-	-	5	-	-	20
UK (Engl. and Wales)	-	27	38	109	811	513	-
UK (Scotland)	-	-	-	19	26	84	-
United Kingdom	-	-	-	-	-	-	1,668
Total	61,156	38,813	36,890	35,323	40,842	37,012	35,989
Working Group estimate ²	61,396	39,326	37,950	35,487	41,247	37,187	-

1) Provisional data

2) Working Group estimate as in Tables 6.2-6.4

Table 3.2.4.2 GREENLAND HALIBUT. Nominal catches (tonnes) by countries, in Division Vb 1981-1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988
Denmark	-	-	-	-	-	-	6	+
Faroe Islands	442	863	1,112	2,456	1,052	775	907	901
France	8	27	236	489	845	52	19	25
Germany	114	142	86	118	227	113	109	42
Greenland	-	-	-	-	-	-	-	-
Norway	2	+	2	2	2	+	2	1
UK (Engl. and Wales)	-	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-
Total	566	1,032	1,436	3,065	2,126	940	1,043	969
Working Group estimate	-	-	-	-	-	-	-	-

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Denmark	-	-	-	-	-	-	-
Faroe Islands	1,513	1,064	1,293	2,105	4,058	5,163	3,597
France 6	...	...	...	3	2	...	16 ⁷
Germany	73	43	24	71	24	8	-
Greenland	-	-	-	-	-	-	-
Norway	3	42	16	25 ¹	371 ¹	53	142
UK (Engl. and Wales)	-	-	-	1	15	-	-
UK (Scotland)	-	-	-	1	-	-	-
United Kingdom	-	-	-	-	-	-	58
Total	1,589	1,149	1,333	2,206	4,470	5,224	3,813
Working Group estimate	1,606 ²	1,282 ³	1,662 ⁴	2,269 ⁵	-	-	-

1) Provisional data

2) Includes 17 t taken by France

3) Includes 133 t taken in Division IIa (Faroese waters).

4) Includes 317 t taken in Division IIa (Faroese waters) + France 12 t.

5) Includes 63 t taken in Division IIa (Faroese waters).

6) Quantity unknown 1989-1991 and 1993-1994.

7) Reported to Faroese Coastal Guard service

Table 3.2.4.3 GREENLAND HALIBUT. Nominal catches (tonnes) by countries, in Division Va 1981-1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988
Faroe Islands	325	669	33	46	-	-	15	379
Germany	-	-	-	-	-	-	-	-
Greenland	-	-	-	-	-	-	-	-
Iceland	15,455	28,300	28,359	30,078	29,195	31,027	44,644	49,000
Norway	-	-	+	+	2	-	-	-
Total	15,780	28,969	28,392	30,124	29,197	31,027	44,659	49,379
Working Group estimate	-	-	-	-	-	-	-	-

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Faroe Islands	719	739	273	23	166	910	18
Germany	-	-	-	-	-	1	-
Greenland	-	-	-	-	-	1	-
Iceland	58,330	36,557	34,883	31,955	33,968	27,696	27,375
Norway	-	-	-	-	-	-	-
Total	59,049	37,296	35,156	31,978	34,134	28,608	27,393
Working Group estimate	59,272 ²	37,308 ³	35,413 ⁴	-	-	-	-

1) Provisional data

2) Includes 223 t catch by Norway.

3) Includes 12 t catch by Norway.

4) Includes additional catch of 257 t by Iceland.

Table 3.2.4.4 GREENLAND HALIBUT. Nominal catches (tonnes) by countries, in Sub-area XIV 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988
Faroe Islands	-	-	-	-	-	78	74	98
Germany	2,893	2,439	1,054	818	636	745	456	595
Greenland	+	1	5	15	81	177	154	37
Iceland	-	-	1	2	36	17	136	40
Norway	-	-	-	+	-	-	-	-
Russia	-	-	-	-	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-
Total	2,893	2,440	1,060	835	753	1,017	820	770
Working Group estimate	-	-	-	-	-	-	-	-

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Faroe Islands	87	-	-	-	181	168	-
Germany	420	293	279	311	391	639	808
Greenland	11	40	66	437	288	921	940 ⁷
Iceland	+	-	-	-	19	82	10
Norway	-	8	18	260	537 ¹	773	1,395
Russia	+	-	-	5	-	-	20
UK (Engl. and Wales)	-	27	38	108	796	513	...
UK (Scotland)	-	-	-	18	26	84	...
United Kingdom	-	-	-	-	-	-	1,610
Total	518	368	401	1,139	2,238	3,180	4,783
Working Group estimate	-	736 ²	875 ³	1,240 ⁴	2,275 ⁵	- ⁶	-

1) Provisional data

2) Includes 370 t catches taken by Japan

3) Includes 315 t catch taken by Japan and 159 t by other countries as reported to Greenland.

4) Indicates additional catches taken by Germany (96 t) and UK (17 t) as reported to Greenland.

5) Indicates additional catches taken by Germany (37 t), Norway (238 t), UK (182 t) and Japan (62 t) as reported to Greenland.

6) Total reported to Greenlandic authorities are used in assessment: 159 t trawl (Norwegian charter), 205 t gillnets (Norwegian charter).

7) includes 439 t offshore longlines, 93 t inshore longlines, and 273 t offshore gillnets (Greenland charter), 135 t trawl (Japanese charter) and 159 t trawl (Norwegian charter).

Table 3.2.4.5 Greenland halibut (Fishing Areas V and XIV).

Year	Recruitment Age 5	Spawning Stock Biomass	Landings	Fishing Mortality Age 8-12
1976	25.83	53.96	6.05	0.072
1977	26.13	65.05	16.58	0.254
1978	27.48	75.99	14.35	0.172
1979	35.01	76.65	23.62	0.274
1980	40.51	79.10	31.25	0.428
1981	39.90	73.25	19.24	0.282
1982	33.56	80.14	32.44	0.394
1983	28.80	72.48	30.89	0.378
1984	31.98	83.99	34.02	0.391
1985	44.15	96.19	32.08	0.236
1986	44.72	104.68	32.98	0.225
1987	37.22	115.63	46.62	0.301
1988	31.24	119.98	51.12	0.347
1989	31.24	108.47	61.40	0.462
1990	30.68	91.31	39.33	0.356
1991	22.74	96.33	37.95	0.303
1992	22.22	75.07	35.49	0.390
1993	25.19	73.15	41.25	0.502
1994	33.45	65.59	37.01	0.527
1995	33.58	75.90	35.99	0.618
Average	32.28	84.14	32.98	0.345
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.2.5a.1 REDFISH. Nominal catches (tonnes) by countries, in Division Va 1981-1995, as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988
Belgium	283	389	291	400	423	398	372
Faroe Island	1,046	1,357	686	291	144	332	372
Germany, F.	-	-	-	-	-	-	-
Iceland	115,051	122,749	108,270	91,381	85,992	87,768	93,995
Norway	11	32	12	8	2	7	7
Total	116,391	124,527	109,259	92,080	86,561	88,505	94,746

Country	1989	1990	1991	1992	1993	1994	1995
Belgium	190	70	146	107	96	50	
Faroe Island	394	624	412	389	438	202	
Germany, F.	-	-	-	-	-	40	61
Iceland ²	91,536	90,891	96,770	94,382	96,577	95,091	94,000
Norway	1	-	-	-	-	-	-
Total	92,121	91,585	97,328	94,878	97,111	95,383	94,061

1) Provisional

2) Oceanic *S. mentella* not included

Table 3.2.5a.2 Landings of REDFISH (in tonnes) by countries in Division Va as used by the Working Group.

Year	Belgium	Faroes	FRG	Iceland	Norway	Total
1978	1,549	242		33,318	93	35,202
1979	1,385	629		62,253	43	64,310
1980	1,381	1,055		69,780	33	72,249
1981	924	1,212		93,349	32	95,517
1982	283	1,046		115,051	11	116,391
1983	389	1,357		122,749	32	124,527
1984	291	686		108,270	12	109,259
1985	400	291		91,381	8	92,080
1986	423	253		85,992	2	86,670
1987	398	332		87,768	7	88,505
1988	372	372		94,011	7	94,762
1989	190	394		91,536	1	92,121
1990	70	624		90,891	0	91,585
1991	146	412		96,770	0	97,328
1992	107	389		96,350 ²	0	96,846
1993	96	438		99,180 ³	0	99,714
1994	50	202	40	110,563 ⁴	0	110,855
1995 ¹			61	91,010 ⁵	0	91,071

1 Provisional data

2 Including 1968 tonnes oceanic *S. mentella*.

3 Including 2603 tonnes oceanic *S. mentella*.

4 Including 15472 tonnes oceanic *S. mentella*.

5 Including 1543 tonnes oceanic *S. mentella*.

Table 3.2.5a.3 REDFISH. Nominal catches (tonnes) by countries, in Division Vb 1981-1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988
Denmark	-	-	-	-	-	36	176	8
Faroe Islands	3,232	3,999	4,642	8,770	12,634	15,224	13,477	12,966
France	59	204	439	559	1,157	752	819	582
Germany, Fed. Rep. ²	3,841	4,660	4,300	4,460	5,091	5,142	3,060	1,595
Iceland	-	1	-	-	-	-	-	-
Norway	13	7	3	1	4	2	5	5
UK (Engl. and Wales)	-	-	-	-	-	-	-	-
USSR	-	-	-	142	-	-	-	-
Total	7,145	8,871	9,384	13,932	18,886	21,156	17,537	15,156

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Denmark	-	+	-	-	-	-	-
Faroe Islands	12,636	10,017	14,090	15,279	9,687	8,872 ¹	-
France ¹	996	909	473	114	32	-	-
Germany, Fed. Rep. ²	1,191	441	447	450	239	155	44
Norway	21	21	20	34	26 ¹	31 ¹	33
UK (Engl. and Wales)	-	-	2	21	28	1	-
UK (Scotland)	-	+	1	8	1	18	-
United Kingdom	-	-	-	-	-	-	26
USSR/Russia ³	-	-	-	15	44	3	-
Total	14,844	11,388	15,033	15,921	10,057	9,080	103

1) Provisional

2) Includes former GDR.

3) As from 1991.

Table 3.2.5a.4 Landings of REDFISH (in tonnes) by countries in Division Vb as used by the Working Group.

Year	Denmark	Faroes	France	FRG	Iceland	Lithuania	Norway	Nederl	UK	Russia ²	Total
1978	0	1,525	448	7,767	0		9	0	57	0	9,806
1979	0	5,693	862	6,108	0		11	0	0	0	12,674
1980	0	5,509	627	3,891	0		12	0	0	0	10,039
1981	0	3,232	59	3,841	0		13	0	0	0	7,145
1982	0	3,999	204	5,230	1		7	0	0	0	9,441
1983	0	4,642	439	4,300	0		3	0	0	0	9,384
1984	0	8,770	559	4,460	0		1	0	0	142	13,932
1985	0	12,634	1,157	5,091	0		4	0	0	868	19,754
1986	36	15,224	752	5,142	0		2	0	0	320	21,476
1987	176	13,478	819	3,060	0		5	0	0	0	17,538
1988	8	13,318	582	1,595	0		5	0	0	0	15,508
1989	0	12,860	996	1,191	0		21	0	0	0	15,068
1990	0	10,364	909	441	0		21	0	0	2	11,737
1991	0	14,090	473	447	0		20	0	3	4	15,037
1992	0	15,279	114	450	0	4	35	35	39	47	16,003
1993	0	10,040	35	239	0	0	26	22	29	44	10,435
1994	0	8,872	61 ³	155	0	0	31	0	19	3	9,141
1995 ¹	0	8,030	18 ³	44	0	0	33	0	26	9	8,160

1 Provisional data.

2 USSR 1978-1991, Russia 1992-1994

3 Reported to Faroese coastal guard service

Table 3.2.5a.5 REDFISH. Nominal catches (tonnes) by countries, 'in Sub-area VI 1981-1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988
Faroe Islands	-	-	-	19	18	-	-	1
France	24	44	93	102	397	480	1,032	1,024
Germany, Fed. Rep.	983	604	359	563	76	24	-	16
Ireland	-	-	-	-	-	-	-	-
Norway	3	4	2	9	-	14	2	1
Spain	1	-	2	-	-	-	-	-
UK (Engl. and Wales)	-	2	-	1	1	2	3	75
UK (Scotland)	-	-	-	1	-	10	17	6
Total	1,011	654	456	695	492	530	1,054	1,123

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Faroe Islands	61	-	22	6	-	- ¹	
France ¹	726	684	483	127	268		
Germany, Fed. Rep.	1	6	8	-	77	87	5
Ireland	-	-	-	1	1	-	
Norway	2	5	+	4 ¹	3 ¹	2 ¹	8
Spain							
UK (Engl. and Wales)	4	29	11	4	4	9	...
UK (Scotland)	4	6	39	32	94	118	...
United Kingdom							599
Total	798	730	563	174	447	216	612

1) Provisional

Table 3.2.5a.6 Landings of REDFISH (in tonnes) by countries in Sub-area VI as used by the Working Group.

Year	Faroes	France	FRG	Ireland	Norway	Spain	UK	Total
1978	0	307	18	0	4	0	2	331
1979	1	215	604	0	4	0	1	825
1980	0	202	907	0	2	0	0	1,111
1981	0	24	983	0	3	1	0	1,011
1982	0	44	604	0	4	0	2	654
1983	0	93	359	0	2	2	0	456
1984	19	102	563	0	9	0	2	695
1985	18	397	76	0	0	0	1	492
1986	0	480	24	0	14	0	12	530
1987	0	1,032	0	0	2	0	20	1,054
1988	1	1,024	16	0	1	0	81	1,123
1989	61	726	1	0	2	0	8	798
1990	0	684	6	0	5	0	35	730
1991	22	483	8	0	+	0	50	563
1992	9	127	0	1	4	0	36	177
1993	6	268	77	1	3	0	98	453
1994	0		87	0	2	0	127	216
1995 ¹	0		5		8	0	599	612

1 Provisional data.

Table 3.2.5a.7 REDFISH. Nominal catches (tonnes) by countries, in Sub-area XII 1982-1995.
as officially reported to ICES and/or FAO.

Country	1982	1983	1984	1985	1986	1987	1988
Bulgaria	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-
Faroe Islands	-	-	-	-	-	-	-
Germany, Fed. Rep.	5,696	2,209	-	-	-	-	-
Germany, Dem. Rep.	-	-	-	-	-	-	-
Greenland	-	-	-	-	-	-	-
Iceland	-	-	-	-	-	-	-
Latvia	-	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-	-
Norway	-	-	-	-	-	-	-
Poland	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-
Ukraine	-	-	-	-	-	-	-
USSR	39,783	60,079	60,643	17,300	24,131	2,948	9,772
Total	45,479	62,288	60,643	17,300	24,131	2,948	9,772

Country	1989	1990	1991	1992	1993	1994	1995
Bulgaria	-	1,617	-	628	3,216	-	-
Estonia	-	-	-	1,810	6,365	17,875	421
Faroe Islands	-	-	-	-	4,026	2,896 ¹	-
Germany Fed. Rep. ³	353	7	62	1,084	6,459	6,354	9,673
Greenland	-	-	-	9	710	-	-
Iceland	567	185	95	361	8,098	17,892	18,000
Latvia	-	-	-	780	6,803	13,205	5,002
Lithuania	-	-	-	6,656	7,899	7,404	-
Netherlands	-	-	-	-	-	-	13
Norway	-	249	726	10,560 ¹	6,207 ¹	4,275	4,168
Poland	112	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	+	-	-
Ukraine	-	-	-	160	2,622	-	3,185
USSR/Russia ²	15,543	4,274	6,624	2,485	4,106	10,489	-
Total	16,575	6,332	7,507	24,533	56,511	80,390	40,462

1) Provisional

2) As from 1991.

3) Includes former GDR

Table 3.2.5a.8 Landings of REDFISH (in tonnes) by countries in Sub-area XII as used by the Working Group.

Year	Bulgaria	Canada	Estonia	Faroes	France	FRG ⁴	Greenland	Iceland	Japan	Latvia	Lithuania	Netherlands	Norway	Poland	Ukraine	Russia ³	Spain	Total
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39,783	0	39,783
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60,079	0	60,079
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60,643	0	60,643
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17,300	0	17,300
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24,131	0	24,131
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,948	0	2,948
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,772	0	9,772
1989	0	0	0	0	0	353	0	658 ⁵	0	0	0	0	0	112	0	15,543	0	16,666
1990	1,617	0	0	0	0	7	0	215 ⁵	0	0	0	0	926 ²	0	0	4,274	0	7,039
1991	0	0	0	0	0	370	0	110 ⁵	0	0	0	0	764 ²	0	0	6,624	0	7,868
1992	628	0	1,810	0	2	1,280	9	110 ⁵	0	780	6,656	0	369 ²	0	160	11,266	0	23,070
1993	3,216	0	6,365	4,026	0	6,144	8	0 ⁵	0	6,803	7,899	0	5,735 ²	0	2,622	18,669	0	61,487
1994	0	0	17,875	2,896	606 ⁶	7,058	0	0 ⁵	0	13,205	7,404	0	4,774 ²	0	0	10,489	0	64,307
1995 ¹	0	602 ⁷	421	5,239	226 ⁶	7,570	156	20,880 ⁵	1,146	5,002	0	0	3,201 ²	0	3,185	32,730	20	80,378

1 Provisional data.

2 Area and quantum adjusted according to official log-books and raised (by 5% prior to 1994 and 3% in 1994-1995) to account for discarding.

3 USSR 1981-1991, Russia 1992-1995.

4 Includes former GDR.

5 Raised by 16% to account for discarding.

6 As reported to Greenland

7 Taken in NAFO area 1F

Table 3.2.5a.9 REDFISH. Nominal catches (tonnes) by countries, in Sub-area XIV 1982-1995, as officially reported to ICES and/or FAO.

Country	1982	1983	1984	1985	1986	1987	1988
Bulgaria	-	-	2,961	5,825	11,385	12,270	8,455
Denmark	11	-	-	-	-	-	-
Faroe Islands	-	27	-	-	5	382	1,634
German Dem. Rep.	-	155	989	5,438	8,574	7,023	22,582 ⁴
Germany, Fed. Rep.	37,119	28,878	14,141	5,974	5,584	4,691	
Greenland	+	1	10	5,519	9,542	670	42
Iceland	17	-	-	+	-	-	-
Norway	-	-	17	-	-	-	-
Poland	581	-	239	135	149	25	-
UK (Engl. and Wales)	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-
USSR/Russia	20,217	-	-	42,973	60,863	68,521	55,254
Total	57,945	29,061	18,357	65,864	96,102	93,582	87,967

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Bulgaria	4,546	1,073	-	-	-	-	
Denmark	-	-	-	-	-	-	
Faroe Islands	226	-	115	3,765	3,095	164 ¹	
Germany, Fed. Rep. ⁴	8,816	11,218	9,122	7,959	26,969	22,406	9,702
Greenland	3	24	42	962	264	422	
Iceland	814	3,726	7,477	12,982	11,650	29,114	7,000
Norway	-	6,070	4,954	14,000	7,162 ¹	2,609 ¹	2,429
Portugal	-	-	-	-	-	1,887	
UK (Engl. and Wales)	5	39	219	178	241	138	...
UK (Scotland)	-	3	+	28	8	4	...
United Kingdom	-	-	-	-	-	-	58
USSR/Russia ³	7,177	3,040	2,665	1,844	6,560	13,917	
Total	21,587	25,193	24,594	41,718	55,949	70,661	19,189

1) Provisional data

2) Fished mainly by Japan

3) As from 1991

4) Includes former GDR

Table 3.2.5a.10 Landings on REDFISH (in tonnes) by country in Sub-area XIV, as used by the Working Group.

Year	Bulgaria	Danmark	Faroes	FRG ⁵	Greenland	Iceland	Japan	Norway	Poland	Portugal	UK	Russia ³	Spain	Total
1978	0		0	20,711	3	151	0	2	0		13	0		20,880
1979	0		0	20,428	0	0	0	0	0		0	0		20,918
1980	0		0	32,520	0	89	0	0	0		0	0		32,609
1981	0		18	42,980	1	0	0	0	0		0	0		42,999
1982	0		0	42,815	0	17	0	0	581		0	20,217		63,630
1983	0		27	30,970	1	0	0	0	0		0	0		30,998
1984	2,961		0	15,130	10	0	0	15	239		0	0		18,355
1985	5,825		0	11,412	5,519	0	0	0	135		0	42,973		65,864
1986	11,385		5	14,158	9,542	0	0	0	149		0	60,683		95,922
1987	12,270		382	11,714	2,912	0	0	0	25		0	68,521		95,824
1988	8,455		1,634	22,582	3,751	0	0	0	0		0	55,254		91,676
1989	4,546		226	8,816	285	3,158 ⁴	307	0	0		5	7,177		24,520
1990	1,073		0	11,218	24	4,322 ⁴	3,450	6,159 ²	0		42	4,973		31,261
1991	0		115	10,028	42	8,673 ⁴	1,224	5,434 ²	0		219	2,665		28,400
1992	0		3,765	8,893	3,769	13,091 ⁴	0	14,322 ²	0		206	4,467		48,513
1993	0		3,095	26,404	264	10,911 ⁴	938	8,848 ²	0		241	5,496		56,197
1994			164	23,474	422	17,105 ⁴		2,665 ²		1,887	142	13,917		59,776
1995 ¹		14	10	11,805	400 ⁶	8,120 ⁴	89 ⁷	3,378 ²		5,125	58	9,452	4,535	42,986

1) Provisional data.

2 Area and quantum adjusted according to official log-books and raised (by 5% prior to 1994 and 3% in 1994-1995) to account for discarding.

3) USSR 1978-1991; Russia 1992-1994.

4) Raised by 16% to account for discarding.

5) Includes former GDR

6) Estimated bycatch in the shrimpfishery

7) Estimated bycatch in the shrimpfishery

Table 3.2.5b.1 *S. marinus* . Landings (in tonnes) by area used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	31,300	2,039	313	0	15,477	49,129
1979	56,616	4,805	6	0	15,787	77,214
1980	62,052	4,920	2	0	22,203	89,177
1981	75,828	2,538	3	0	23,608	101,977
1982	97,899	1,810	28	0	30,692	130,429
1983	87,412	3,394	60	0	15,636	106,502
1984	84,766	6,228	86	0	5,040	96,120
1985	67,312	9,194	245	0	2,117	78,868
1986	67,772	6,300	288	0	2,988	77,348
1987	69,212	6,143	576	0	1,196	77,127
1988	80,472	5,020	533	0	3,964	89,989
1989	51,825	4,140	373	0	685	57,023
1990	63,156	2,407	382	0	687	66,632
1991	49,677	2,140	292	0	4,255	56,364
1992	51,464	3,470	40	0	746	55,721
1993	45,890	2,631	101	0	1,737	50,360
1994	38,669	2,271	129	0	1,443	42,512
1995 ¹	41,513	2,594	607	0	84	44,798

1) Provisional data.

Table 3.2.5.c.1 Deep-sea *S. mentella* . Landings (in tonnes) by area used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	3,902	7,767	18	0	5,403	17,090
1979	7,694	7,869	819	0	5,131	21,513
1980	10,197	5,119	1,109	0	10,406	26,831
1981	19,689	4,607	1,008	0	19,391	44,695
1982	18,492	7,631	626	0	12,140	38,889
1983	37,115	5,990	395	0	15,207	58,707
1984	24,493	7,704	609	0	9,126	41,932
1985	24,768	10,560	247	0	9,376	44,951
1986	18,898	15,176	242	0	12,138	46,454
1987	19,293	11,395	478	0	6,407	37,573
1988	14,290	10,488	590	0	6,065	31,433
1989	40,248	10,928	425	0	2,284	53,885
1990	28,429	9,330	348	0	6,097	44,204
1991	47,651	12,897	271	0	7,057	67,876
1992	43,414	12,533	137	0	6,992	63,075
1993	51,221	7,804	352	0	14,821	74,197
1994	56,714	6,870	87	0	19,305	82,976
1995 ¹	48,015	5,566	5	0	990	54,576

1) Provisional data.

Table 3.2.5d.1 Oceanic *S. mentella*. Landings (in tonnes) by countries as used by the Working Group.

Year	Bulgaria	Canada	Estonia	Faroes	France	FRG ³	Greenland	Iceland	Japan	Latvia	Lithuania	Netherlands	Norway	Poland	Portugal	Russia ²	Spain	Ukraine	Total
1981	0		0	0	0	0	0	0					0	0	0	0			0
1982	0		0	0	0	0	0	0					0	581		60,000			60,581
1983	0		0	0	0	155	0	0					0	0		60,079			60,234
1984	2,961		0	0	0	989	0	0					0	239		60,643			64,832
1985	5,825		0	0	0	5,438	0	0					0	135		60,273			71,671
1986	11,385		0	5	0	8,574	0	0					0	149		84,994			105,107
1987	12,270		0	382	0	7,023	0	0					0	25		71,469			91,169
1988	8,455		0	1,090	0	16,848	0	0					0	0		65,026			91,419
1989	4,546		0	226	0	6,797	0	3,816					0	112		22,720			38,217
1990	2,690		0	0	0	7,957	0	4,537					7,085	0		9,247			31,516
1991	0		0	115	0	571	0	8,783					6,198	0		9,289			24,956
1992	628		1,810	3,765	2	6,447	9	15,478		780	6,656		14,654	0		15,733		160	66,122
1993	3,216		6,365	7,121	0	17,498	8	22,908		6,803	7,899		14,518	0		24,165		2,622	113,123
1994			17,875	2,896	606	17,152	0	53,332		13,205	7,404		7,391	0	1,887	17,814			139,562
1995 ¹		602 ⁴	421	5,239	226	18,900	156	30,543	1,146	5,002		13	6,551	0	5,125	42,182	4,555	3,185	123,846

1) Provisional data.

2) USSR 1981-1991; Russia since 1992.

3) Includes former GDR.

4) Taken in NAFO area IF.

Table 3.2.5d.2 Oceanic *S. mentella*. Landings (in tonnes) by area as used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	0	0	0	0	0	0
1979	0	0	0	0	0	0
1980	0	0	0	0	0	0
1981	0	0	0	0	0	0
1982	0	0	0	39,783	20,798	60,581
1983	0	0	0	60,079	155	60,234
1984	0	0	0	60,643	4,189	64,832
1985	0	0	0	17,300	54,371	71,671
1986	0	0	0	24,131	80,976	105,107
1987	0	0	0	2,948	88,221	91,169
1988	0	0	0	9,772	81,647	91,419
1989	0	0	0	16,666	21,551	38,217
1990	0	0	0	7,039	24,477	31,516
1991	0	0	0	7,868	17,088	24,956
1992	1,968	0	0	23,379	40,775	66,122
1993	2,603	0	0	70,881	39,639	113,123
1994	15,472	0	0	85,062	39,028	139,562
1995 ¹	1,543	0	0	80,391	41,912	123,846

1) Provisional data.

Table 3.2.6.1 Icelandic summer-spawning herring. Landings and catch in weight ('000 t) as used by the Working Group.

Year	Landings '000 t	Catches '000 t
1984	50.3	50.3
1985	49.1	49.1
1986	65.5	65.5
1987	73.0	73.0
1988	92.8	92.8
1989	97.3	101.0
1990/1991 ¹	101.6	105.1
1991/1992 ¹	98.5	109.5
1992/1993 ¹	106.7	108.5
1993/1994 ¹	101.5	102.7
1994/1995 ¹	132.0	134.0
1995/1996 ¹	125.0	125.9

¹ For season starting in October of the first year.

Table 3.2.6.2 Herring Icelandic Summer-spawning (Fishing Area Va).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-14
1947	179.51	140.72	47.80	0.533
1948	68.01	120.36	56.80	2.582
1949	77.47	90.94	5.40	0.131
1950	197.37	86.95	13.60	0.233
1951	116.48	87.74	15.80	0.306
1952	323.93	100.54	10.50	0.243
1953	197.30	108.25	17.60	0.224
1954	167.41	147.06	11.00	0.166
1955	191.20	169.40	20.50	0.220
1956	469.18	169.86	20.40	0.177
1957	791.38	179.87	22.80	0.197
1958	369.22	199.64	33.50	0.261
1959	555.11	278.23	35.00	0.179
1960	712.88	258.86	28.50	0.051
1961	531.01	286.80	74.00	0.303
1962	525.30	310.08	92.90	0.423
1963	467.07	267.05	130.30	0.790
1964	585.84	189.25	86.50	0.745
1965	507.39	156.61	122.90	1.240
1966	99.67	83.73	58.40	0.904
1967	39.22	89.31	67.70	1.422
1968	178.06	27.41	16.80	0.920
1969	46.32	16.56	20.91	0.766
1970	33.78	19.69	16.45	0.787
1971	70.41	13.00	11.83	1.697
1972	89.76	10.35	0.37	0.052
1973	417.89	28.65	0.26	0.007
1974	131.80	45.90	1.27	0.019
1975	198.43	116.93	13.28	0.152
1976	553.91	129.34	17.17	0.148
1977	436.77	132.97	28.92	0.220
1978	194.57	175.61	37.33	0.244
1979	247.79	198.35	45.07	0.239
1980	253.51	212.75	53.27	0.294
1981	879.74	186.23	39.54	0.246
1982	237.89	192.68	56.53	0.367
1983	227.60	219.68	58.67	0.224
1984	477.37	232.90	50.29	0.255
1985	1,225.73	251.27	49.09	0.227
1986	643.68	261.51	65.50	0.356
1987	374.75	366.63	73.00	0.382
1988	523.07	427.19	92.80	0.291
1989	389.74	400.01	101.00	0.311
1990	1,092.40	363.79	105.10	0.356
1991	1,255.07	313.00	109.50	0.372
1992	699.37	385.94	108.50	0.324
1993	987.27	517.66	102.70	0.201
1994	600.00	520.48	134.00	0.267
1995	600.00	520.21	125.90	0.271
Average	413.03	200.16	51.16	0.435
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.2.7.1 Capelin in the Iceland-Greenland -Jan Mayen area. The international capelin catch 1964–1996 (thousand tonnes)

Year	Iceland	Winter season			Summer- and autumn season					Total
		Norway	Faroes	Total	Iceland	Norway	Faroes	Others	Total	
1964	8.6	-	-	8.6	-	-	-	-	-	8.6
1965	49.7	-	-	49.7	-	-	-	-	-	49.7
1966	124.5	-	-	124.5	-	-	-	-	-	124.5
1967	97.2	-	-	97.2	-	-	-	-	-	97.2
1968	78.1	-	-	78.1	-	-	-	-	-	78.1
1969	170.6	-	-	170.6	-	-	-	-	-	170.6
1970	190.8	-	-	190.8	-	-	-	-	-	190.8
1971	182.9	-	-	182.9	-	-	-	-	-	182.9
1972	276.5	-	-	276.5	-	-	-	-	-	276.5
1973	440.9	-	-	440.9	-	-	-	-	-	440.9
1974	461.9	-	-	461.9	-	-	-	-	-	461.9
1975	457.1	-	-	457.1	3.1	-	-	-	3.1	460.2
1976	338.7	-	-	338.7	114.4	-	-	-	114.4	453.1
1977	549.2	-	24.3	573.5	259.7	-	-	-	259.7	833.2
1978	468.4	-	36.2	504.6	497.5	154.1	3.4	-	655.0	1,159.6
1979	521.7	-	18.2	539.9	442.0	124.0	22.0	-	588.0	1,127.9
1980	392.1	-	-	392.1	367.4	118.7	24.2	17.3	527.6	919.7
1981	156.0	-	-	156.0	484.6	91.4	16.2	20.8	613.0	769.0
1982	13.2	-	-	13.2	-	-	-	-	-	13.2
1983	-	-	-	-	133.4	-	-	-	133.4	133.4
1984	439.6	-	-	439.6	425.2	104.6	10.2	8.5	548.5	988.1
1985	348.5	-	-	348.5	644.8	193.0	65.9	16.0	919.7	1,268.2
1986	341.8	50.0	-	391.8	552.5	149.7	65.4	5.3	772.9	1,164.7
1987	500.6	59.9	-	560.5	311.3	82.1	65.2	-	458.6	1,019.1
1988	600.6	56.6	-	657.2	311.4	11.5	48.5	-	371.4	1,028.6
1989	609.1	56.0	-	665.1	53.9	52.7	14.4	-	121.0	786.1
1990	612.0	62.5	12.3	686.8	83.7	21.9	5.6	-	111.2	798.0
1991	202.4	-	-	202.4	56.0	-	-	-	56.0	258.4
1992	573.5	47.6	-	621.1	213.4	65.3	18.9	*0.5	298.1	919.2
1993	489.1	-	*0.5	489.6	450.0	127.5	23.9	*10.2	611.6	1,101.2
1994	550.3	15.0	*1.8	567.1	210.7	99.0	12.3	*2.1	324.1	891.2
1995	539.4	-	*0.4	539.8	175.5	28.0	-	*2.2	205.7	745.5
1996	707.9	-	**15.7	723.6						

* Greenlandic vessel

** Faroes and Greenland

Table 3.2.7.2 Capelin Iceland-Greenland-Jan Mayen area.
Landings is from July to March the following year.

Year	Recruitment (age 1)	Spawning stock biomass	Landings
1964			50
1965			125
1966			97
1967			78
1968			171
1969			191
1970			183
1971			277
1972			441
1973			462
1974			457
1975			342
1976			688
1977			764
1978	164		1195
1979	60	600	980
1980	66	300	684
1981	49	170	626
1982	147	140	0
1983	125	260	573
1984	252	440	897
1985	99	460	1312
1986	157	460	1333
1987	144	420	1116
1988	81	400	1037
1989	64	440	808
1990	118	115	370
1991	133	330	677
1992	148	475	787
1993	145	499	1179
1994	223	460	864
1995	184	420	929
1996		830	
Average	131	401	615

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Table 3.3.2.1

Catches of SAITHE in Vb by various faroese fleet categories. Tonnes gutted weight.

Year	Open boats	Longliners < 100 GRT	Singletrawl < 400 HP	Gill nett	Jiggers	Singletrawl 400-1000HP	Singletrawl > 1000 HP	Pairtrawl < 1000 HP	Pairtrawl > 1000 HP	Longliners > 100 GRT	Industrial trawlers	Others	Total
1985	89	38	23	13	982	2509	12930	10822	10805	28	60	79	38377
1986	107	67	31	54	1296	1004	9872	9921	13173	21	254	330	36132
1987	244	52	116	157	1985	1458	7289	8134	15790	37	408	1	35700
1988	173	101	40	113	2576	2660	8257	7748	17266	31	501	21	39587
1989	352	55	133	90	3723	2144	7118	9440	16513	60	504	5	40136
1990	315	132	110	122	4032	2096	10742	13127	23442	101	495	8	54721
1991	298	55	78	281	4784	585	6791	12978	22584	64	404	7	48910
1992	123	121	18	0	3300	135	2253	7677	17486	37	320	1	31472
1993	168	56	57	0	2697	146	1879	6234	17639	29	203	3	29111
1994	139	112	44	2	3655	315	1995	5408	17240	63	202	0	29175
1995	50	19	90	5	2579	216	2406	4289	14776	73	19		24519

Table 3.3.2.2 Saithe in the Faroes. Nominal catches (t) by countries, 1982-95 as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988
Denmark	-	-	-	-	21	255	94
Faroe Islands	30,808	38,963	54,344	42,874	40,139	39,301	44,402
France	130	180	243	839	87	153	313
German Dem. Rep.	-	-	-	31	-	-	-
German Fed. Rep.	19	28	73	227	105	49	74
Netherlands	-	-	-	-	-	-	-
Norway	15	5	5	-	24	14	52
UK (Eng. & W.)	-	-	-	4	-	108	-
UK (Scotland)	1	-	-	630	1,340	140	92
United Kingdom	-	-	-	-	-	-	-
USSR	-	-	-	-	-	-	-
Total	30,973	39,176	54,665	44,605	41,716	40,020	45,027

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Denmark		2					
Faroe Islands	43624	59821	53321	35979	32719	32406	27217
France ³	-	-	-	1999	75	-	-
German Dem. Rep.	9		32	5	2	1	19
German Fed. Rep.	20	15	-	-	-	-	-
Netherlands	22	67	65	-	-	-	-
Norway	51	46	103	85	34	156	14
UK (Eng. & W.)	-	-	5	74	280	151	-
UK (Scotland)	9	33	79	98	425	438	-
United Kingdom	-	-	-	-	-	-	221
USSR/Russia ²	-	30	-	12	-	-	-
Total	43735	60014	53605	38252	33535	33152	27471

¹ Preliminary.² As from 1991.³ Quantity unknown 1989-91 and 1994.

Table 3.3.2.3 Saithe in the Faroes. Nominal catches (t) by countries, 1982-95 as used in the assessment.

Country	1982	1983	1984	1985	1986	1987	1988
Denmark	-	-	-	-	21	255	94
Faroe Islands							
Vb	30,808	38,963	54,344	42,874	40,139	39,301	44,402
IIa4	-	-	-	-	-	-	258
France	130	180	243	839	87	153	313
German Dem.Rep.	-	-	-	31	-	-	-
German Fed. Rep.	19	28	73	227	105	49	74
Netherlands	-	-	-	-	-	-	-
Norway	15	5	5	-	24	14	52
UK (Eng. & W.)	-	-	-	4	-	108	-
UK (Scotland)	1	-	-	630	1,340	140	92
United Kingdom	-	-	-	-	-	-	-
USSR	-	-	-	-	-	-	-
Total	30,973	39,176	54,665	44,605	41,716	40,020	45,285

Country	1989	1990	1991	1992	1993	1994	1995 ¹
Denmark	-	2	-	-	-	-	-
Faroe Islands							
Vb	43624	59821	53321	35979	32719	32406	27217
IIa4	269	988	963	165	-	-	-
France ³	473	626	283	1999	75	10	-
German Dem.Rep.	9	-	-	-	-	-	-
German Fed. Rep.	20	15	32	5	2	1	-
Netherlands	22	67	65	-	-	-	-
Norway	51	46	103	34	85	156	14
UK (Eng. & W.)	-	-	5	74	280	151	-
UK (Scotland)	9	33	79	98	425	438	-
United Kingdom	-	-	-	-	-	-	221
USSR/Russia ²	-	30	7	12	11	11	9
Total	44477	61628	54858	38366	33597	33173	27461

¹ Preliminary.

² As from 1991.

³ Quantity unknown 1989-91 and 1994.

Table 3.3.2.4 Saithe in the Faroes Grounds (Fishing Area Vb).

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-8
1961	9.05	83.82	9.59	0.091
1962	13.67	85.66	10.45	0.108
1963	22.44	100.67	12.69	0.100
1964	16.21	98.43	21.89	0.201
1965	22.83	107.28	22.18	0.183
1966	21.86	108.87	25.56	0.203
1967	26.93	104.75	21.32	0.166
1968	21.55	116.12	20.39	0.135
1969	40.87	124.00	27.44	0.179
1970	34.21	129.41	29.11	0.183
1971	37.35	139.84	32.71	0.176
1972	33.71	147.99	42.66	0.232
1973	23.31	137.17	57.43	0.332
1974	18.90	138.24	47.19	0.280
1975	16.68	138.64	41.58	0.312
1976	18.82	122.86	33.07	0.279
1977	12.99	115.16	34.84	0.347
1978	8.49	97.14	28.14	0.263
1979	8.74	84.92	27.25	0.280
1980	12.39	91.02	25.23	0.227
1981	33.35	77.86	30.10	0.413
1982	14.77	84.20	30.96	0.340
1983	41.07	106.10	39.18	0.385
1984	25.97	103.14	54.67	0.501
1985	22.25	119.83	44.61	0.407
1986	62.56	106.14	41.72	0.507
1987	49.09	104.79	40.02	0.413
1988	45.17	112.05	45.29	0.449
1989	29.71	109.15	44.48	0.361
1990	21.80	102.36	61.56	0.551
1991	26.38	80.78	54.86	0.665
1992	16.90	70.08	38.37	0.507
1993	26.00	73.86	33.48	0.417
1994	9.65	71.56	33.19	0.429
1995	14.88	66.38	27.48	0.418
Average	24.59	104.58	34.02	0.315
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.3.3.a1 Faroe Plateau (Sub-division Vb1) COD. Nominal catches (tonnes) by countries, 1986-1995, as officially reported to ICES.

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹⁾
Denmark	8	30	10	-	-	-	-	-	-	-
Faroe Islands	34,492	21,303	22,272	20,535	12,232	8,203	5,938	5,744	8,724 ¹⁾	19,128
France ¹⁾	4	17	17	-	-	-	318 ³⁾	1 ³⁾	-	-
Germany	8	12	5	7	24	16	12	+	2 ³⁾	-
Norway	83	21	163	285	124	89	39	61 ¹⁾	36 ¹⁾	38
UK (Engl. and Wales)	-	8	-	-	-	1	79	186	56	-
UK (Scotland) ²⁾	-	-	-	-	-	-	-	-	-	641 ³⁾
Total	34,595	21,391	22,467	20,827	12,380	8,309	6,386	5,992	8,818	19,807

¹⁾ Preliminary

¹⁾ Quantity unknown 1989-1991 and 1994.

²⁾ Catches included in Sub-division Vb2

³⁾ Reported as Vb.

Table 3.3.3.a2 Nominal catch (tonnes) of COD in sub-division Vb1 (Faroe Plateau) 1986-1995, as used in the assessment.

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹⁾
Officially reported	34,595	21,391	22,467	20,827	12,380	8,309	6,386	5,992	8,818	19,807
Faroesse catches in IIA within Faroe area jurisdiction			715	1,229	1,090	351	154			
Expected misreporting/discard French catches as reported to Faroesse authorities				12	17					3330
Total used in the assess	34,595	21,391	23,182	22,068	13,487	8,660	6,540	5,992	8,818	23,137

¹⁾ Preliminary

Table 3.3.3.a.3 Cod in the Faroe Plateau (Fishing Area Vb1).

Year	Recruitment Age 2	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1961	12.02	40.78	25.50	0.606
1962	20.65	39.59	23.20	0.523
1963	20.29	45.33	23.10	0.494
1964	21.83	54.32	24.00	0.502
1965	8.27	64.68	24.86	0.491
1966	18.57	65.93	21.03	0.474
1967	23.45	74.77	25.17	0.390
1968	17.58	87.17	30.28	0.464
1969	9.33	90.56	35.67	0.438
1970	8.61	81.41	29.04	0.388
1971	11.93	75.46	26.15	0.353
1972	21.32	70.68	20.44	0.336
1973	12.57	84.83	22.38	0.289
1974	30.48	91.90	24.58	0.314
1975	38.31	112.94	36.78	0.395
1976	18.57	128.69	39.80	0.475
1977	9.99	83.37	34.93	0.676
1978	10.72	78.48	26.59	0.426
1979	15.02	66.68	23.11	0.428
1980	23.53	58.84	20.51	0.395
1981	14.02	63.49	22.96	0.466
1982	22.21	67.15	21.49	0.415
1983	25.17	98.76	38.13	0.710
1984	47.88	115.75	36.98	0.506
1985	17.38	84.86	39.48	0.703
1986	9.45	74.37	34.60	0.660
1987	10.04	62.49	21.39	0.439
1988	8.64	52.59	23.18	0.603
1989	14.17	38.73	22.07	0.784
1990	3.08	28.10	13.49	0.660
1991	5.17	19.40	8.66	0.538
1992	7.27	17.27	6.54	0.498
1993	9.33	25.16	5.99	0.329
1994	20.23	53.84	8.82	0.312
1995	38.36	51.74	23.14	0.559
Average	17.30	67.15	24.69	0.487
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.3.3.b.1 Faroe Bank (Sub-division Vb2) COD. Nominal catches (tonnes) by countries, 1986-1995, as officially reported to ICES.

Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ²⁾
Faroe Islands	1,836	3,409	2,960	1,270	289	297	122	264	717 ¹⁾	569
Norway	6	23	94	128	72	38	32	2 ²⁾	8 ²⁾	105
UK (Engl. and Wales)	-	-	-	-	-	-	+	1	1	²⁾
UK (Scotland) ¹⁾	63	47	37	14	207	90	172	118	227	²⁾
Total	1,905	3,479	3,091	1,412	568	425	326	385	953	674

¹⁾ Provisional data

¹⁾ Includes Vb1

²⁾ Included in Vb1 /UK

Table 3.3.3.b2 Faroe Bank cod (Fishing Area Vb2)

Year	Landings
1984	2,216
1985	2,961
1986	1,905
1987	3,479
1988	3,091
1989	1,412
1990	568
1991	425
1992	326
1993	385
1994	953
1995	674
Average	1,533
Unit	tonnes

Table 3.3.4.1 Faroe Plateau (Sub-division Vb1) HADDOCK. Nominal catches (tonnes) by countries 1981-1994, as officially reported to ICES, and the total Working Group estimate for Sub-divisions Vb₁ and Vb₂ combined.

Country	1982	1983	1984	1985	1986	1987	1988
Denmark	-	-	-	-	1	8	4
Faroe Islands	10,319	11,898	11,418	13,597	13,359	13,954	10,867
France ¹	2	2	20	23	8	22	14
Germany	1	+	+	+	1	1	-
Norway	12	12	10	21	22	13	54
UK (Engl. and Wales)	-	-	-	-	-	2	-
UK (Scotland) ³	1	-	-	-	-	-	-
United Kingdom							
Total	10,335	11,912	11,448	13,641	13,391	14,000	10,939
Working Group estimate ^{4,5}	11,937	12,894	12,378	15,143	14,477	14,882	12,178

Country	1989	1990	1991	1992	1993	1994	1995 ²
Denmark	-	-	-	-	-	-	-
Faroe Islands	13,506	11,106	8,074	4,629	3,622	3,675	4,566
France ¹	-	-	-	164	-	-	-
Germany	+	+	+	-	-	-	5 ⁶
Norway	111	94	125	71 ²	29 ²	22	28
UK (Engl. and Wales)	-	7	-	71	80	-	-
UK (Scotland) ³	-	-	-	-	-	-	-
United Kingdom						200 ⁶	55 ⁶
Total	13,617	11,207	8,199	4,935	3,731	3,897	
Working Group estimate ^{4,5}	14,325	11,726	8,429	5,476	3,814	4,251	4,987

1) Including catches from Sub-division Vb2. Quantity unknown 1989-1991, 1993 and 1995.

2) Provisional data

3) From 1983 catches included in Sub-division Vb2.

4) Includes catches from Sub-division Vb2 and Division IIa in Faroese waters.

5) Includes French catches from Division Vb, as reported to the Faroese coastal guard service

6) Reported as Division Vb.

Table 3.3.4.2 Faroe Bank (Sub-division Vb2) HADDOCK. Nominal catches (tonnes) by countries, 1981-1995, as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988
Faroe Islands	1,533	967	925	1,474	1,050	832	1,160
France ¹	-	-	-	-	-	-	-
Norway	1	2	5	3	10	5	43
UK (Engl. and Wales)	-	-	-	-	-	-	-
UK (Scotland) ³	48	13	+	25	26	45	15
Total	1,582	982	930	3,462	1,086	882	1,218

Country	1989	1990	1991	1992	1993	1994	1995 ²
Faroe Islands	659	325	217	338	185	353	313
France ¹	-	-	-	-	-	-	-
Norway	16	97	4	23	8	1	20
UK (Engl. and Wales)	-	-	-	+	+	... ¹	... ¹
UK (Scotland) ³	30	725	287	852	102	... ¹	... ¹
Total	705	1,147	508	1,213	295		

1) Catches included in Sub-division Vb1.

2) Provisional data

3) Since 1983 includes also catches taken in Sub-division Vb1 (see Table 2.4.1)

Table 3.3.4.3 Haddock in the Faroe Grounds (Fishing Area Vb).

Year	Recruitment Age 2	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1961	51.28	47.80	20.83	0.562
1962	38.54	51.88	27.15	0.651
1963	47.36	49.55	27.57	0.700
1964	30.11	44.13	19.49	0.475
1965	22.65	45.56	18.48	0.526
1966	20.21	43.95	18.77	0.529
1967	25.36	41.96	13.38	0.403
1968	54.87	45.39	17.85	0.438
1969	31.98	53.44	23.27	0.485
1970	35.62	59.89	21.36	0.476
1971	15.47	62.96	19.39	0.456
1972	33.21	62.05	16.49	0.396
1973	23.71	61.67	17.97	0.289
1974	52.40	64.75	14.76	0.220
1975	70.63	75.58	20.72	0.180
1976	56.39	89.56	26.21	0.247
1977	26.48	97.13	25.55	0.386
1978	34.93	98.16	19.20	0.276
1979	2.86	86.29	12.42	0.153
1980	5.15	82.74	15.02	0.176
1981	3.49	76.84	12.23	0.178
1982	16.42	57.31	11.94	0.324
1983	19.96	52.85	12.89	0.258
1984	41.15	55.34	12.38	0.216
1985	38.89	63.56	15.14	0.264
1986	25.43	67.27	14.48	0.214
1987	8.31	68.92	14.88	0.248
1988	16.87	61.65	12.18	0.202
1989	14.02	50.82	14.33	0.296
1990	9.96	41.39	11.73	0.300
1991	2.78	32.35	8.43	0.313
1992	3.69	24.70	5.48	0.247
1993	1.96	21.39	3.81	0.193
1994	4.31	19.66	4.25	0.186
1995	24.92	20.80	4.99	0.208
Average	26.04	56.55	15.86	0.333
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.4.1.1 Catches of the most important species in the industrial fisheries in Division IIIa ('000 t), 1974–1995¹.

Year	Sandeel	Sprat ²	Herring ³	Norway pout	Blue whiting	Total
1974	8	71	76	13	-	168
1975	17	101	57	19	-	194
1976	22	59	38	42	-	161
1977	7	67	32	21	-	127
1978	23	78	16	25	-	142
1979	34	96	13	25	6	174
1980	39	84	25	26	14	188
1981	59	76	63	30	+	228
1982	25	40	54	44	5	168
1983	29	26	89	30	16	190
1984	26	36	112	46	15	235
1985	6	20	116	9	19	170
1986	73	11	65	6	9	164
1987	5	14	72	3	25	119
1988	23	9	97	8	15	152
1989	18	10	52	6	9	95
1990	16	10	51	27	10	114
1991	23	14	22	32	11	102
1992	39	2	47	42	18	148
1993 ⁴	45	2	71	8	32	158
1994	55	58	30	7	12	162
1995	12	41	21	50	10	134
Mean						
1974–1995	26	41	56	24	14 ⁵	154

¹Data from 1974–1984 from Anon. (1986), 1985–1995 provided by Working Group members.²Total landings from all fisheries.³For years 1974–1985, human consumption landings used for reduction are included in these data.⁴Preliminary.⁵Mean 1979–1995.

Table 3.4.2 b.1 Cod landings (in tonnes) from the Kattegat. 1971–1995.

Year	Kattegat			Total
	Denmark	Sweden	Germany ²	
1971	11,748	3,962	22	15,732
1972	13,451	3,957	34	17,442
1973	14,913	3,850	74	18,837
1974	17,043	4,717	120	21,880
1975	11,749	3,642	94	15,485
1976	12,986	3,242	47	16,725
1977	16,668	3,400	51	20,119
1978	10,293	2,893	204	13,390
1979	11,045	3,763	22	14,830
1980	9,265	4,206	38	13,509
1981	10,693	4,380	284	15,337
1982	9,320	3,087	58	12,465
1983	9,149	3,625	54	12,828
1984	7,590	4,091	205	11,886
1985	9,052	3,640	14	12,706
1986	6,930	2,054	112	9,096
1987	9,396	2,006	89	11,491
1988	4,054	1,359	114	5,527
1989	7,056	1,483	51	8,590
1990	4,715	1,186	35	5,936
1991	4,664	2,006	104	6,834
1992	3,406	2,771	94	6,271
1993	4,464	2,549	157	7,170
1994	3,968	2,836	98	7,802 ³
1995	3,789	2,704	71	8,164 ⁴

¹Preliminary.

²Landings statistics incompletely split on the Kattegat and Skagerrak.

The figures are estimated by the Working Group members.

³Including 900 t reported in Skagerrak.

⁴Including 1,600 t misreported by area.

Table 3.4.4.1 Nominal landings (in tonnes) of WHITING from Division IIIa as supplied by the Study Group on Division IIIa Demersal Stocks (Anon., 1992b) and updated by the Working Group.

Year	Denmark		Norway	Sweden	Others	Total	
1975	19,018		57	611	4	19,690	
1976	17,870		48	1,002	48	18,968	
1977	18,116		46	975	41	19,178	
1978	48,102		58	899	32	49,091	
1979	16,971		63	1,033	16	18,083	
1980	21,070		65	1,516	3	22,654	
	Total consumption	Total industrial	Total				
1981	1,027	23,915	24,942	70	1,054	7	26,073
1982	1,183	39,758	40,941	40	670	13	41,664
1983	1,311	23,505	24,816	48	1,061	8	25,933
1984	1,036	12,102	13,138	51	1,168	60	14,417
1985	557	11,967	12,524	45	654	2	13,225
1986	484	11,979	12,463	64	477	1	13,005
1987	443	15,880	16,323	29	262	43	16,657
1988	391	10,872	11,263	42	435	24	11,764
1989	777	11,662	12,439	29	675	-	13,215
1990	1,016	17,829	18,845	46	435	73	19,333
1991	881	12,463	13,344	56	557	97	14,054
1992	538	10,675	11,213	67	959	1	12,240
1993	181	3,581	3,762	42	756	1	4,561
1994	0	5,391	5,391	21	439	1	5,852
1995	85	9,029	9,114	24	431	1	9,570

¹Preliminary.

Table 3.4.5.1 Plaice landings from the Kattegat and Skagerrak (tonnes) 1972–1994. Official figures, excluding misreported landings in the period 1983–1988.
See Anon. (1992).

Year	Denmark		Sweden		Germany		Belgium		Norway		Total		Total		Total
	Kattegat	Skagerrak	Kattegat	Skagerrak	Kattegat	Skagerrak	Skagerrak	Skagerrak	Skagerrak	Skagerrak	Kattegat	Skagerrak	Skagerrak	Skagerrak	Div. IIIa
1972	15,504	5,095	348	70							15,852	5,165			21,017
1973	10,021	3,871	231	80							10,252	3,951			14,203
1974	11,401	3,429	255	70							11,656	3,499			15,155
1975	10,158	4,888	369	77							10,527	4,965			15,492
1976	9,487	9,251	271	81							9,758	9,332			19,090
1977	11,611	12,855	300	142							11,911	12,997			24,908
1978	12,685	13,383	368	94							13,053	13,477			26,530
1979	9,721	11,045	281	105							10,002	11,150			21,152
1980	5,582	9,514	289	92							5,871	9,606			15,477
1981	3,803	8,115	232	123							4,035	8,238			12,273
1982	2,717	7,789	201	140							2,918	7,929			10,847
1983	3,280	6,828	291	170				133	14		3,571	7,145			10,716
1984	3,252	7,560	323	356	32			27	22		3,607	7,965			11,572
1985	2,979	9,646	403	296	4			136	18		3,386	10,096			13,482
1986	2,468	10,653	170	215				505	24		2,638	11,397			14,035
1987	2,868	11,370	283	222	104			907	25		3,255	12,524			15,779
1988	1,818	9,781	210	281	3			716	41		2,031	10,819			12,850
1989	1,596	5,387	135	320	4		0	230	33		1,735	5,970.1			7,705
1990	1,831	8,726	201	777	2		1	471	69		2,034	10,043.7			12,078
1991	1,756	5,849	267	472	6		4	315	68		2,029	6,707.9			8,737
1992	2,071	8,522	208	381				537	107		2,279	9,547			11,826
1993	1,289	9,128	287	175				339	78		1,576	9,720			11,296
1994	1,553	8,790	315	227	4		33	325	65		1,872	9,440			11,312
1995	1,555	8,479	132	338	6		42	302	76		1,693	9,237			10,930

Table 3.4.5.2 Plaice in the Kattegat and Skagerrak (Division IIIa).

Year	Recruitment Age 2	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-8
1978	61.96	61.15	26.53	0.759
1979	46.64	46.67	21.15	0.832
1980	35.49	39.81	15.48	0.903
1981	26.89	33.10	12.27	0.645
1982	52.25	27.51	10.85	0.828
1983	97.85	28.70	10.72	0.727
1984	73.69	42.82	11.57	0.739
1985	50.82	49.10	13.48	0.545
1986	38.16	45.12	14.04	0.570
1987	35.54	39.19	15.78	0.804
1988	34.06	28.84	12.85	1.116
1989	68.19	23.87	7.71	0.740
1990	73.48	34.52	12.08	0.967
1991	51.60	36.24	8.74	0.682
1992	49.58	40.61	11.83	0.808
1993	50.19	37.59	11.30	0.795
1994	39.57	36.20	11.31	0.726
1995	35.39	35.59	10.93	0.783
Average	51.19	38.15	13.26	0.776
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.4.6.1 Kattegat and Skagerrak Sole landings (tonnes) 1970–1995. Official statistics and Working Group corrections. Danish catches are given for Kattegat and Skagerrak combined 1952–1969. For Sweden there is no information 1962–1974.

Year	Denmark		Sweden Skag+Kat	Germany Kattegat	Belgium Skagerrak	Netherlands Skagerrak	Working Group Corrections	Total
	Kattegat	Skagerrak						
1952	156		51	59				266
1953	159		48	42				249
1954	177		43	34				254
1955	152		36	35				223
1956	168		30	57				255
1957	265		29	53				347
1958	226		35	56				317
1959	222		30	44				296
1960	294		24	83				401
1961	339		30	61				430
1962	356			58				414
1963	338			27				365
1964	376			45				421
1965	324			50				374
1966	312			20				332
1967	429			26				455
1968	290			16				306
1969	261			7				268
1970	158	25						183
1971	242	32		9				283
1972	327	31		12				370
1973	260	52		13				325
1974	388	39		9				436
1975	381	55	16	16		9	-9	468
1976	367	34	11	21	2	155	-155	435
1977	400	91	13	8	1	276	-276	513
1978	336	141	9	9		141	-141	495
1979	301	57	8	6	1	84	-84	373
1980	228	73	9	12	2	5	-5	324
1981	199	59	7	16	1			282
1982	147	52	4	8	1	1	-1	212
1983	180	70	11	15		31	-31	276
1984	235	76	13	13		54	-54	337
1985	275	102	19	1	+	132	-132	397
1986	456	158	26	1	2	109	-109	643
1987	564	137	19		2	70	-70	722
1988	540	138	24		4			706
1989	578	217	21	7	1			824
1990	464	128	29	8	2		419	1050
1991	746	216	38	11				1011
1992	856	372	54	12				1294
1993	1016	355	68	+				1439
1994	890	296	12	+				1198
1995	850	382	65					1297

Table 3.4.7.1 Nominal landings (tonnes) of *Pandalus borealis* in ICES division IIIa and Sub-area IV as officially reported to ICES.

Year	Division IIIa				Sub-area IV					Total
	Denmark	Norway	Sweden †	Total	Denmark	Norway	Sweden	UK (Engl.)*	UK (Scotl.)*	
1970	757	982	2740	4479	3460	1107		14	100	4681
1971	834	1392	2906	5132	3572	1265			438	5275
1972	773	1123	2524	4420	2448	1216		692	187	4543
1973	716	1415	2130	4261	196	931		1021	163	2311
1974	475	1186	2003	3664	337	767		50	432	1586
1975	743	1463	1740	3946	1392	604	261		525	2782
1976	865	2541	2212	5618	1861	1051	136	186	2006	5240
1977	763	2167	1895	4825	782	960	124	265	1723	3854
1978	757	1841	1529	4127	1592	692	78	98	2044	4504
1979	973	2489	1752	5214	962	594	34	238	309	2137
1980	1679	3498	2121	7298	1273	1140	38	203	406	3060
1981	2593	3753	2210	8556	719	1435	31	1	341	2527
1982	2920	3877	1421	8218	1069	1545	92		354	3060
1983	1571	3722	988	6281	5752	1657	112	65	1836	9422
1984	1717	3509	933	6159	4638	1274	120	277	25	6334
1985	4105	4772	1474	10351	4582	1785	128	415	1347	8257
1986	4686	4811	1357	10854	3896	1681	157	458	358	6550
1987	4140	5198	1085	10423	9223	3145	252	526	774	13920
1988	2278	3047	1075	6400	2647	4614	220	489	109	8098
1989	2527	3156	1304	6987	3298	3418	122	353	590	7802
1990	2277	3006	1471	6754	2079	3146	137	304	365	6031
1991	3256	3441	1747	8444	750	2715	161	64	54	3744
1992	3296	4250	2057	9603	1881	2918	147	69	116	5131
1993	2490	4081	2133	8704	1985	3421	167	29	516	6118
1994	1973	4389	2553	8915	1352	2425	176	41	35	4029
1995	2396	5181	2642	10219	4684	2964	179	168	1364	9359

* Includes small amounts of other Pandalid shrimps

† 1970 to 1974 includes subarea IV.

Total 1988 and 1989 includes 19 and 21 t. by the Netherlands

1995 figures are preliminary.

Table 3.4.7.2 *Pandalus borealis* landings from Divisions IIIa (Skagerrak) and IVa (eastern Part). (Norwegian Deeps) as estimated by the Study Group.

Year	Denmark	Norway	Sweden	Total	Estimated discards
1970	1102	1729	2742	5573	
1971	1190	2486	2906	6582	
1972	1017	2477	2524	6018	
1973	755	2333	2130	5218	
1974	530	1809	2003	4342	
1975	817	2339	2003	5159	
1976	1204	3348	2529	7081	
1977	1120	3004	2019	6143	
1978	1459	2440	1609	5508	
1979	1062	3040	1787	5889	
1980	1678	4562	2159	8399	
1981	2593	5183	2241	10017	
1982	3766	5042	1450	10258	
1983	1567	5361	1136	8064	
1984	1747	4783	1022	7552	
1985	3827	6646	1571	12044	584
1986	4834	6490	1463	12787	477
1987	4599	8343	1321	14263	808
1988	3068	7661	1278	12007	830
1989	3150	6411	1433	10994	1548
1990	2479	6139	1540	10158	1723
1991	3583	6106	1908	11597	765
1992	3725	7136	2154	13015	713
1993	2915	7504	2300	12719	1188
1994	2118	6813	2719	11650	426
1995	2465	8064	2821	13350	528

Table 3.4.7.3 *Pandalus* in Division IIIa & IVa East (Skagerrak & Norwegian Deeps).

Year	Recruitment Age 0	Spawning Stock Biomass	Catch	Fishing Mortality Age 1-3
1985	19,324.40	17.05	12.63	0.547
1986	17,564.40	9.27	13.26	0.486
1987	10,609.80	15.37	15.07	0.479
1988	17,392.10	11.69	12.84	0.662
1989	20,391.10	11.61	12.54	0.683
1990	19,741.70	12.56	11.88	0.598
1991	15,065.00	15.26	12.36	0.718
1992	25,545.50	13.66	13.73	1.070
1993	16,414.00	13.79	13.91	0.782
1994	13,736.60	17.18	12.08	0.424
1995	15,101.90	14.49	13.88	0.668
Average	17,353.32	13.81	13.11	0.647
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.4.8.1 HERRING in Division IIIa and Sub. Division 22-24, 1986 - 1995
Landings in thousands of tonnes.
(Data provided by Working Group members 1996).

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Skagerrak											
Denmark	88.2	94.0	105.0	144.4	47.4	62.3	58.7	64.7	87.8	44.9	43.7
Faroe Islands	0.5	0.5									
Norway	4.5	1.6	1.2	5.7	1.6	5.6	8.1	13.9	24.2	17.7	16.7
Sweden	40.3	43.0	51.2	57.2	47.9	56.5	54.7	88.0	56.4	66.4	48.5
Total	133.5	139.1	157.4	207.3	96.9	124.4	121.5	166.6	168.4	129.0	108.9
Kattegat											
Denmark	69.2	37.4	46.6	76.2	57.1	32.2	29.7	33.5	28.7	23.6	16.9
Sweden	39.8	35.9	29.8	49.7	37.9	45.2	36.7	26.4	16.7	15.4	30.8
Total	109.0	73.3	76.4	125.9	95.0	77.4	66.4	59.9	45.4	39.0	47.7
Sub. Div. 22+24											
Denmark	15.9	14.0	32.5	33.1	21.7	13.6	25.2	26.9	38.0	39.5	36.8
Germany	54.6	60.0	53.1	54.7	56.4	45.5	15.8	15.6	11.1	11.4	13.4
Poland	16.7	12.3	8.0	6.6	8.5	9.7	5.6	15.5	11.8	6.3	7.3
Sweden	11.4	5.9	7.8	4.6	6.3	8.1	19.3	22.3	16.2	7.4	15.8
Total	98.6	92.2	101.4	99.0	92.9	76.9	65.9	80.3	77.1	64.6	73.3
Sub. Div. 23											
Denmark	6.8	1.5	0.8	0.1	1.5	1.1	1.7	2.9	3.3	1.5	0.9
Sweden	1.1	1.4	0.2	0.1	0.1	0.1	2.3	1.7	0.7	0.3	0.2
Total	7.9	2.9	1.0	0.2	1.6	1.2	4.0	4.6	4.0	1.8	1.1
Grand Total	349.0	307.5	336.2	432.4	286.4	279.9	257.8	311.4	294.9	234.4	231.0

Table 3.4.8.2

Herring in Division IIIa and Sub-divisions 22-24 (spring spawners).

Year	Landings
1975	106
1976	86
1977	89
1978	124
1979	124
1980	143
1981	158
1982	151
1983	224
1984	261
1985	247
1986	186
1987	175
1988	251
1989	186
1990	204
1991	192
1992	168
1993	171
1994	164
1995	173
Average	171
Unit	1000 tonnes

Table 3.4.9.1 Landings of SPRAT in Division IIIa Catch (in tonnes 10³). (Data provided by Working Group members). These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1974	1975	1976	1977	1978	1979	1980	1981
Skagerrak								
Denmark	17.9	15.0	12.8	7.1	26.6	33.5	31.7	26.4
Sweden	2.0	2.1	2.6	2.2	2.2	8.1	4.0	6.3
Norway	1.2	1.9	2.0	1.2	2.7	1.8	3.4	4.6
Total	21.1	19.0	17.4	10.5	31.5	43.4	39.1	37.3

Country	1974	1975	1976	1977	1978	1979	1980	1981
Kattegat								
Denmark	31.6	60.7	27.9	47.1	37.0	45.8	35.8	23.0
Sweden	18.6	20.9	13.5	9.8	9.4	6.4	9.0	16.0
Total	50.2	81.6	41.4	56.9	46.4	52.2	44.8	39.0
Div. IIIa Total	71.3	100.6	58.8	67.4	77.9	95.6	83.9	76.3

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 ¹	1995 ¹
Skagerrak														
Denmark	10.5	3.4	13.2	1.3	0.4	1.4	1.7	0.9	1.3	4.2	1.1	0.6	47.7	29.1
Sweden	-	-	-	-	-	-	-	-	-	-	-	-	4.7	9.7
Norway	1.9	1.9	1.8	2.5	1.1	0.4	0.3	1.1	1.3	1.0	0.6	1.3	1.8	0.5

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 ¹	1995 ¹
Kattegat														
Denmark	21.4	9.1	10.9	4.6	0.9	1.4	1.3	3.0	1.1	2.2	2.2	0.8	11.7	11.7
Sweden	-	-	-	-	-	-	-	-	-	-	-	1.7	2.6	4.6

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 ¹	1995 ¹
Division IIIa														
Sweden	5.9	13.0	10.2	11.3	8.4	11.2	5.4	4.8	6.0	6.6	6.6	-	-	-
Div. IIIa Total	39.7	26.4	36.1	19.7	10.8	14.4	8.7	9.8	9.7	14.0	10.5	9.1	96.0	55.6

¹Preliminary.

Table 3.4.11.1 Sandeels. Annual landings (tonnes) in Division IIIa. (Data as officially reported to ICES).

Country	1989	1990	1991	1992	1993	1994	1995
Denmark ²	17,178	16,109	25,094	52,563	51,224	85,146	24,836
Faroe Islands	-	-	-	-	344	-	-
Norway	40	99	-	49	¹	¹	¹
Sweden	-	-	-	88	-	20	40
Total	17,218	16,208	25,094	52,700	51,568	85,166	24,876

¹Preliminary.

²Including all species in landings categorised as sandeel landings.

Table 3.5.1.1 Species composition in the small meshed fisheries in the North Sea ('000 t). (Data provided by WG members).

Year	Sandeel	Sprat	Herring	Norway pout	Blue whiting	Haddock	Whiting	Saithe	Other	Total
1974	525	314	-	736	62	48	130	42		1857
1975	428	641	-	560	42	41	86	38		1799
1976	488	622	12	435	36	48	150	67		1791
1977	786	304	10	390	38	35	106	6		1675
1978	787	378	8	270	100	11	55	3		1612
1979	578	380	15	320	64	16	59	2		1434
1980	729	323	7	471	76	22	46	-		1675
1981	569	209	84	236	62	17	67	1		1245
1982	611	153	153	360	118	19	33	5	24	1476
1983	537	88	155	423	118	13	24	1	42	1401
1984	669	77	35	355	79	10	19	6	48	1298
1985	622	50	63	197	73	6	15	8	66	1100
1986	848	16	40	174	37	3	18	1	33	1170
1987	825	33	47	147	30	4	16	4	73	1179
1988	893	87	179	102	28	4	49	1	45	1388
1989	1,039	63	146	162	28	2	36	1	59	1537
1990	591	71	115	140	22	3	50	8	40	1033
1991	843	110	131	155	28	5	38	1	38	1350
1992	854	214	128	252	45	11	27	-	30	1561
1993	578	153	102	174	17	11	20	1	27	1083
1994	769	281	40	172	11	5	10	-	19	1307
1995	911	278	66	181	64	8	27	1	15	1551
Mean 1974-1993	704	220	70	292	53	15	49	9	42	1454
1993 q1	26	16	23	36	1	2	3	0	6	114
1993 q2	430	5	5	28	6	4	4	0	6	487
1993 q3	88	72	51	59	4	3	7	1	7	293
1993 q4	33	61	23	51	5	1	6		8	189
1994 q1	2	19	2	34	3	1	2	-	3	66
1994 q2	643	11	3	15	4	2	1	-	4	683
1994 q3	124	175	22	51	4	1	4	-	7	388
1994 q4	+	76	13	72	+	1	3	-	5	170
1995 q1	18	20	1	36	-	2	2	-	2	81
1995 q2	752	6	1	17	4	1	3	-	2	786
1995 q3	132	157	49	48	48	2	16	1	7	460
1995 q4	8	96	15	79	11	3	6	1	4	223

Table 3.5.1.2 Distribution of landings and associated by-catches of selected species (1,000 t) from industrial fisheries by Denmark and Norway by landings categories in the North Sea, 1995. (ACFM estimates).

Area	Fishery	Species composition									Total
		Norway pout	Sandeel	Sprat	Herring	Haddock	Whiting	Saithe	Blue Whiting	Other	
North of 57°N	Norway pout	164	0	0	3	6	8	0	65	4	250
	Sandeel	1	373	13	0	0	0	0	0	0	387
	Sprat	0	3	15	5	0	1	0	0	0	24
	Other	11	3	16	9	0	2	1	1	2	45
	Sum	176	379	44	17	6	11	1	66	6	706
South of 57°N	Norway pout	0	0	0	0	0	0	0	0	0	0
	Sandeel	0	505	16	4	0	3	0	0	2	530
	Sprat	1	10	205	26	0	6	0	0	3	251
	Other	4	19	24	19	0	6	0	0	1	73
	Sum	5	534	245	49	1	15	0	0	6	855
Total	Norway pout	164	0	0	3	6	8	0	65	4	250
	Sandeel	1	878	29	4	0	3	0	0	2	917
	Sprat	1	13	220	31	0	7	0	0	3	275
	Other	15	22	40	28	0	8	1	1	3	118
	Sum	181	913	289	66	6	26	1	66	12	1560

Table 3.5.1.3 Landings of demersal, pelagic and industrial species from the North Sea.

	cod	had	had	whit	whit	saithe	saithe	sole	plaice	N pout	sandeel	sprat	herring	mackerel	horse m	demersal	pelagic	industrial	total
		hc	lb	hc	lb	hc	lb									total	total	total	total
1970	226	525	180	83	115	163	59	20	130	238	191	51	563	323	12	1147	898	834	2879
1971	328	235	32	61	72	218	35	24	114	305	382	95	520	243	32	980	795	921	2696
1972	354	193	30	64	61	218	28	21	123	445	359	92	498	125	8	973	631	1015	2619
1973	239	179	11	71	90	195	31	19	130	346	297	228	484	226	42	833	752	1003	2588
1974	214	150	48	81	130	231	42	18	113	736	524	314	275	190	31	807	496	1794	3097
1975	205	147	41	84	86	240	38	21	108	560	428	641	313	138	10	805	461	1794	3060
1976	234	166	48	83	150	253	67	17	114	435	488	622	175	165	9	867	349	1810	3026
1977	209	137	35	78	106	190	6	18	119	390	786	304	46	188	1	751	235	1627	2613
1978	297	86	11	97	55	132	3	20	114	270	787	398	11	103	5	746	119	1524	2389
1979	270	83	16	107	59	113	2	23	145	329	578	380	25	66	1	741	92	1364	2197
1980	294	99	22	101	46	120	0	16	140	483	729	323	71	61	2	770	134	1603	2507
1981	335	130	17	90	67	121	1	15	140	239	569	209	175	60	7	831	242	1102	2175
1982	303	166	19	81	33	161	5	22	155	395	612	153	275	40	3	888	318	1217	2423
1983	259	159	13	88	24	167	1	25	144	451	537	88	387	43	4	842	434	1114	2390
1984	228	128	10	86	19	192	6	27	156	393	669	77	409	67	26	817	502	1174	2493
1985	213	159	6	62	15	192	8	24	160	205	623	50	609	35	24	810	668	907	2385
1986	196	166	3	64	18	163	1	18	165	178	848	16	661	25	21	772	707	1084	2543
1987	210	108	4	68	16	145	4	17	154	149	825	33	773	3	21	702	797	1031	2530
1988	176	105	4	56	49	104	1	22	154	109	893	87	875	6	63	617	944	1143	2704
1989	140	76	2	45	43	90	2	22	170	173	1039	63	768	7	112	543	887	1322	2752
1990	125	51	3	47	51	86	2	35	166	152	591	71	619	10	145	500	774	870	2144
1991	102	45	5	53	38	98	1	34	148	193	843	110	635	10	78	480	723	1190	2393
1992	114	70	11	52	27	92	0	29	125	300	855	124	694	10	113	482	817	1317	2616
1993	122	80	11	53	20	104	1	31	117	182	579	200	647	10	140	507	797	993	2297
1994	111	80	4	50	10	97	0	33	110	179	766	324	538	10	133	481	681	1283	2445
1995	139	75	8	47	27	114	0	30	98	241	918	357	607	10	99	503	716	1551	2770

hc = human consumption, lb = industrial by-catch

Table 3.5.2.1 Nominal catch (in tonnes) of COD in Sub-area IV, 1984–1995, as officially reported to ICES, and estimated total landings used by the Working Group.

Year	Belgium	Denmark ²	Faroe Islands	France	Germany	Netherlands	Norway ²	Poland	Sweden	UK (E+W)	UK Isle of Man	UK (N.Ireland)	UK (Scotland)	Russia	Total	Unallocated landings	Landings as used by Working Group
1984	5,804	46,751	-	8,129	13,453	25,460	7,005	7	575	35,605	-	-	54,359	-	197,148	7,723	204,871
1985	4,815	42,547	71	4,834	7,675	30,844	5,766	-	748	29,692	-	-	60,931	-	187,923	5,043	192,966
1986	6,604	32,892	45	8,402	7,667	25,082	4,864	10	839	25,361	-	-	45,748	-	157,484	5,745	163,229
1987	6,693	36,948	57	8,199	8,230	21,347	5,000	13	688	29,960	-	-	49,671	-	166,806	8,671	175,477
1988	5,508	34,905	46	8,323	7,707	16,968 ⁴	3,585	19	367	23,496	-	-	41,382	-	142,306	7,815	150,121
1989	3,398	25,782	35	2,578 ^{1,3}	11,430	12,028	4,813	24	501	18,250	1	124	31,480	-	110,444	5,180	115,624
1990	2,934	21,601	96	1,641 ^{1,3}	11,725	8,445 ¹	5,168	53	620	15,596	-	26	31,120	-	99,025	5,726	104,751
1991	2,331	18,997	23	975 ^{1,3}	7,278	6,830 ¹	5,425	15	784	14,481	-	70	28,748	-	85,957	2,554	88,511
1992	3,356	18,479	109	2,146 ¹	8,446	11,133	10,053 ¹	-	823	14,836	15	72	28,204	-	97,672	-332	97,340
1993	3,374	19,547	46	2,162 ^{1,3}	6,808	10,220	8,760 ¹	-	646	14,894	-	47	28,191	-	94,687	10,009	104,565
1994	2,648	19,234	80 ¹	1,830 ^{1,4}	5,974	6,512	8,268 ¹	-	630	13,941	-	54	28,844	-	88,015	6,434	94,449
1995	4,827	24,067	219	2,782	9,457	11,199	7,358	-	709	14,991	-	-	35,848	-	111,457	9,035	120,492

¹ Preliminary.

² Figures do not include cod caught as industrial by-catch, and not sorted for human consumption.

³ Includes Division IIa (EC).

⁴ Includes VIIe.

Table 3.5.2.2 Cod in Sub-division IIIa (Skagerrak) Reported landings by country and estimated total landings used by the Working Group.

Year	Open Skagerrak					Total	Landings used by the WG	Norwegian Coast Norway
	Denmark	Sweden	Norway	Germany	Others			
1971	5,914	2,040	1,355	-	13	9,322	9,322	-
1972	6,959	1,925	1,201	-	22	10,107	10,107	-
1973	6,673	1,690	1,253	-	27	9,643	9,643	-
1974	6,694	1,380	1,197	-	92	9,363	9,363	-
1975	14,171	917	1,190	-	52	16,330	16,330	-
1976	18,847	873	1,241	-	466	21,427	21,427	-
1977	18,618	560	-	-	675	19,853	19,853	-
1978	23,614	592	-	-	260	24,466	23,406	1,305
1979	14,007	1,279	-	-	213	15,499	13,128	1,752
1980	21,551	1,712	402	-	341	24,006	25,110	1,580
1981	25,498	2,835	286	-	294	28,913	29,507	1,792
1982	23,377	2,378	314	-	41	26,110	27,775	1,466
1983	18,467	2,803	346	-	163	21,779	22,576	1,520
1984	17,443	1,981	311	-	156	19,891	20,126	1,187
1985	14,521	1,914	193	-	-	16,628	17,611	990
1986	18,424	1,505	174	-	-	20,103	21,142	917
1987	17,824	1,924	152	-	-	19,900	20,855	838
1988	14,806	1,648	392	-	106	16,952	16,945	769
1989	16,634	1,902	256	12	34	18,838	19,648	888
1990	15,788	1,694	143	110	65	17,800	18,589	846
1991	10,396	1,579	72	12	12	12,071	12,441	854
1992	11,194	2,436	270	-	102	14,002	14,794	923
1993	11,997	2,574	75	-	91	14,735	15,324	909
1994	11,953	1,821	60	301	25	14,161	13,910	760
1995	15,888	5,185	169	200	134	21,578	14,636	846

Table 3.5.2.3 COD in Division VIId. Nominal landings (tonnes) as officially reported to ICES, 1976 to 1995.

Year	Belgium	France	Denmark	Netherlands	UK (E+W)	UK (S)	Total	Unreported landings	Total as used by Working Group
1982	251	2696	-	1	306	-	3254	726	3980
1983	368	2802	-	4	358	-	3532	308	3840
1984	331	2492	-	-	282	-	3105	415	3520
1985	501	2589	-	-	326	-	3416	- 86	3330
1986	650	9938	4	-	830	-	11422	1398	12820
1987	815	7541	-	-	1044	-	9400	4820	14220
1988	486	8795	+	1	867	-	10149	- 789	9360
1989	173	n/a	+	1	562	-	n/a	-	5540
1990	237	n/a	-	-	420	7	n/a	-	2730
1991	182	n/a	-	-*	340	2	n/a	-	1920
1992	187	2079*	1	2	441	22	2733	-	2680
1993*	157	n/a	1 ¹	-	530	2	n/a	-	2430
1994*	228	n/a	9	-	312	+	n/a	-	2850
1995	377	n/a	-	-	336	+	n/a	-	3636

* Preliminary; 1 Includes VIIe.

Table 3.5.2.4 Cod in fishing areas IV, Skagerrak and VIId.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-8
1963	195.11	151.52	116.46	0.473
1964	374.09	166.13	126.04	0.493
1965	415.44	205.38	181.04	0.546
1966	506.87	230.74	221.34	0.515
1967	488.81	250.05	252.98	0.613
1968	194.60	258.25	288.37	0.616
1969	209.06	255.99	200.76	0.574
1970	781.98	276.93	226.12	0.551
1971	910.99	277.33	328.10	0.669
1972	173.68	231.11	353.98	0.824
1973	319.70	209.23	239.05	0.691
1974	263.66	231.01	214.28	0.658
1975	486.41	211.95	205.25	0.707
1976	246.65	182.56	234.17	0.703
1977	839.04	159.91	209.15	0.707
1978	487.66	159.81	297.02	0.824
1979	525.06	164.59	269.97	0.681
1980	898.96	182.04	293.64	0.803
1981	314.49	195.52	335.50	0.761
1982	617.99	189.45	303.25	0.898
1983	323.66	153.49	259.29	0.943
1984	592.34	131.01	228.29	0.848
1985	152.13	122.36	212.93	0.811
1986	706.39	110.43	196.15	0.905
1987	276.78	100.73	209.60	0.891
1988	193.72	95.20	176.43	0.866
1989	276.67	89.70	139.86	0.933
1990	133.65	77.13	125.29	0.790
1991	168.65	70.17	102.49	0.930
1992	311.65	67.46	114.03	0.876
1993	159.38	63.08	121.93	0.974
1994	398.86	63.30	110.56	0.944
1995	247.59	74.68	138.76	0.809
Average	399.75	163.88	213.09	0.752
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.3.1 Nominal catch of HADDOCK in Division IIIa, 1988-1995, as officially reported to ICES.

Country	1988	1989	1990	1991	1992	1993	1994	1995
Belgium	19	5	13	4	14	9	4	18
Denmark	2558	3895	3885	2339	3812	1600	1458	1576
Germany	-	-	3	-	-	+	1	1
Netherlands	8	-	-	-	-	-	-	-
Norway	245	84	100	110	184	153	130	134
Sweden	64	66	84	69	744	436	408	498
UK (Engl. & Wales)	-	-	-	-	-	+	-	-
Total	2894	4050	4085	2522	4754	2198	2001	2227
WG estimate of H.cons. landings	2852	4098	4100	4086	4396	1959	1833	2191
WG estimate of industrial bycatch	1480	360	1968	2593	4604	2415	2180	2162
WG estimate of total catch	4332	4458	6068	6679	9000	4374	4013	4353
Unallocated landings	42	-48	-15	-1564	358	239	168	36

Nominal catch of HADDOCK in Sub-Area IV, 1988-1995, as officially reported to ICES.

Country	1988	1989	1990	1991	1992	1993	1994	1995
Belgium	220	145	192	168	415	292	306	407
Denmark	9174	2789	1993	1330	1476	3582	3208	2902
Faroe Islands	35	16	6	15	13	25	43	49
France	2193	1702	1115	631	508	960	678	598
Germany	802	447	749	535	764	348	1829	1284
Netherlands	894	328	102	100	148	192	96	147
Norway	1590	1697	1572	2069	3273	2651	2519	2443
Sweden	614	1051	900	957	1289	908	551	722
UK (Engl. & Wales)	5537	2507	2019	2173	2926	4259	4043	3616
UK (Isle of Man)	-	-	-	-	11	-	-	-
UK (N. Ireland)	-	137	11	48	73	18	9	-
UK (Scotland)	84104	53587	34567	36474	39896	66799	73793	63411
Total	105163	64406	43226	44500	50792	80034	87075	75579
WG estimate of H.cons. landings	105111	76186	51459	44624	70176	79654	80871	75318
WG estimate of discards	62053	25712	32603	40257	47938	79675	65371	57364
WG estimate of industrial bycatch	3995	2410	2591	5421	10816	10741	3561	7747
WG estimate of total catch	171159	104308	86653	90302	128930	170070	149803	140429
Unallocated landings	52	-11780	-8233	-124	-19384	380	6204	261

North Sea + Division IIIa.

WG estimate of Total Catch	175491	108766	92721	96981	137930	174444	153816	144782
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Table 3.5.3.2 Catches ('000t) of Haddock from the North Sea and Division IIIa, 1963-1995.

Year	North Sea				Division IIIa			Total
	H.cons	Disc	Ind. BC	Total	H. cons.	Ind. BC	Total	
1963	68.4	189.0	13.7	271.0	0.4	0.1	0.5	271.5
1964	130.5	160.3	88.6	379.4	0.4	0.3	0.7	380.2
1965	161.6	62.2	74.6	298.4	0.7	0.3	1.0	299.5
1966	225.8	73.6	46.7	346.0	0.6	0.1	0.7	346.7
1967	147.4	78.1	20.7	246.1	0.4	0.1	0.4	246.6
1968	105.4	161.9	34.2	301.5	0.4	0.1	0.5	302.0
1969	330.9	260.2	338.4	929.5	0.5	0.5	1.1	930.5
1970	524.6	101.4	179.7	805.7	0.7	0.2	0.9	806.7
1971	235.4	177.5	31.5	444.4	2.0	0.3	2.2	446.6
1972	192.9	128.1	29.6	350.6	2.6	0.4	3.0	353.6
1973	178.6	114.7	11.3	304.6	2.9	0.2	3.1	307.7
1974	149.6	166.8	47.8	364.2	3.5	1.1	4.6	368.8
1975	146.6	260.4	41.4	448.4	4.8	1.3	6.1	454.5
1976	165.6	154.3	48.2	368.1	7.0	2.0	9.1	377.1
1977	137.3	44.3	35.0	216.6	7.8	2.0	9.8	226.4
1978	85.8	76.9	10.8	173.5	5.9	0.7	6.6	180.1
1979	83.1	41.7	16.4	141.2	4.0	0.8	4.8	146.0
1980	98.6	94.7	22.3	215.7	6.4	1.5	7.9	223.6
1981	129.6	60.1	17.1	206.8	9.1	1.2	10.4	217.2
1982	165.8	40.5	19.4	225.8	10.8	1.3	12.1	237.8
1983	159.3	65.9	13.1	238.4	8.0	7.2	15.2	253.6
1984	128.1	75.3	10.1	213.5	6.4	2.7	9.1	222.6
1985	158.9	85.7	6.0	250.6	7.2	1.0	8.1	258.7
1986	165.5	52.2	2.6	220.4	3.6	1.7	5.3	225.7
1987	108.0	59.2	4.4	171.6	3.8	1.4	5.3	176.9
1988	105.1	62.1	4.0	171.2	2.9	1.5	4.3	175.5
1989	76.2	25.7	2.4	104.3	4.1	0.4	4.5	108.8
1990	51.5	32.6	2.6	86.7	4.1	2.0	6.1	92.7
1991	44.6	40.3	5.4	90.3	4.1	2.6	6.7	97.0
1992	70.2	47.9	10.8	128.9	4.4	4.6	9.0	137.9
1993	79.7	79.7	10.7	170.1	2.0	2.4	4.4	174.4
1994	80.9	65.4	3.6	149.8	1.8	2.2	4.0	153.8
1995	75.3	57.4	7.7	140.4	2.2	2.2	4.4	144.8
Min	44.6	25.7	2.4	86.7	0.4	0.1	0.4	92.7
Mean	144.4	96.9	36.7	278.0	3.8	1.4	5.2	283.2
Max	524.6	260.4	338.4	929.5	10.8	7.2	15.2	930.5

Table 3.5.3.3 Haddock in Fishing Area IV and IIIa.

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1963	2,338.28	137.30	271.53	0.725
1964	9,172.05	420.02	380.16	0.906
1965	26,336.30	524.62	299.46	0.846
1966	68,992.30	432.38	346.73	0.904
1967	388,112.00	228.95	246.59	0.841
1968	17,102.50	264.74	302.04	0.620
1969	12,195.50	815.89	930.54	1.152
1970	87,763.90	901.57	806.67	1.121
1971	78,284.80	417.07	446.63	0.776
1972	21,539.20	300.94	353.61	1.070
1973	72,898.30	294.70	307.69	0.915
1974	133,493.00	258.45	368.80	0.879
1975	11,542.30	238.35	454.54	1.027
1976	16,484.20	308.02	377.12	1.060
1977	25,750.40	238.46	226.41	1.065
1978	39,551.40	132.11	180.14	1.092
1979	72,180.80	109.36	146.00	1.056
1980	15,658.30	153.23	223.61	1.005
1981	32,501.60	240.31	217.15	0.760
1982	20,648.50	300.27	237.84	0.704
1983	67,037.60	253.23	253.59	0.973
1984	17,280.10	199.22	222.56	1.018
1985	24,069.00	241.71	258.73	0.955
1986	49,894.10	221.56	225.73	1.065
1987	4,201.78	157.12	176.86	1.002
1988	8,445.07	159.16	175.49	1.019
1989	8,633.73	129.15	108.77	0.862
1990	28,322.00	81.16	92.72	0.987
1991	27,774.80	63.04	96.98	0.847
1992	43,029.60	100.96	137.93	0.981
1993	12,543.00	134.56	174.44	0.920
1994	56,957.30	160.17	153.82	0.913
1995	16,404.00	161.78	144.78	0.742
Average	45,973.87	266.05	283.20	0.934
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.4.1 Nominal catch (in tonnes) of WHITING in Sub-area IV, 1982-1995, as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Belgium	2,272	2,864	2,798	2,177	2,275	1,404	1,984	1,271	1,040	913	1,030	944	1,042	880
Denmark	27,043	18,054	19,771	16,152	9,076	2,047	12,112	803	1,207	1,529	1,377	1,418	549	368
Faroe Islands	57	18	-	6	-	12	222	1	26	-	16	7	2	21
France	23,780	21,263	19,209	10,853	8,250	10,493	10,569	5,277 ^{1,2}	4,951 ¹	5,188 ^{1,2}	5,115 ¹	5,502 ^{1,2}	5020 ²	5,735
Germany, Fed. Rep.	223	317	286	226	313	274	454	415	692	865	511	441 ¹	239	124
Netherlands	12,218	10,935	8,767	6,973	13,741	8,542	5,087 ³	3,860	3,272 ¹	4,028 ¹	5,390	4,799	3,864	3,640
Norway	17	39	88	103	103	74	52	32	55	103	232	125 ¹	80	114
Poland	-	1	2	-	-	-	-	-	-	-	-	-	-	-
Sweden	11	44	53	22	33	17	5	17	16	48	22	18	10	1
UK (Engl. & Wales) ³	4,743	4,366	5,017	5,024	3,805	4,485	4,008	2,178	2,338	2,676	2,528	2,774	2,722	2,477
UK (Scotland)	29,640	41,248	42,967	30,398	29,113	37,630	31,804	26,271	27,486	31,257	30,821	31,268	28,974	27,811
Total	100,004	99,149	98,958	71,934	66,709	64,978	66,294	40,125	41,084	46,607	47,042	47,296	42,502	41,171
Total h.c. catch used by Working Group	73,000	81,000	79,000	55,000	59,000	64,000	52,000	41,000	43,000	47,000	46,000	48,000	43,000	42,000
Total discards	27,000	50,000	41,000	29,000	80,000	54,000	28,000	36,000	56,000	34,000	31,000	43,000	33,000	31,000
Total Ind. By-catch	33,000	24,000	19,000	15,000	18,000	16,000	49,000	43,000	51,000	38,000	27,000	20,000	10,000	27,000

¹Preliminary.²Includes Division IIa (EC).

n/a = Not available.

³1989-1994 revised. N. Ireland included with England and Wales.

Table 3.5.4.2 WHITING in Division VIIId. Nominal landings (tonnes) as officially reported to ICES, 1982 to 1995

Year	Belgium	France	Netherlands	UK (E+W)	UK (S)	Total	Unreported landings	Total as used by Working Group
1982	93	7,012	2	170	-	7,277	633	7,910
1983	84	5,057	1	198	-	5,340	1,600	6,940
1984	79	6,914	-	88	-	7,081	289	7,370
1985	82	7,563	-	186	-	7,831	491	7,340
1986	65	4,551	-	180	-	4,796	704	5,500
1987	136	6,730	-	287	-	7,153	2,463	4,690
1988	69	7,501	-	251	-	7,821	3,391	4,430
1989	38	n/a	-	231	-	n/a	-	4,160
1990	83	n/a	-	237	1	n/a	-	3,480
1991	83	n/a	-	292	1	n/a	-	5,780
1992	66	5,414	-	417	24	5,921	-	5,760
1993	74	n/a	-	321	2	n/a	-	5,200
1994	61	n/a	-	293	-	n/a	-	6,623
1995 ¹	68	n/a	-	280	1	n/a	-	4,892

¹Preliminary

Table 3.5.4.3 Whiting in Sub-area IV and Division VIId.

Year	Recruitment Age 0	Spawning Stock Biomass	Landings and discards	Fishing Mortality Age 2-6
1960	41,803.60	312.23	182.36	1.533
1961	75,344.60	373.59	326.09	1.388
1962	83,179.00	282.02	222.43	1.236
1963	18,597.30	460.29	260.77	0.955
1964	36,252.00	513.51	149.96	0.678
1965	31,593.60	457.92	186.76	0.627
1966	59,691.30	389.20	242.23	1.179
1967	117,629.00	317.27	236.99	0.837
1968	14,221.10	447.01	265.27	1.004
1969	27,656.40	621.65	327.62	0.758
1970	43,195.90	376.19	271.65	0.922
1971	73,740.90	235.53	195.36	0.557
1972	96,968.00	288.64	191.32	0.789
1973	47,752.30	407.69	270.53	0.967
1974	99,181.10	476.17	296.20	1.026
1975	62,693.00	487.70	305.01	1.172
1976	61,088.60	629.90	368.24	1.095
1977	61,900.30	596.56	347.06	0.858
1978	63,366.70	450.27	188.19	0.775
1979	58,336.00	511.93	243.85	0.751
1980	23,207.40	518.15	223.52	0.922
1981	27,036.30	486.59	192.05	0.919
1982	24,144.00	376.59	140.20	0.730
1983	36,714.20	338.55	161.21	0.767
1984	24,905.60	280.12	145.74	0.941
1985	50,872.60	272.83	106.67	0.882
1986	43,102.20	287.16	161.75	0.967
1987	29,990.60	298.88	138.81	1.173
1988	58,477.00	297.04	133.46	0.918
1989	26,529.70	282.51	123.76	0.994
1990	26,369.10	321.00	153.45	0.922
1991	29,164.80	277.14	125.04	0.781
1992	32,734.20	270.84	109.72	0.743
1993	35,203.80	254.50	116.69	0.811
1994	35,197.20	274.02	93.08	0.696
1995	37,826.60	334.30	103.88	0.509
Average	47,657.39	383.48	202.97	0.911
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.5.1 Nominal catch (in tonnes) of Saithe in Sub-area IV and Division IIIa, 1984-1995, as officially reported to ICES.

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Belgium	32	31	16	4	60	13	23	29	70	113	130	228
Denmark	8,526	9,033	10,343	7,928	6,868	6,550	5,800	6,314	4,669	4,232	4,305 ¹	4,388
Faroe Islands	-	895	224	691	276	739	1,650	671	2,480	2,875	1,780 ¹	3,808
France	43,592	42,200	43,958	38,356	28,913	30,761 ^{1,2}	29,892 ^{1,2}	14,795 ^{1,2}	9,061 ¹	15,258 ¹	18,220 ^{1,2}	15,751 ²
Germany	25,262	22,551	22,277	22,400	18,528	14,339	15,006	19,574	13,177	14,814	10,013	12,093
Netherlands	181	233	134	334	345	257	206	199	180	79	18	9
Norway	88,420	101,808	67,341	66,400	40,021	24,737	19,122	36,240	48,205	48,725 ¹	50,282 ¹	53,293
Poland	413	-	495	832	1,016	809	1,244	1,336	1,238	937 ¹	151	592
Sweden	522	1,764	1,987	1,732	2,064	797	838	1,514	3,302	4,955	5,366	1,891
UK (Engl. & Wales)	8,183	5,455	4,480	3,233	3,790	4,012	3,397	4,070	2,893	2,429	2,354	2,522
UK (Scotland)	6,970	9,932	15,520	11,911	10,850	9,190	7,703	8,602	6,881	5,929	5,566	6,341
USSR	-	-	-	-	-	-	-	116 ³	-	-	-	-
Total reported to ICES	182,101	193,902	166,775	153,821	112,731	92,204	84,881	93,460	92,156	100,346	98,185	100,916
Unreported landings	15,900	5,839	-2,459	-4,627	-7,630	-211	3,194	5,463	350	5,278	3,512	12,737
Landings as used by WG	198,001	199,741	164,297	149,194	105,101	91,993	88,075	98,923	92,506	105,624	101,697	113,653

¹Preliminary.

²Includes IIa(EC), IIIa-d(EC).

³Includes Estonia.

n/a = not available.

Table 3.5.2 Saithe in the North Sea Area (Sub-area IV and Division IIIa)

Year	Recruitment Age 1	Spawning Stock Biomass	Fishing Landings	Mortality Age 3-6
1970	231.91	264.12	222.10	0.446
1971	226.53	369.63	252.62	0.340
1972	239.68	405.66	245.88	0.408
1973	270.23	438.68	225.77	0.429
1974	642.83	454.48	273.47	0.590
1975	197.53	390.83	278.13	0.510
1976	140.28	254.54	319.93	0.801
1977	126.57	209.33	196.19	0.656
1978	103.80	186.33	134.83	0.484
1979	267.61	183.52	114.36	0.409
1980	164.07	179.86	120.29	0.466
1981	196.55	187.77	122.52	0.312
1982	325.11	157.45	165.98	0.503
1983	472.78	169.60	168.88	0.613
1984	394.28	135.78	198.00	0.771
1985	157.22	102.91	199.74	0.848
1986	183.30	96.58	164.30	0.925
1987	94.94	100.36	149.19	0.684
1988	166.45	104.61	105.10	0.651
1989	213.52	87.99	91.99	0.708
1990	141.08	77.92	88.08	0.544
1991	222.84	79.44	98.92	0.557
1992	151.29	89.14	92.51	0.582
1993	231.99	104.56	105.62	0.480
1994	115.04	112.69	101.70	0.480
1995	220.00	138.66	113.65	0.426
Average	226.82	195.48	167.30	0.562
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.6.1 North Sea plaice. Nominal landings (tonnes) in Sub-area IV as officially reported to ICES, 1984 -1995

Country	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Belgium	9965	7232	8554	11527	10939	13940	14328	12006	10814	7951	7093
Denmark	28236	26332	21597	20259	23481	26474	24356	20891	16452	17056	13358
Faroe Islands				43							
France	1010	751	1580	1773	2037	1339	508	537	603	438	445
Germany	2197	1809	1794	2566	5341	8747	7926	6818	6895	5697	6329
Netherlands	90950	74447	76612	77724	84173	78204	67945	51064	48552	50289	44263
Norway	23	21	12	21	321	1756	560	836	753	551	674
Sweden	18	16	7	2	12	169	103	53	7	6	3
UK (England & Wales)	11335	12428	14891	17613	20413	18810	18267	21049	20586	17806	15801
UK (Scotland)	4577	4866	5747	6884	5691	6822	9572	10228	10542	9943	8594
Total reported	148311	127902	130794	138412	152408	156261	143565	123482	115204	109737	96560
Unallocated landings	11527	37445	22876	16063	17410	-21	4439	1708	1909	655	1796
Landings as used by WG	159838	165347	153670	154475	169818	156240	148004	125190	117113	110392	98356

Table 3.5.6.2 Plaice in the North Sea (Sub-area IV).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-10
1957	296.16	354.63	70.56	0.197
1958	429.98	340.64	73.35	0.212
1959	433.44	345.19	79.30	0.227
1960	405.32	368.31	87.54	0.247
1961	359.38	352.88	85.98	0.233
1962	318.80	446.57	87.47	0.235
1963	315.18	439.98	107.12	0.264
1964	1,021.89	422.94	110.54	0.273
1965	309.57	414.36	97.14	0.276
1966	305.38	416.39	101.83	0.259
1967	277.23	493.01	108.82	0.243
1968	245.51	456.11	111.53	0.221
1969	327.47	418.29	121.65	0.254
1970	370.45	399.58	130.34	0.333
1971	275.52	372.36	113.94	0.316
1972	234.64	375.82	122.84	0.341
1973	541.83	334.75	130.43	0.381
1974	451.72	308.85	112.54	0.391
1975	336.12	320.06	108.54	0.366
1976	325.33	314.57	113.67	0.315
1977	471.88	329.34	119.19	0.335
1978	430.77	322.86	113.98	0.329
1979	444.79	309.79	145.35	0.458
1980	661.11	295.70	139.95	0.398
1981	426.09	306.16	139.75	0.401
1982	1,029.01	298.96	154.55	0.441
1983	592.18	322.80	144.04	0.420
1984	611.45	324.01	156.15	0.388
1985	533.04	356.95	159.84	0.381
1986	1,259.09	358.33	165.35	0.446
1987	542.30	388.16	153.67	0.443
1988	566.62	371.10	154.48	0.416
1989	403.80	412.98	169.82	0.388
1990	387.96	385.70	156.24	0.370
1991	396.94	326.95	148.00	0.457
1992	429.82	289.87	125.19	0.489
1993	337.62	259.60	117.11	0.503
1994	283.46	222.58	110.39	0.526
1995	515.72	212.31	98.36	0.461
Average	459.09	353.57	121.71	0.350
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.7.1 Nominal catch (tonnes) of SOLE in Sub-area IV and landings as estimated by the Working Group, 1982-1995

Year	Belgium	Denmark	France	Germany Fed. Rep.	Netherlands	UK (Engl. & Wales)	Other countries	Total reported	Unreported landings	Grand Total
1982	1,927	522	686	290	17,749	403		21,577	2	21,579
1983	1,740	730	332	619	16,101	435		19,957	4,970	24,927
1984	1,771	818	400	1,034	14,330	586	1	18,940	7,899	26,839
1985	2,390	692	875	303	14,897	774	3	19,934	4,313	24,247
1986	1,833	443	296	155	9,558	647	2	12,934	5,267	18,201
1987	1,644	342	318	210	10,635	676	4	13,829	3,539	17,368
1988	1,199	616	487	452	9,841	740	28	13,363	8,227	21,590
1989	1,596	1,020	312	864	9,620	1,033*	50	14,495	7,311	21,806
1990	2,389	1,428	352	2,296	18,202	1,614*	263	26,544	8,576	35,120
1991	2,977	1,307	465	2,107	18,758	1,723*	271	27,608	5,905	33,513
1992	2,058	1,359	548	1,880	18,601	1,281*	277	26,004	3,337	29,341
1993	2,783	1,661	484	1,379	22,015	1,149*	298	29,769	1,659	31,428
1994	2,935	1,802	498	1,744	22,874	1,137*	355	31,345	1,288	32,633
1995	2,624	1,673	540	1,564	20,927	1,040*	312	28,680	1,618	30,298

all landings reported to ICES
unreported landings estimated by the Working Group
1994 data are provisional
No data on discards available
*1989-1994 revised (N-Ireland included with England & Wales)

Table 3.5.7.2

Sole in the North Sea (Sub-area IV)

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-8
1957	165.51	78.90	12.07	0.137
1958	144.96	85.57	14.29	0.160
1959	559.02	93.19	13.83	0.132
1960	66.86	101.25	18.62	0.167
1961	115.74	148.96	23.57	0.160
1962	28.35	148.79	26.88	0.181
1963	23.01	148.41	26.16	0.261
1964	554.36	53.59	11.34	0.228
1965	121.49	48.96	17.04	0.246
1966	41.18	104.79	33.34	0.240
1967	75.33	100.88	33.44	0.308
1968	100.10	88.93	33.18	0.373
1969	50.59	70.38	27.56	0.423
1970	141.53	62.95	19.69	0.351
1971	41.94	52.38	23.65	0.444
1972	76.96	55.75	21.09	0.393
1973	106.55	41.88	19.31	0.452
1974	110.81	42.30	17.99	0.462
1975	41.90	43.06	20.77	0.461
1976	114.15	43.52	17.33	0.404
1977	140.62	36.09	18.00	0.381
1978	47.10	38.60	20.28	0.493
1979	11.86	46.22	22.60	0.461
1980	154.93	36.07	15.81	0.442
1981	149.53	24.77	15.40	0.448
1982	153.44	34.84	21.58	0.496
1983	144.23	42.22	24.93	0.467
1984	72.14	45.45	26.84	0.552
1985	82.07	42.66	24.25	0.514
1986	161.09	35.81	18.20	0.501
1987	72.60	31.00	17.37	0.434
1988	455.74	41.25	21.59	0.502
1989	110.43	35.82	21.81	0.396
1990	181.50	91.87	35.12	0.452
1991	65.67	79.33	33.51	0.482
1992	393.06	79.71	29.34	0.459
1993	75.08	55.85	31.43	0.530
1994	47.52	81.30	32.63	0.519
1995	99.16	68.51	30.30	0.511
Average	135.85	65.69	22.87	0.385
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.8.1

North Sea HERRING (Sub-area IV and Division VIId). Catch in tonnes by country, 1983-1994. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1984	1985	1986	1987	1988	1989
Belgium	5,080	3,482	414	39	4	434
Denmark	38,777	129,305	121,631	138,596	263,006	210,315 ²
Faroe Islands	-	-	623	2,228	810	1,916
France	20,320	14,400	9,729	7,266	8,384	29,085
Germany, Fed.Rep.	11,609	8,930	3,934	5,552	13,824	38,707
Netherlands	44,308	79,335	85,998	91,478	82,267	84,178
Norway ⁴	98,706	159,947	223,058	241,765	222,719	221,891 ²
Sweden	886	2,442	1,872	1,725	1,819	4,774
UK (England)	1,689	5,564	1,404	873	8,097	7,980
UK (Scotland)	31,393	55,795	77,459	76,413	64,108	68,106
UK (N.Ireland)	-	-	-	-	-	-
Unallocated landings	64,487	74,220	21,089	58,972	33,411	26,749 ²
Total landings	317,255	533,420	547,211	624,907	698,449	694,135 ²
Discards ³	-	-	-	-	-	4,000
Total catch	317,255	533,420	547,211	624,907	698,449	698,135
Estimates of the parts of the catches which have been allocated to spring spawning stocks						
IIIa type	-	6,958	17,386	19,654	23,306	19,869
Coastal type	-	520	905	490	250	2,283

Country	1990	1991	1992	1993	1994 ¹	1995 ¹
Belgium	180	163	242	56	144	12
Denmark	159,280 ²	194,358 ²	193,968 ²	164,817	121,559	153,361
Faroe Islands	633	334	-	-	-	-
France	23,480	24,625	16,587	12,627	27,941	29,504
Germany	43,191	41,791	42,665	41,669	38,394	43,798
Netherlands	69,828	75,135	75,683	79,190	76,155	78,491
Norway ⁴	157,850 ²	124,991 ²	116,863	122,815	125,522	131,026
Sweden	3,754	5,866	4,939	5,782	5,425	5,017
UK (England)	8,333	11,548	11,314	19,853	14,216	14,676
UK (Scotland)	56,812	57,572	56,171	55,531	49,919	44,802
UK (N.Ireland)	-	92	-	-	-	-
Unallocated landings	21,081	24,435	25,867	18,410	5,749	33,594
Total landings	544,422	560,910	544,299	520,550	465,024	534,281
Discards ³	8,660	4,617	4,950	3,470	2,510	-
Total catch	553,082	565,527	549,249	524,020	467,534	534,281
Estimates of the parts of the catches which have been allocated to spring spawning stocks						
IIIa type	8,357	7,894	7,854	8,928	13,228	10,315
Coastal type	1,136	252 ⁵	202 ⁵	201 ⁵	215 ⁵	203 ⁵

¹Preliminary.

²Working Group estimates.

³Any discards prior to 1989 were included in unallocated landings.

⁴Catches of Norwegian spring spawners removed (taken under a separate TAC).

⁵Landings from the Thames estuary area.

Table 3.5.8.2 HERRING, catch in tonnes in Division IVa West. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1986	1987	1988	1989	1990
Denmark	48,590	50,184	25,268	29,298	9,037
Faroe Islands	275	102	810	1,916	633
France	462	285	266	¹	2,581
Germany, Fed.Rep.	2,510	3,250	9,308	26,528	20,422
Netherlands	42,900	44,358	32,639	24,600	29,729
Norway	63,848	55,311	30,657	41,768	24,239
Sweden	¹	768	1,197	742	-
UK (N.Ireland)	-	-	-	-	-
UK (England)	-	4,820	4,820	5,104	3,337
UK (Scotland)	71,285	66,774	48,791	58,455	46,431
Unallocated landings	-	16,092	-	3,173	4,621
Total Landings	229,870	221,032	153,751	191,584	141,030
Discards ²	-	-	-	900	750
Total catch	229,870	237,124	153,751	192,484	141,780

Country	1991	1992	1993	1994	1995 ³
Denmark	5,980	10,751	10,604	20,017	17,748
Faroe Islands	334	-	-	-	-
France	3,393	4,714 ⁴	3,362	11,658	10,427
Germany	20,608	21,836	17,342 ⁴	18,364	17,095
Netherlands	29,563	29,845	28,616	16,944	24,696
Norway	37,674	39,244	33,442	56,422	56,124
Sweden	1,130	985	1,372	2,159	1,007
UK (N.Ireland)	92	-	-	-	-
UK (England)	4,873	4,916	4,742	3,862	3,091
UK (Scotland)	42,745	39,269	36,628 ⁴	44,687	40,159
Unallocated landings	5,492	4,855	-8,271 ⁵	2,944	26,018
Total Landings	151,884	156,415	127,837	177,327	196,365
Discards ²	883	850	825	550	-
Total catch	152,767	157,265	128,662	177,877	196,365

¹Included in Division IVb.

²Any discards prior to 1989 were included in unallocated.

³Preliminary.

⁴Including IVa East.

⁵Negative unallocated catches due to misreporting from other areas.

Table 3.5.8.3 HERRING, catch in tonnes in Division IVa East. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1985	1986	1987	1988	1989	1990
Denmark	-	4,540	7,101	47,183	44,269	44,364
Faroe Islands	-	-	2,126	-	-	-
France	-	-	159	45	-	892
Netherlands	-	-	-	200	-	-
Norway ¹	109,975	118,408	145,843	153,496	168,365	121,405
Sweden	-	-	957	622	612	2,482
UK (Scotland)	-	-	-	-	-	-
Germany, Fed.Rep.	-	-	-	-	-	5,604
Unallocated landings	-	-	-	-	-	-
Total landings	109,975	122,348	156,186	201,546	213,246	174,747
Discards ²	-	-	-	-	-	-
Total catch	109,975	122,948	156,186	201,546	213,246	174,747

Country	1991	1992 ³	1993	1994	1995 ³
Denmark	48,875	53,692	43,224	43,787	45,257
Faroe Islands	-	-	-	-	-
France	-	- ⁴	4	14	+
Netherlands	-	-	-	-	-
Norway ¹	77,465	61,379	56,215	40,658	62,224
Sweden	114	508	711	1,010	2,081
UK (Scotland)	173	196	- ⁴	-	-
Germany	- ⁴	- ⁴	- ⁴	-	-
Unallocated landings	-	-	-	-	-
Total landings	126,627	115,775	100,154	85,469	109,562
Discards ²	-	-	-	-	-
Total catch	126,627	115,775	100,154	85,469	109,562

¹Catches of Norwegian spring spawners herring removed (taken under a separate TAC).

²Any discards prior to 1989 would have been included in unallocated.

³Preliminary.

⁴Included in IVa West.

Table 3.5.8.4 HERRING, catch in tonnes in Division IVb. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1986	1987	1988	1989	1990
Denmark	67,966	81,280	190,555	136,239	105,614
Belgium	-	-	-	-	-
France	605	387	617	14,415 ⁵	10,289
Faroe Islands	348	-	-	-	-
Germany, Fed. Rep.	1,424	2,302	4,516	11,880	17,165
Netherlands ⁴	21,101	31,371	37,192	47,388	28,402
Norway	40,682	40,111	38,566	11,758	12,207
Sweden	1,872 ²	-	-	3,420	1,276
UK (England)	1,101 ¹	329	2,011	957	3,200
UK (Scotland)	6,057	9,639	15,317	9,651	10,381
Unallocated landings	1,594	20,829	1,969	-23,947 ⁷	-15,616 ⁷
Total landings	142,750	186,248	290,743	211,711	172,914
Discards ⁴	-	-	-	1,900	2,560
Total catch	142,750	186,248	290,743	213,611	175,474

Country	1991	1992	1993	1994 ⁶	1995 ⁶
Denmark	138,555	125,229	109,994	55,060	87,917
Belgium	3	13	-	-	-
France	4,120	2,313	2,086	5,492	7,639
Faroe Islands	-	-	-	-	-
Germany	20,479	20,005	23,628	14,796	21,707
Netherlands ⁴	26,266	26,987	31,370	39,052	30,065
Norway	9,852	16,240	33,158	28,442	12,678
Sweden	4,622	3,446	3,699	2,256	1,929
UK (England)	2,715	3,026	3,804	7,337	9,688
UK (Scotland)	14,587	16,707	18,904	5,101	4,654
Unallocated landings	3,180	-13,637 ⁷	-16,415 ⁷	-26,988 ⁷	-10,831 ⁷
Total landings	224,376	200,329	210,228	130,548	165,355
Discards ⁴	1,072	1,900	245	460	-
Total catch	225,448	202,229	210,473	131,008	165,455

¹Includes catches misreported from Division IVc.

²Includes Division IVa catches.

³Included in Division IVa.

⁴Any discards prior to 1989 were included in unallocated.

⁵Includes catch in Division IVa.

⁶Preliminary.

⁷Negative unallocated catches due to misreporting from other areas.

Table 3.5.8.5 HERRING, catch in tonnes in Divisions IVc and VIId. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1986	1987	1988	1989	1990
Belgium	414	39	4	434	180
Denmark	535	31	-	509	265
France	8,662	6,435	7,456	14,670	9,718
Germany, Fed.Rep.	-	-	-	299	-
Netherlands	21,997	15,749	12,236	12,240	11,697
Norway	-	-	-	-	-
UK (England)	303	544	1,266	1,919	1,796
UK (Scotland)	117	-	-	-	-
Unallocated landings	19,495	22,051	31,442	47,523	32,076
Total landings	51,523	44,849	52,404	77,594	55,732
Discards ¹	-	-	-	1,200	5,350
Total catch	51,523	44,849	52,404	78,794	61,082
Coastal spring spawners included above	496	250	250	2,283	1,136

Country	1991	1992	1993	1994 ²	1995 ²
Belgium	163	229	56	144	12
Denmark	948	4,296	995	2,695	2,441
France	17,112	9,560	7,171	10,777	11,433
Germany	704	824	649	4,964	4,996
Netherlands	19,306	18,851	19,204	20,159	23,730
Norway	-	-	-	-	-
UK (England)	3,960	3,372	11,307	3,016	1,896
UK (Scotland)	67	-	-	131	-
Unallocated landings	15,763	34,649	43,096	29,792	18,397
Total landings	58,023	71,781	82,478	71,678	62,905
Discards ¹	2,662	2,200	2,400	2,400	-
Total catch	60,685	73,981	84,878	74,078	62,905
Coastal spring spawners included above	252	202	201	215	203

¹Any discards prior to 1989 would have been included in unallocated.

²Preliminary.

Table 3.5.8.6 Herring in Sub-area IV, Division VIId and Division IIIa.

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996
SUB-AREA IV AND DIVISION VIId									
TAC (IV and VIId)									
Recommended Div. IVa,b ¹	500	484	373/332	363 ⁶	352	290 ⁷	296 ⁷	389 ¹¹	210
Recommended Div. IVc, VIId	15	30	30	50-60 ⁶	54	50	50	50	25
Expected catch of spring spawners					10	8			
Agreed Div. IVa,b ²	500	484	385	370 ⁶	380	380	390	390	263
Agreed Div. IVc, VIId	30	30	30	50 ⁶	50	50	50	50	50
CATCH (IV and VIId)									
National landings Div. IVa,b ³	644	639	499	495	481	463	421	456	
Unallocated landings Div. IVa,b	2	-21	-11	8	-9	-25	-24	15	
Discard/slipping Div. IVa,b ⁴		3	4	2	3	1	1	0	
Total Catch Div. IVa,b ⁵	646	621	492	505	475	439	394	471	
National landings Div. IVc, VIId ³	21	30	24	42	37	40	42	45	
Unallocated landings Div. IVc, VIId	31	48	32	16	35	43	30	18	
Discard/slipping Div. IVc, VIId		1	5	3	2	2	2	-	
Total Catch Div. IVc, VIId	52	79	61	61	74	85	74	63	
Total catch IV and VIId as used by ACFM ⁵	698	700	553	566	549	524	468	534	
CATCH BY FLEET/STOCK (IV and VIId) ¹⁰									
North Sea autumn spawners directed fisheries	Not available			421	419	418	414	472	
North Sea autumn spawners industrial	Not available			134	124	101	38	65	
North Sea autumn spawners total	675	678	544	555	543	519	452	537	
Baltic-IIIa-type spring spawners	23	20	8	8	8	9	13	10	
Coastal-type spring spawners	0.3	2.3	1.1	0.3	0.2	0.2	0.2	0.2	
DIVISION IIIa									
TAC (IIIa)									
Predicted catch of autumn spawners					96	153	102	77	146
Recommended spring spawners	99	84	67	91	90	93-113	⁹	¹²	¹²
Recommended mixed clupeoids	80	80	60	0	0	0	-	-	-
Agreed herring TAC	138	138	120	104.5	124	165	148	140	120
Agreed mixed clupeoid TAC	80	80	65	50	50	45	43	43	43
CATCH (IIIa)									
National landings	333	192	202	188	227	214	168	157	
Catch as used by ACFM	330	162	195	191	227	214	168	157	
CATCH BY FLEET/STOCK (IIIa)									
Autumn spawners human consumption	Not available			26	47	44	42	21	
Autumn spawners mixed clupeoid	Not available			13	23	25	12	6	
Autumn spawners other industrial landings	Not available			38	82	63	32	43	
Autumn spawners total	201	91	77 ⁸	77	152	132	86	70	
Spring spawners human consumption	Not available			68	53	68	59	59	
Spring spawners mixed clupeoid		Not available		5	2	1	1	2	
Spring spawners other industrial landings		Not available		40	20	12	24	29	
Spring spawners total	129	71	118	113	75	81	84	90	
NORTH SEA AUTUMN SPAWNERS									
Total catch as used by ACFM	876	769	620	635	694	647	538	607	

¹Includes catches in directed fishery and catches of 1-ringers in small mesh fishery up to 1992. ²IVa,b and EC zone of IIa. ³Provided by Working Group members. ⁴One country only. ⁵Includes spring spawners not included in assessment. ⁶Revised during 1991. ⁷Based on F=0.3 in directed fishery only; TAC advised for IVc, VIId subtracted. ⁸Estimated. ⁹130-180 for spring spawners in all areas. ¹⁰Based on sum-of-products (number x mean weight at age). ¹¹Status quo F catch for fleet a. ¹²The catch should not exceed recent catch levels. Weights in '000t.

Table 3.5.8.7 Herring in Sub-area IV, Divisions VIId and IIIa (autumn-spawners).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1958	34,940.78	1,397.31	670.50	0.400
1959	44,713.73	2,601.47	784.50	0.447
1960	12,115.32	2,133.60	696.20	0.311
1961	108,894.91	1,830.97	696.70	0.396
1962	46,320.81	1,239.82	627.80	0.473
1963	47,660.70	2,329.72	716.00	0.218
1964	62,821.15	2,138.50	871.20	0.338
1965	34,899.44	1,527.90	1,168.80	0.691
1966	27,854.34	1,319.59	895.50	0.617
1967	40,260.22	929.25	695.50	0.795
1968	38,700.51	418.66	717.80	1.328
1969	21,585.08	427.03	546.70	1.098
1970	41,088.94	377.23	563.10	1.097
1971	32,333.53	272.90	520.10	1.390
1972	20,866.44	289.42	497.50	0.698
1973	10,159.18	234.25	484.00	1.129
1974	21,752.21	162.86	275.10	1.046
1975	2,936.83	83.63	312.80	1.440
1976	2,777.39	80.88	174.80	1.354
1977	4,375.62	52.04	46.00	0.725
1978	4,646.84	69.75	11.00	0.048
1979	10,586.70	113.34	25.10	0.061
1980	16,659.40	138.35	70.76	0.273
1981	37,650.60	202.26	174.88	0.334
1982	64,183.20	284.59	275.08	0.260
1983	61,133.10	431.24	387.20	0.335
1984	52,583.60	705.30	409.49	0.431
1985	79,388.40	739.72	609.11	0.631
1986	95,006.40	753.99	660.55	0.554
1987	84,045.30	870.15	773.41	0.533
1988	41,443.80	1,115.90	875.92	0.524
1989	38,056.40	1,239.85	768.89	0.531
1990	35,323.00	1,135.26	619.96	0.427
1991	34,579.30	939.04	635.93	0.485
1992	64,759.00	698.94	694.21	0.614
1993	52,296.00	457.77	647.00	0.777
1994	31,765.60	517.08	538.00	0.690
1995	50,281.60	495.95	607.00	0.801
Average	39,774.88	809.36	545.90	0.639
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.8 b1

Herring in the Southern North Sea (Fishing areas IVc and VIId).

Year	Landings
1964	56,572
1965	21,777
1966	11,623
1967	11,446
1968	9,610
1969	24,322
1970	27,086
1971	23,451
1972	23,004
1973	30,163
1974	7,383
1975	25,527
1976	17,526
1977	1,446
1978	1,591
1979	6,552
1980	43,086
1981	41,883
1982	68,652
1983	64,430
1984	45,643
1985	69,884
1986	51,523
1987	44,849
1988	52,404
1989	78,794
1990	61,082
1991	60,685
1992	73,981
1993	84,878
1994	74,078
1995	62,905
Average	39,932
Unit	tonnes

Table 3.5.8.c.1 Catches of herring and the development of SSB for the years 1997-2002, at $F=0.3$ in the North Sea human consumption fishery combined with different levels of fishing mortality ($F(\text{juv})$) for the other fleets. The assumed recruitment is 10% of average (geometric mean).

Recruitment 10% of average , $F(\text{adult})=0.3$

		1997	1998	1999	2000	2001	2002
$F(\text{juv})=0.00$	Juv. catch	40	40	10	0	0	0
	Adult catch	180	230	220	190	140	125
	SSB	540	780	700	550	430	370
$F(\text{juv})=0.02$	Juv. catch	40	40	10	5	5	5
	Adult catch	180	230	210	180	130	120
	SSB	540	780	700	540	420	350
$F(\text{juv})=0.05$	Juv. catch	50	35	10	5	5	5
	Adult catch	180	230	210	170	130	110
	SSB	540	750	670	520	410	340
$F(\text{juv})=0.10$	Juv. catch	60	40	15	10	10	10
	Adult catch	180	225	205	165	120	105
	SSB	540	750	670	500	400	320
$F(\text{juv})=0.20$	Juv. catch	90	40	15	15	15	15
	Adult catch	180	225	195	160	110	95
	SSB	540	710	610	470	370	300
$F(\text{juv})=F(95)=0.38$	Juv. catch	120	40	20	15	15	15
	Adult catch	180	210	175	140	110	90
	SSB	540	650	560	420	350	280

Table 3.5.8.c.2 Catches of herring and the development of SSB for the years 1997-2002, at $F=0.3$ in the North Sea human consumption fishery combined with different levels of fishing mortality ($F(\text{juv})$) for the other fleet. The assumed recruitment is 50% of average (geometric mean).

Recruitment 50 % of average , $F(\text{adult})=0.3$

		1997	1998	1999	2000	2001	2002
$F(\text{juv})=0.00$	Juv. catch	35	40	30	20	20	20
	Adult catch	180	230	250	260	260	265
	SSB	540	790	860	870	880	880
$F(\text{juv})=0.02$	Juv. catch	40	45	35	30	30	30
	Adult catch	180	230	250	255	250	250
	SSB	540	780	830	830	830	830
$F(\text{juv})=0.05$	Juv. catch	50	50	40	35	35	35
	Adult catch	180	230	240	250	240	240
	SSB	540	760	810	810	800	800
$F(\text{juv})=0.10$	Juv. catch	70	60	50	50	45	45
	Adult catch	180	225	235	230	230	230
	SSB	540	740	780	770	750	720
$F(\text{juv})=0.20$	Juv. catch	110	85	70	70	70	70
	Adult catch	180	220	225	215	205	200
	SSB	540	700	700	670	650	610
$F(\text{juv})=F(95)=0.38$	Juv. catch	150	100	85	85	85	85
	Adult catch	180	210	205	190	175	170
	SSB	540	650	620	570	530	500

Table 3.5.8.c.3 Catches of herring and the development of SSB for the years 1997-2002, at $F=0.3$ in the North Sea human consumption fishery combined with different levels of fishing mortality ($F(\text{juv})$) for the other fleets. Average (geometric mean) recruitment is assumed.

Recruitment average , $F(\text{adult})=0.3$

		1997	1998	1999	2000	2001	2002
$F(\text{juv})= 0.00$	Juv. catch	35	45	50	50	50	50
	Adult catch	180	230	300	350	400	440
	SSB	540	800	1000	1200	1350	1450
$F(\text{juv})= 0.02$	Juv. catch	45	55	60	60	60	60
	Adult catch	180	230	300	350	380	410
	SSB	540	800	1000	1150	1200	1300
$F(\text{juv})= 0.05$	Juv. catch	60	70	75	75	75	75
	Adult catch	180	220	280	320	360	400
	SSB	540	750	950	1100	1200	1300
$F(\text{juv})= 0.10$	Juv. catch	80	90	90	90	90	90
	Adult catch	180	220	270	310	350	370
	SSB	540	720	900	1050	1100	1150
$F(\text{juv})= 0.20$	Juv. catch	125	125	125	125	125	125
	Adult catch	180	210	250	270	300	320
	SSB	540	700	820	900	950	1000
$F(\text{juv})=F(95)=0.38$	Juv. catch	180	160	160	160	160	160
	Adult catch	180	210	230	240	245	260
	SSB	540	650	710	750	780	800

Table 3.5.8.c.4 Catches of herring and the development of SSB for the years 1997-2002, at $F=0.3$ in the North Sea human consumption fishery combined with different levels of fishing mortality ($F(\text{juv})$) for the other fleets. Stochastic recruitment around the conventional stock-recruitment relationship for the stock is assumed.

Recruitment - stochastic around the conventional stock-recruitment relationship, $F(\text{adult})=0.3$

		1997	1998	1999	2000	2001	2002
$F(\text{juv})= 0.00$	Juv. catch	35	45	50	55	60	65
	Adult catch	180	230	300	370	420	490
	SSB	540	800	1000	1200	1400	1600
$F(\text{juv})= 0.02$	Juv. catch	45	55	60	65	70	75
	Adult catch	180	225	290	350	400	460
	SSB	540	800	1000	1150	1350	1500
$F(\text{juv})= 0.05$	Juv. catch	60	70	75	80	90	95
	Adult catch	180	220	280	330	400	450
	SSB	540	770	950	1100	1300	1450
$F(\text{juv})= 0.10$	Juv. catch	80	90	95	100	110	115
	Adult catch	180	210	250	300	350	400
	SSB	540	740	900	1050	1200	1300
$F(\text{juv})= 0.20$	Juv. catch	130	130	135	140	145	150
	Adult catch	180	210	240	270	300	330
	SSB	540	700	850	950	1000	1100
$F(\text{juv})=F(95)=0.38$	Juv. catch	185	165	170	175	180	180
	Adult catch	180	210	230	245	260	280
	SSB	540	650	710	750	820	850

Table 3.5.9.1 Sprat catches in the North Sea ('000 t) 1983–1995. Catch in tonnes by country. Catches in fjords of western Norway excluded. (Data provided by Working Group members except where indicated). These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 ¹	1995
Division IVa West													
Denmark	-	-	0.9	0.6	0.2	0.1	+	-		0.26	0.6	-	-
Germany	-	-	-	-	-	-	-	-		-	-	-	-
Netherlands	-	-	6.7	-	-	-	-	-	-	-	-	-	-
Norway	-	-	-	-	-	-	-	-	0.1	-	-	-	-
UK (Scotland)	-	+	6.1	+	+	-	-	+	-	-	-	0.1	+
Total	-	+	13.7	0.6	0.2	0.1	+	+	0.1	0.26	0.6	0.1	+
Division IVa East (North Sea) stock													
Denmark	-	-	+	0.2	+	+	+	-	-	-	+	+	+
Norway	-	-	-	-	-	-	-	-	-	0.54	2.5	+	+
Sweden	-	-	-	-	-	-	-	+	2.5	-	-	-	-
Total	-	-	+	0.2	+	+	+	+	2.5	0.64	2.5	+	+
Division IVb West													
Denmark	32.6	5.6	1.8	0.4	3.4	1.4	2.0	10.0	9.4	19.9	13.0	19.0	26.0
Faroe Islands	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway	0.9	0.5	-	-	-	3.5	0.1	1.2	4.4	18.4	16.8	12.6	21.0
UK (England)	-	+	-	-	-	-	-	-	-	0.48	0.5	-	+
UK (Scotland)	+	+	-	-	0.1	-	-	-	-	-	0.5	-	-
Total	33.5	6.1	1.8	0.4	3.5	4.9	2.1	11.2	13.8	38.26	30.5	31.6	47.0
Division IVb East													
Denmark	39.2	62.1	36.6	10.3	28.0	80.7	59.2	59.2	67.0	66.56	136.2	251.7	283.2
Germany	-	0.6	0.6	0.6 ³	-	-	-	-	-	-	-	-	-
Norway	10.8	3.1	-	-	-	0.6	-	0.6	25.1	9.5	24.1	19.1	14.7
Sweden	-	-	-	-	-	-	-	+ ²	+ ²	-	-	-	0.2
Total	50.0	65.8	37.2	10.9	28.0	81.3	59.2	59.8	92.1	76.49	160.3	270.8	298.1
Division IVc													
Belgium	-	-	+	+	+	-	+ ²	+ ²	+ ²	-	-	-	-
Denmark	1.0	0.5	+	0.1	+	0.1	0.5	1.5	1.7	2.49	3.5	-	11.4
France	-	-	-	+	-	-	+ ²	-	+ ²	-	+	+	+
Netherlands	-	0.1	-	-	-	0.4	0.4 ^{2,3}	-	+ ^{2,3}	-	-	-	-
Norway	0.5	3.4	-	-	-	-	-	-	-	-	0.4	4.6	0.4
UK (England)	3.6	0.9	3.4	4.1	0.7	0.6	0.9	0.2	1.8	6.12 ¹	2.0	2.9	0.2
Total	5.1	4.9	3.4	4.3	0.7	1.1	1.8	1.7	3.5	8.61	5.9	21.2	12.0
Total North Sea													
Belgium	-	-	+	+	+	-	+	+ ²	+ ²	-	-	-	-
Denmark	72.6	68.1	39.5	11.7	31.7	82.3	61.9	69.2	78.1	89.1	153.3	284.4	320.6
Faroe Islands	-	-	-	-	-	-	-	-	-	-	-	-	-
France	-	-	-	+	-	-	+	-	+ ^{2,3}	-	+	-	+
Germany	-	0.6	-	0.6	-	-	-	-	-	-	-	-	-
Netherlands	-	0.1	0.6	-	0.5	0.4	0.4	-	+ ^{2,3}	-	-	-	-
Norway	12.0	7.0	6.1	-	-	4.1	0.1	1.8	29.6	28.5	43.8	36.3	36.2
Sweden	-	-	-	-	-	-	-	+ ²	+ ²	-	0.1	-	0.2
UK (England)	3.6	0.9	3.4	4.1	0.7	0.6	0.9	0.2	1.8	6.6	2.6	2.9	0.2
UK (Scotland)	+	+	-	+	0.2	-	-	+	-	-	0.5	0.1	+
Total	88.4	76.7	49.6	16.4	33.1	87.4	63.3	71.2	109.5	124.2	200.3	323.7	357.2

¹ Preliminary.
² Official statistics.
³ Includes Division IV a-c.

Table 3.5.9.2 Sprat in the North Sea (Fishing Area IV).

Year	Landings
1974	314
1975	641
1976	622
1977	304
1978	378
1979	380
1980	323
1981	209
1982	154
1983	88
1984	77
1985	50
1986	16
1987	33
1988	87
1989	63
1990	71
1991	110
1992	124
1993	200
1994	324
1995	357
Average	224
Unit	1000 tonnes

Table 3.5.11.1 Landings (t) of HORSE MACKEREL in Sub-area IV by country. (Data submitted by Working Group members).

Country	1980	1981	1982	1983	1984	1985	1986	1987
Belgium	8	34	7	55	20	13	13	9
Denmark	199	3,576	1,612	1,590	23,730	22,495	18,652 ²	7,290 ²
Estonia	-	-	-	-	-	-	-	-
Faroe Islands	260	-	-	-	-	-	-	-
France	292	421	567	366	827	298	231 ³	189 ³
Germany, Fed.Rep.	+	139	30	52	+	+	-	3
Ireland	1,161	412	-	-	-	-	-	-
Netherlands	101	355	559	2,029 ⁴	824 ⁴	160 ⁴	600 ⁴	850 ⁴
Norway	119	2,292	7	322	94 ²	203 ²	776 ²	11,728 ^{2,5}
Poland	-	-	-	2	-	-	-	-
Sweden	-	-	-	-	-	-	2 ²	-
UK (Engl. + Wales)	11	15	6	4	3	71	3	339
UK (N. Ireland)	-	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	489	998	531	487
Unallocated + discards	-	-	-	-	-	-	-	-
Total	2,151	7,244	2,788	4,420	25,987	24,238	20,808	20,895

Country	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Belgium	10	10	13	-	+	74	57	51
Denmark	20,323 ²	23,329 ²	20,605 ²	6,982 ²	7,755	6,120	3,921	2,432
Estonia	-	-	-	-	293	-	-	17
Faroe Islands	-	-	942	340	-	360	275	-
France	784 ³	248	220	174	162	302	-	-
Germany, Fed.Rep.	153	506	2,469 ⁶	5,995	2,801	1,570	1,014	1,600
Ireland	-	-	687	2,657	2,600	4,086	415	220
Netherlands	1,060 ⁴	14,172	1,970	3,852	3,000	2,470	1,329	5,285
Norway ²	34,425 ⁵	84,161	117,903	50,000	96,000	126,800	94,000	84,747
Poland	-	-	-	-	-	-	-	-
Sweden	-	-	102	953 ²	800	697	2,087	-
UK (Engl. + Wales)	373	10	10	132	4	115	389	478
UK (N. Ireland)	-	-	-	350	-	-	-	-
UK (Scotland)	5,749	2,093	458	7,309	996	1,059	7,582	3,650
Unallocated + discards	-	-12,482 ⁵	-317 ⁵	-750 ⁵	-278	-3,270	1,511	28
Total	62,877	112,047	145,062	77,994	114,133 ⁷	140,383	112,580	98,508

¹Preliminary. ²Includes Division IIIa. ³Includes Division IIa. ⁴Estimated from biological sampling. ⁵Assumed to be misreported. ⁶Includes 13 t from the German Democratic Republic. ⁷Includes a negative unallocated catch of -4,000 t.

Table 3.5.11.2 Landings and discards of HORSE MACKEREL (t) by year and division, for the North Sea, Western and Southern horse mackerel.
(Data submitted by Working Group members.)

Year	North Sea horse mackerel					Western horse mackerel					Southern horse mackerel				Total
	IIIa	IVb,c	Discards	VIIId	Total	IIa	IVa	Vla	VIIa-c,e-k	VIIIa,b,d,e	Discards	Total	VIIIc	IXa	Total
1982	-	2,788 ³	-	1,247	4,035	-	-	6,283	32,231	3,073	-	41,587	19,610	39,726	59,336
1983	-	4,420 ³	-	3,600	8,020	412	-	24,881	36,926	2,643	-	64,862	25,580	48,733	74,313
1984	-	25,893 ³	-	3,585	29,478	23	94	31,716	38,782	2,510	500	73,625	23,119	23,178	46,297
1985	1,138	22,897	-	2,715	26,750	79	203	33,025	35,296	4,448	7,500	80,551	23,292	20,237	43,529
1986	396	19,496	-	4,756	24,648	214	776	20,343	72,761	3,071	8,500	105,665	40,334	31,159	71,493
1987	436	9,477	-	1,721	11,634	3,311	11,185	35,197	99,942	7,605	-	157,240	30,098	24,540	54,638
1988	2,261	18,290	-	3,120	23,671	6,818	42,174	45,842	81,978	7,548	3,740	188,100	26,629	29,763	56,392
1989	913	25,830	-	6,522	33,265	4,809	85,304 ²	34,870	131,218	11,516	1,150	268,867	27,170	29,231	56,401
1990	14,872 ¹	17,437	-	1,325	18,762	11,414	112,753 ²	20,794	182,580	21,120	9,930	373,463	25,182	24,023	49,205
1991	2,725 ¹	11,400	-	600	12,000	4,487	63,869 ²	34,415	196,926	25,693	5,440	333,555	23,733	21,778	45,511
1992	2,374 ¹	13,955	-	400	688	13,457	101,752	40,881	180,937	29,329	1,820	370,550	24,243	26,713	50,955
1993	850 ¹	3,895	-	930	8,792	3,168	134,908	53,782	204,318	27,519	8,600	433,145	25,483	31,945	57,428
1994	2,492 ¹	2,496	-	630	2,503	759	106,911	69,546	194,188	11,044	3,935	388,875	24,147	28,442	52,589
1995	240	7,948	-	30	8,666	13,133	90,527	83,486	320,102	1,175	2,046	510,597	27,534	25,147	52,681
															580,034

¹Norwegian and Danish catches are included in the Western horse mackerel.

²Norwegian catches in Division IVb included in the Western horse mackerel.

³Divisions IIIa and IVb,c combined.

Table 3.5.12.1 Norway pout annual landings ('000 t) in the North Sea and Division IIIa, by countries in 1958–1995. (Data provided by Working Group members).

Year	Denmark		Faroes	Norway	Sweden	UK (Scotland)	Others	Total
	North Sea	Div. IIIa						
1957	-	-	-	0.2	-	-	-	0.2
1958	-	-	-	-	-	-	-	-
1959	61.5	-	-	7.8	-	-	-	69.3
1960	17.2	-	-	13.5	-	-	-	30.7
1961	20.5	-	-	8.1	-	-	-	28.6
1962	121.8	-	-	27.9	-	-	-	149.7
1963	67.4	-	-	70.4	-	-	-	137.8
1964	10.4	-	-	51.0	-	-	-	61.4
1965	8.2	-	-	35.0	-	-	-	43.2
1966	35.2	-	-	17.8	-	-	+	53.0
1967	169.6	-	-	12.9	-	-	+	182.6
1968	410.8	-	-	40.9	-	-	+	451.8
1969	52.5	-	19.6	41.4	-	-	+	113.5
1970	142.1	-	32.0	63.5	-	0.2	0.2	238.0
1971	178.5	-	47.2	79.3	-	0.1	0.2	305.3
1972	259.6	-	56.8	120.5	6.8	0.9	0.2	444.8
1973	215.2	-	51.2	63.0	2.9	13.0	0.6	345.9
1974	464.5	-	85.0	154.2	2.1	26.7	3.3	735.8
1975	251.2	-	63.6	218.9	2.3	22.7	1.0	559.7
1976	244.9	-	64.6	108.9	+	17.3	1.7	435.4
1977	232.2	-	50.9	98.3	2.9	4.6	1.0	389.9
1978	163.4	-	19.7	80.8	0.7	5.5	-	270.1
1979	219.9	9.0	21.9	75.4	-	3.0	-	329.2
1980	366.2	11.6	34.1	70.2	-	0.6	-	482.7
1981	167.5	2.8	16.6	51.6	-	+	-	238.5
1982	256.3	35.6	15.4	88.0	-	-	-	395.3
1983	301.1	28.5	24.5	97.3	-	+	-	451.4
1984	251.9	38.1	19.1 ¹	83.8	-	0.1	-	393.0
1985	163.7	8.6	9.9	22.8	-	0.1	-	205.1
1986	146.3	4.0	6.6	21.5	-	-	-	178.4
1987	108.3	2.1	4.8	34.1	-	-	-	149.3
1988	79.0	7.9	1.5	21.1	-	-	-	109.5
1989	95.6	5.4	0.8	65.3	-	0.1	0.3	172.5
1990	61.5	12.1	0.9	77.1	-	-	-	151.6
1991	85.0	38.3	1.3	68.3	-	-	+	192.9
1992	146.9	44.7	2.6	105.5	-	0	0.1	299.8
1993	97.3	7.8	n/a	76.7	-	-	-	181.8
1994	97.9	6.6	n/a	74.2	-	-	-	178.7
1995	138.4	50.3	8.8	43.1	-	-	-	240.6

Table 3.5.12.2 Norway pout. Annual landings (tonnes) in Division IIIa as officially reported to ICES.

Country	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Denmark ⁴	40,144	20,694	23,922	23,951	26,235	29,273	51,317	36,124	67,007	85,082	32,056	47,527	45,034	16,873	41,215	49,341	83,866	37,208	23,698	67,841
Faroe Islands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	139	-	-
Norway	50 ²	104	362	1,182	141	752	1,265	990	947	831	400	1,680	1,178	309	40	23	619	1	5 ¹	1
Sweden	2,255	318	591 ³	32	39	60	60	52	+	-	+	-	-	+	+	3	5	-	-	68
Total	42,449	21,116	24,875	25,165	26,415	30,085	52,685	37,166	67,954	85,913	32,456	49,207	46,212	17,182	41,255	49,367	84,490	37,347	23,703	67,909

¹Preliminary.²Including by-catch.³Includes North Sea.⁴Including all species in landings categorised as Norway pout landings.

Table 3.5.12.3 Norway pout in the North Sea and Division IIIa (Sub-area IV and Division IIIa)

Year	Recruitment Age 0	Spawning Stock Biomass	Fishing Landings	Mortality Age 1-1
1974	176,000.00	171.00	735.80	.
1975	212,000.00	208.00	559.70	.
1976	198,000.00	200.00	435.40	0.560
1977	102,000.00	242.00	389.90	0.570
1978	201,000.00	241.00	270.10	0.450
1979	233,000.00	198.00	329.20	0.440
1980	61,000.00	332.00	482.70	0.500
1981	306,000.00	278.00	238.50	0.550
1982	238,000.00	174.00	395.30	0.420
1983	154,000.00	382.00	451.40	0.470
1984	79,000.00	378.00	393.00	0.750
1985	57,000.00	179.00	205.10	0.870
1986	112,000.00	91.00	178.40	0.590
1987	32,000.00	99.00	149.30	0.500
1988	91,000.00	139.00	109.50	0.280
1989	104,000.00	94.00	172.50	0.490
1990	97,000.00	143.00	151.60	0.360
1991	167,000.00	178.00	192.90	0.310
1992	77,000.00	208.00	299.80	0.480
1993	67,000.00	240.00	181.80	0.410
1994	217,000.00	145.00	178.70	0.440
1995	42,000.00	164.00	240.60	0.380
1996	.	319.00	.	.
Average	137,409.09	208.83	306.42	0.491
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.13.1 Landings ('000 t) of sandeel from the North Sea, 1952–1995. (Data provided by Working Group members.)

Year	Denmark	Germany	Faroes	Netherlands	Norway	Sweden	UK	Total
1952	1.6	-	-	-	-	-	-	1.6
1953	4.5	+	-	-	-	-	-	4.5
1954	10.8	+	-	-	-	-	-	10.8
1955	37.6	+	-	-	-	-	-	37.6
1956	81.9	5.3	-	+	1.5	-	-	88.7
1957	73.3	25.5	-	3.7	3.2	-	-	105.7
1958	74.4	20.2	-	1.5	4.8	-	-	100.9
1959	77.1	17.4	-	5.1	8.0	-	-	107.6
1960	100.8	7.7	-	+	12.1	-	-	120.6
1961	73.6	4.5	-	+	5.1	-	-	83.2
1962	97.4	1.4	-	-	10.5	-	-	109.3
1963	134.4	16.4	-	-	11.5	-	-	162.3
1964	104.7	12.9	-	-	10.4	-	-	128.0
1965	123.6	2.1	-	-	4.9	-	-	130.6
1966	138.5	4.4	-	-	0.2	-	-	143.1
1967	187.4	0.3	-	-	1.0	-	-	188.7
1968	193.6	+	-	-	0.1	-	-	193.7
1969	112.8	+	-	-	-	-	0.5	113.3
1970	187.8	+	-	-	+	-	3.6	191.4
1971	371.6	0.1	-	-	2.1	-	8.3	382.1
1972	329.0	+	-	-	18.6	8.8	2.1	358.5
1973	273.0	-	1.4	-	17.2	1.1	4.2	296.9
1974	424.1	-	6.4	-	78.6	0.2	15.5	524.8
1975	355.6	-	4.9	-	54.0	0.1	13.6	428.2
1976	424.7	-	-	-	44.2	-	18.7	487.6
1977	664.3	-	11.4	-	78.7	5.7	25.5	785.6
1978	647.5	-	12.1	-	93.5	1.2	32.5	786.8
1979	449.8	-	13.2	-	101.4	-	13.4	577.8
1980	542.2	-	7.2	-	144.8	-	34.3	728.5
1981	464.4	-	4.9	-	52.6	-	46.7	568.6
1982	506.9	-	4.9	-	46.5	0.4	52.2	610.9
1983	485.1	-	2.0	-	12.2	0.2	37.0	536.5
1984	596.3	-	11.3	-	28.3	-	32.6	668.6
1985	587.6	-	3.9	-	13.1	-	17.2	621.8
1986	752.5	-	1.2	-	82.1	-	12.0	847.8
1987	605.4	-	18.6	-	193.4	-	7.2	824.6
1988	686.4	-	15.5	-	185.1	-	5.8	892.8
1989	824.4	-	16.6	-	186.8	-	11.5	1039.1
1990	496.0	-	2.2	0.3	88.9	-	3.9	591.3
1991	701.4	-	11.2	-	128.8	-	1.2	842.6
1992	751.1	-	9.1	-	89.3	0.5	4.9	855.0
1993	482.2	-	-	-	95.5	-	1.5	579.2
1994	603.5	-	10.3	-	165.8	-	5.9	765.5
1995	647.8	-	-	-	263.4	-	6.7	917.9

+ = less than half unit.

- = no information or no catch.

Table 3.5.13.2 Annual landings ('000 t) of Sandeels by area of the North Sea (Denmark, Norway and UK (Scotland)). Data provided by Working Group members (Figure 13.1).

Year	Area									Assessment areas ¹			
	1A	1B	1C	2A	2B	2C	3	4	5	6	Shetland	Northern	Southern
1972	98.8	28.1	3.9	24.5	85.1	0.0	13.5	58.3	6.7	28.0	0.0	130.6	216.3
1973	59.3	37.1	1.2	16.4	60.6	0.0	8.7	37.4	9.6	59.7	0.0	107.6	182.4
1974	50.4	178.0	1.7	2.2	177.9	0.0	29.0	27.4	11.7	25.4	7.4	386.6	117.1
1975	70.0	38.2	17.8	12.2	154.7	4.8	38.2	42.8	12.3	19.2	12.9	253.7	156.5
1976	154.0	3.5	39.7	71.8	38.5	3.1	50.2	59.2	8.9	36.7	20.2	135.0	330.6
1977	171.9	34.0	62.0	154.1	179.7	1.3	71.4	28.0	13.0	25.3	21.5	348.4	392.3
1978	159.7	50.2		346.5	70.3		42.5	37.4	6.4	27.2	28.1	163.0	577.2
1979	194.5	0.9	61.0	32.3	27.0	72.3	34.1	79.4	5.4	44.3	13.4	195.3	355.9
1980	215.1	3.3	119.3	89.5	52.4	27.0	90.0	30.8	8.7	57.1	25.4	292.0	401.2
1981	105.2	0.1	42.8	151.9	11.7	23.9	59.6	63.4	13.3	45.1	46.7	138.1	378.9
1982	189.8	5.4	4.4	132.1	24.9	2.3	37.4	75.7	6.9	74.7	52.0	74.4	479.2
1983	197.4	-	2.8	59.4	17.7	-	57.7	87.6	8.0	66.0	37.0	78.2	419.0
1984	337.8	4.1	5.9	74.9	30.4	0.1	51.3	56.0	3.9	60.2	32.6	91.8	532.8
1985	281.4	46.9	2.8	82.3	7.1	0.1	29.9	46.6	18.7	84.5	17.2	79.7	513.5
1986	295.2	35.7	8.5	55.3	244.1	2.0	84.8	22.5	4.0	80.3	14.0	375.1	457.4
1987	275.1	63.6	1.1	53.5	325.2	0.4	5.6	21.4	7.7	45.1	7.2	395.9	402.8
1988	291.1	58.4	2.0	47.0	256.5	0.3	37.6	35.3	12.0	102.2	4.7	384.8	487.6
1989	228.3	31.0	0.5	167.9	334.1	1.5	125.3	30.5	4.5	95.1	3.5	492.4	526.3
1990	141.4	1.4	0.1	80.4	156.4	0.6	61.0	45.5	13.8	85.5	2.3	219.5	366.7
1991	228.2	7.1	0.7	114.0	252.8	1.8	110.5	22.6	1.0	93.1	+	372.9	458.9
1992	422.4	3.9	4.2	168.9	67.1	0.3	101.2	20.1	2.8	54.4	0	176.7	668.6
1993	196.5	21.9	0.1	26.2	164.9	0.3	88.0	26.6	3.9	48.7	0	276.0	301.9
1994	157.0	108.6	-	61.7	203.4	2.7	175.0	16.0	2.8	42.0	0	489.7	279.5
1995	322.4	43.9	147.4	86.7	169.5	1.0	59.4	26.6	5.3	55.8	1.2	421.2	496.8
1996 ²	199.7	13.5	26.6	30.4	110.8	1.1	49.5	9.9	2.2	38.8	1.0	201.5	280.9

¹Assessment areas: Northern - Areas 1B, 1C, 2B, 2C, 3.
Southern - Areas 1A, 2A, 4, 5, 6.

²Only January-June included.

Table 3.5.13.3 Sandeel in the North Sea (Sub-area IV).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 1-2
1976	115,000.00	780.00	487.60	0.550
1977	215,000.00	546.00	785.60	0.540
1978	284,000.00	701.00	786.80	0.680
1979	206,000.00	881.00	577.80	0.640
1980	213,000.00	841.00	728.50	0.680
1981	90,000.00	706.00	568.60	0.680
1982	407,000.00	427.00	610.90	0.620
1983	82,000.00	1,204.00	536.50	0.480
1984	375,000.00	640.00	668.60	0.390
1985	110,000.00	1,051.00	621.80	0.960
1986	549,000.00	440.00	847.80	0.490
1987	284,000.00	1,690.00	824.60	0.430
1988	121,000.00	1,578.00	892.80	0.640
1989	323,000.00	688.00	1,039.10	0.540
1990	155,000.00	812.00	591.30	0.820
1991	288,000.00	477.00	842.60	0.710
1992	332,000.00	732.00	855.00	0.460
1993	148,000.00	1,077.00	579.20	0.370
1994	279,000.00	834.00	765.50	0.490
1995	439,000.00	1,158.00	917.90	0.380
Average	250,750.00	863.15	726.43	0.578
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.13.4 Sandeel at Shetland.
Landings ('000 t) 1974-1996.

Year	Landings
1974	7.4
1975	12.9
1976	20.2
1977	21.5
1978	28.1
1979	13.4
1980	25.4
1981	46.7
1982	52
1983	37
1984	32.6
1985	17.2
1986	14
1987	7.2
1988	4.7
1989	3.5
1990	2.3
1991	0
1992	0
1993	0
1994	0
1995	1.16
1996	1.04 *

* Provisional

Table 3.5.14.a.1 Landings in tonnes of *Pandalus borealis* from the Fladen Ground (Division IVa) as estimated by the Working Group

Year	Denmark	Sweden	Norway	UK (Scotland)	Total
1972	2 204			187	2 391
1973	157			163	320
1974	282			434	716
1975	1 308			525	1 833
1976	1 552			1 937	3 489
1977	425		112	1 692	2 229
1978	890		81	2 027	2 998
1979	565		44	268	877
1980	1 122		76	377	1 575
1981	685		1	347	1 033
1982	283			352	635
1983	5 729		8	1 827	7 564
1984	4 553		13	25	4 591
1985	3 649			1 341	4 990
1986	3 416			301	3 717
1987	7 326			686	8 012
1988	1 077		2	84	1 163
1989	2 438		25	547	3 010
1990	1 681	4	3	365	2 053
1991	422		31	53	506
1992	1 448			116	1 564
1993	1 521		38	509	2 068
1994	1 207		0	35	1 242
1995	4 578		89	657	5 324

Table 3.5.14.b.1 Landings (t) of *Pandalus borealis* from Division IVb, the Farn Deep as estimated by the Working Group.

Year	UK (England)	UK (Scotland)	Denmark	Total
1977	227		No data	
1978	91	2	-	
1979	235	34	-	
1980	203	17	-	
1981	1		-	
1982			-	
1983	65		-	
1984	30		-	
1985	2	6	-	
1986	137	57	106	300
1987	212	86	92	390
1988	91	25	384	500
1989	168	8	72	248
1990	144	+	1	145
1991	3			3
1992	1			1
1993				0
1994	4			4
1995	171			171

Table 3.6.4.1 Sole in Vld Nominal landings (tonnes) 'as officially reported to ICES and used by the WG.

Year	Belgium	France	UK (E&W)	others	Total reported	Unallocated ¹	Total used by WG
1974	159	469	309	3	940	-56	884
1975	132	464	244	1	841	41	882
1976	203	599	404	.	1206	99	1305
1977	225	737	315	.	1277	58	1335
1978	241	782	366	.	1389	200	1589
1979	311	1129	402	.	1842	373	2215
1980	302	1075	159	.	1536	387	1923
1981	464	1513	160	.	2137	340	2477
1982	525	1828	317	4	2674	516	3190
1983	502	1120	419	.	2041	1417	3458
1984	592	1309	505	.	2406	1169	3575
1985	568	2545	520	.	3633	204	3837
1986	858	1528	551	.	2937	1087	4024
1987	1100	2086	655	.	3841	1133	4974
1988	667	2057	578	.	3302	680	3982
1989	646	1610	689	.	2945	1242	4187
1990	996	1255	742	.	2993	1067	4060
1991	904	2054	825	.	3783	599	4382
1992	891	2187	706	10	3794	348	4142
1993	917	1907	610	13	3447	1064	4511
1994	940	2001	701	15	3657	984	4641
1995	817	2018	669	9	3513	989	4502

¹ Includes landings corrected for SOP discrepancies and unreported landings estimated by the WG.

Table 3.6.4.2 Sole in the Eastern English Channel (Division VIIId)

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-8
1982	13.01	7.81	3.19	0.348
1983	21.99	9.67	3.46	0.392
1984	22.10	9.11	3.58	0.399
1985	13.46	10.25	3.84	0.309
1986	26.83	10.78	4.02	0.376
1987	11.34	9.86	4.97	0.587
1988	26.36	9.90	3.98	0.412
1989	16.28	7.57	4.19	0.582
1990	45.77	8.48	4.06	0.421
1991	34.04	7.13	4.38	0.471
1992	30.79	9.69	4.14	0.400
1993	13.19	11.20	4.51	0.355
1994	27.39	11.34	4.64	0.426
1995	41.85	9.48	4.50	0.485
Average	24.60	9.45	4.11	0.426
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.6.5.1 Plaice in Division VIId. Nominal landings (tonnes) as officially reported to ICES, 1976–1995.

Year	Belgium	Denmark	France	UK (E+W)	Others	Total reported	Un- allocated	Total as used by WG
1976	147	1 ¹	1,439	376	-	1,963	-	1,963
1977	149	81 ²	1,714	302	-	2,246	-	2,246
1978	161	156 ²	1,810	349	-	2,476	-	2,476
1979	217	28 ²	2,094	278	-	2,617	-	2,617
1980	435	112 ²	2,905	304	-	3,756	-1,106	2,650
1981	815	-	3,431	489	-	4,735	34	4,769
1982	738	-	3,504	541	22	4,805	60	4,865
1983	1,013	-	3,119	548	-	4,680	363	5,043
1984	947	-	2,844	640	-	4,431	730	5,161
1985	1,148	-	3,943	866	-	5,957	65	6,022
1986	1,158	-	3,288	828	488 ²	5,762	1,072	6,834
1987	1,807	-	4,768	1,292	-	7,867	499	8,366
1988	2,165	-	5,688 ²	1,250	-	9,103	1,317	10,420
1989	2,019	+	3,265 ¹³	1,383	-	6,666	2,092	8,758
1990	2,149	-	4,170 ¹³	1,479	-	7,798	1,249	9,047
1991	2,265	-	3,606 ¹³	1,566	-	7,437	376	7,813
1992	1,560	1	2,762 ¹³	1,553	19	5,895	442	6,337
1993	0,877	+ ²	2,408 ¹³	1,075	27	4,387	944	5,331
1994	1,418	+	2,740 ¹³	993	23	5,174	648	6,121
1995	1,157	-	2,349 ¹³	796	18	4,320	810	5,130

¹Estimated by the Working Group from combined Division VIId+e.

²Includes Division VIIe.

³Provisional.

Table 3.6.5.2 Plaice in the Eastern English Channel (Division VIId).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2–6
1980	27.41	5.85	2.65	0.348
1981	13.96	6.82	4.77	0.456
1982	27.13	7.88	4.87	0.473
1983	21.46	8.47	5.04	0.478
1984	26.68	7.82	5.16	0.555
1985	31.91	8.57	6.02	0.486
1986	64.67	10.64	6.83	0.522
1987	33.84	14.22	8.37	0.448
1988	28.49	13.87	10.42	0.485
1989	17.39	15.13	8.76	0.527
1990	19.80	14.35	9.05	0.541
1991	22.88	10.96	7.81	0.655
1992	29.67	8.73	6.34	0.562
1993	14.77	9.12	5.33	0.394
1994	21.20	9.31	6.12	0.577
1995	29.39	8.91	5.13	0.459
Average	26.92	10.04	6.42	0.498
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.7.2.a.1 Nominal catch (in tonnes) of COD in Division VIa, 1981-1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Belgium	30	35	21	22	48	88	33	44	28	-	6	+	22	1	2
Denmark	-	3	-	-	-	-	4	1	3	2	2	3	2	+	6
Faroe Islands	-	2	-	-	-	-	-	11	26	-	-	-	-	-	-
France	7,601	7,160	8,140	7,637	7,411	5,096	5,044	7,669	3,640 ^{1,2}	2,220 ^{1,2}	2,503 ^{1,2}	1,962 ¹	3,047 ¹	3,117 ^{1,2}	1,931 ^{1,2}
Germany, Fed. Rep.	21	8	205	75	66	53	12	25	281	586	60	5	94	100	-
Ireland	2,725	3,527	2,695	2,316	2,564	1,704	2,442	2,551	1,642	1,200	761	761	645	825	1054
Norway	40	238	267	231	204	174	77	186	207	150	40	171	73 ¹	51 ¹	130
Spain	-	41	52	64	28	-	-	-	85	-	-	-	-	-	-
UK (Engl. & Wales) ⁴	3,187 ³	2,948	1,141	692	243	106	306	184	278	230	505	577	524	419	...
UK (N. Ireland) ⁴	7	33	37	32	17	54	138	46	-	-	-	-	-	-	...
UK (Scotland) ⁴	10,339	7,969	8,933	9,483	8,032	4,251	11,143	8,465	9,236	7,389	6,751	5,543	6,069	5,247	...
UK															5,985
Total	23,950	21,965	21,491	20,552	18,614	11,526	19,199	19,182	15,426	11,777	10,628	9,022	10,476	9,760	9,108
Unallocated	-85	-455	-186	+719	+444	+294	-224	+1,447	+1,745	+399	+298	+6,554	+3,839	+7,818	+11,420
WG Estimate	23,865	21,510	21,305	21,271	18,608	11,820	18,975	20,413	17,171	12,176	10,926	15,586	14,315	17,578	20,528

¹Preliminary.

²Includes Divisions Vb(EEC) and Vlb.

³Including 37 t caught in Sub-area VI.

⁴1989-1994 revised. N. Ireland included with England and Wales.

n/a = not available.

Table 3.7.2.a.2 Cod in the N-W Coast of Scotland and N. Ireland (Division VIa).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-5
1966	15.86	40.42	17.10	0.521
1967	6.72	48.99	22.98	0.581
1968	9.98	50.52	24.34	0.572
1969	4.23	40.38	21.60	0.729
1970	7.97	29.30	12.65	0.554
1971	10.75	25.96	10.66	0.499
1972	6.36	28.00	14.70	0.631
1973	8.72	27.43	12.26	0.545
1974	8.49	27.29	13.64	0.619
1975	11.62	27.87	13.16	0.538
1976	6.51	30.06	17.41	0.711
1977	9.95	23.79	12.62	0.636
1978	9.78	27.30	13.52	0.613
1979	15.21	27.05	16.09	0.860
1980	21.00	31.69	17.88	0.816
1981	6.03	39.83	23.87	0.680
1982	15.33	38.04	21.51	0.701
1983	9.21	33.89	21.31	0.782
1984	15.25	31.43	21.27	0.897
1985	6.12	24.78	18.61	1.028
1986	13.39	18.77	11.82	0.808
1987	29.43	20.81	18.98	0.976
1988	4.15	26.70	20.41	0.879
1989	14.44	23.84	17.17	0.929
1990	5.25	20.37	12.18	0.671
1991	10.27	20.34	10.93	0.645
1992	18.66	20.67	(15.59)	(0.962)
1993	7.64	22.41	(14.32)	(0.717)
1994	16.24	26.41	(17.58)	(0.856)
1995	13.18	25.67	(20.53)	(1.067)
Average	11.26	29.33	16.89	0.734
Unit	Millions	1000 tonnes	1000 tonnes	-

(Uncertain)

Table 3.7.2.b.1 Nominal catch (in tonnes) of COD in Division VIb, 1982-1995, as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Faroe Islands	77	112	18	-	1	-	31	5	-	-	-	1	-	-
France	27	97	9	17	5	7	2	...	...	...	...	...	...	...
Germany, Fed. Rep.	+	195	-	3	-	-	3	+	-	126	2	-	-	-
Ireland									400	236	235	472	280	477
Norway	51	462	373	202	95	130	195	148	119	312	199	200 ¹	120	92
Spain	58	42	241	1,200	1,219	808	1,345	-	64	70	n/a	n/a	n/a	n/a
UK (England & Wales) ³	3	163	161	114	93	69	56	131	8	23	26	103	25	-
UK (Scotland) ³	157	35	221	437	187	284	254	265	758	829	714	322	236	-
UK													-	479
Total	373	1,106	1,023	1,973	1,601	1,298	1,886	549	1,349	1,596	n/a	n/a	n/a	n/a

¹Preliminary.

²Included in Division Via.

³1989-1994 revised.

n/a = Not available.

Table 3.7.3.a.1 Nominal catch (tonnes) of HADDOCK in Division VIa, 1983–1995, as officially reported to ICES.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Belgium	1	6	7	-	29	8	9	-	9	1	7	1	+
Denmark	+	+	+	+	+	+	+	+	+	1	1	-	3
Faroe Islands	-	-	-	1	-	-	13	-	1	-	-	-	n/a
France	4,520	4,240	5,930	4,956	5,456	3,001	1,335 ^{1,2}	863 ^{1,2}	761 ^{1,2}	762 ¹	1,132 ¹	1,099 ^{1,2}	562 ²
Germany, Fed. Rep.	65	83	38	25	21	4	4	15	1	2	9	19	13
Ireland	3,450	3,932	3,512	2,026	2,628	2,731	2,171	773	710	700	911	746	1,406
Norway	68	33	76	45	13	54	74	46	12	72	40 ¹	7 ¹	22
Spain	201	129	166	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a
UK (England & Wales) ³	1,376	1,042	348	222	425	114	235	164	137	132	155	254	...
UK (N. Ireland) ³	4	5	-	155	1	35							...
UK (Scotland) ³	21,593	18,472	15,036	12,955	18,503	15,151	19,940	10,964	8,434	5,263	10,423	7,421	...
UK (total)													10,717
Total	31,278	27,942	25,113	20,385	27,076	21,098	23,781	12,825	10,065	6,933	12,678	9,547	12,723
Landings as used by WG	29,477	29,929	24,384	19,394	27,004	19,088	16,693	10,136	10,560	11,353	19,067	14,243	12,357
Discards	6,840	16,435	17,452	7,532	16,218	8,960	3,178	5,406	9,192	9,398	16,904	11,192	8,783
Unallocated landings	-1,831	1,987	-729	-991	-72	-2,010	-7,088	-2,689	495	4,420	6,389	4,696	-366
Total as used by WG	36,287	46,364	41,836	26,926	43,222	28,048	19,871	15,542	19,752	20,751 ¹	35,971	25,435	21,140

¹Preliminary.²Includes Divisions Vb(EC) and Vib.³1989–1994 revised. N. Ireland included with England and Wales.

n/a = Not available.

Table 3.7.3.a.2 Haddock in N-W Coast of Scotland and N. Ireland (Division VIa).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1966	127.94	78.91	30.59	0.551
1967	1,249.40	48.61	27.69	0.599
1968	19.59	37.75	45.80	0.804
1969	24.90	116.44	51.49	0.901
1970	322.47	163.12	40.33	0.677
1971	101.46	148.53	58.48	0.555
1972	113.74	101.00	57.46	0.973
1973	231.03	59.84	40.20	0.755
1974	616.06	37.03	33.34	0.793
1975	52.65	30.82	46.63	0.735
1976	33.32	54.36	34.07	0.671
1977	78.88	55.58	23.66	0.613
1978	220.19	35.75	19.51	0.658
1979	549.73	27.64	28.85	0.695
1980	47.52	32.74	17.48	0.551
1981	100.33	81.45	33.31	0.384
1982	55.63	104.34	39.68	0.446
1983	463.24	89.60	36.29	0.481
1984	88.75	65.02	46.36	0.726
1985	66.55	69.32	41.84	0.678
1986	330.47	62.28	26.93	0.431
1987	29.42	51.80	43.22	0.831
1988	30.20	47.94	28.05	0.748
1989	133.70	38.86	19.87	0.782
1990	148.20	23.71	15.54	0.653
1991	265.17	22.00	19.75	0.653
1992	228.92	29.16	(20.75)	(0.531)
1993	88.70	46.00	(35.97)	(0.814)
1994	115.37	44.86	(25.44)	(0.681)
1995	136.40	43.29	(21.14)	(0.522)
Average	202.33	61.59	33.66	0.663
Unit	Millions	1000 tonnes	1000 tonnes	-

(uncertain)

Table 3.7.3.b.1 Nominal catch (tonnes) of HADDOCK in Division VIb, 1983–1995, as officially reported to ICES.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Faroe Islands	3	3	1	-	-	5	-	-	-	-	-	-	-
France	48	12	116	103	99	5	... ²	... ²	... ²	... ²	... ²	... ²	... ²
Germany, Fed. Rep.	1	-	4	-	-	4	1	-	-	-	-	-	-
Ireland	-	-	-	-	-	-	-	620	640	571	692	956	677
Norway	20	45	31	83	33	20	47	38	69	47	70 ¹	75 ¹	29
Spain	79	128	892	756	371	245	337	178	187	n/a	n/a	n/a	n/a
UK (England & Wales) ³	113	788	1,876	703	1,271	753	272	238	165	74	308	169	...
UK (Isle of Man)	-	-	-	-	-	-	+	-	-	-	-	-	-
UK (N. Ireland) ³	-	-	-	157	-	-	-	-	-	-	-	-	...
UK (Scotland) ³	136	1,654	6,397	2,961	6,221	6,542	5,986	7,139	4,792	3,777	3,045	2,535	...
UK (total)													4,762
Total	400	2,630	9,317	4,763	7,995	7,574	6,643	8,213	5,853	4,469	4,115	3,735	5,468
Unallocated catch	-	-	493	251	437	355	85	-4,329	-198	851	669	1,998	119
Working Group estimate	-	-	9,810	5,014	8,432	7,929	6,728	3,884	5,655	5,320	4,784	5,733	5,587

¹Preliminary.

²Included in Division Via.

³1989–1994 revised. N. Ireland included with England and Wales.

n/a = Not available.

Table 3.7.3.b.2 Haddock off Rockall (Division VIb).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2–5
1985	77.50	19.62	9.81	0.503
1986	9.27	11.10	5.01	0.492
1987	18.35	22.77	8.43	0.506
1988	13.36	13.19	7.93	0.559
1989	11.11	9.24	6.73	1.016
1990	24.86	6.33	3.88	0.846
1991	25.43	5.86	5.66	0.698
1992	29.60	7.29	5.32	0.749
1993	24.42	10.68	4.78	0.661
1994	(21.32)	13.52	5.73	0.582
1995	(22.41)	13.11	5.59	0.561
Average	25.24	12.06	6.26	0.652
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.7.4.a.1 Nominal catch (tonnes) of WHITING in Division VIa, 1980-1995, as officially reported to ICES. Discards not included.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Belgium	+	-	2	-	-	3	-	4	3	1	-	+	-	+	+	+
Denmark	32	-	+	-	-	-	-	5	-	1	+	3	1	1	+	1
France	2,609	1,637	1,798	2,029	1,887	1,502	829	1,644	1,249	199 ^{1,2}	180	352 ^{1,2}	105 ¹	149 ¹	435 ^{1,2}	436 ^{1,2}
Germany, Fed. Rep.	1	49	53	43	6	9	1	+	4	+	+	+	1	1	+	-
Ireland	4,407	8,148	3,406	3,578	3,454	1,917	1,683	2,868	2,640	1,315	977	1,200	1,377	1,192	1,213	1,448
Netherlands	2	6	285	811	-	14	-	-	-	-	-	-	-	-	-	-
Spain	-	-	99	76	40	61	-	-	-	-	-	-	-	-	-	-
UK (Engl. & Wales) ⁴	227	145	166	157	162	63	26	62	30	44	50	218	196	184	233	...
UK (N. Ireland) ⁴	-	-	-	52	40	17	5	13	89	-	-	-	-	-	-	...
UK (Scotland) ⁴	7,386	8,519	8,419	10,019	11,270	9,051	5,848	7,803	7,864	6,109	4,819	5,135	4,330	5,224	4,149	...
UK (all)																4,471
Total	14,664	18,504 ³	14,235	16,765	16,859	12,637	8,392	12,399	11,879	7,669	6,026	6,908	6,010	6,751	6,030	6,356
Unallocated	-1,848	-6,301	-364	-795	-401	+256	-62	-855	-527	-138	-383	-248	3,694	3,410	6,871	7,420
Working Group Estimate	12,816	12,203	13,871	15,970	16,458	12,893	8,454	11,544	11,352	7,531	5,643	6,660	9,704	10,161	12,901	13,776

¹Preliminary.

²Includes Divisions Vb (EC) and VIb.

³Total landings for 1981 may require revision downwards.

⁴1989-1994 revised. N. Ireland included with England and Wales.

n/a = Not available.

Table 3.7.4.a.2 Whiting N-W Coast of Scotland and N. Ireland (Division VIa).

Year	Recruitment Age 0	Spawning Stock Biomass	Catch	Fishing Mortality Age 2-4
1965	120.39	51.42	24.78	0.814
1966	112.56	39.51	18.69	0.735
1967	344.43	35.59	23.70	0.987
1968	41.43	27.76	18.93	0.996
1969	43.79	54.63	16.63	0.723
1970	65.12	42.80	14.37	0.656
1971	228.57	32.30	18.99	0.996
1972	381.28	22.33	22.29	1.155
1973	151.49	28.24	25.71	1.464
1974	319.04	49.88	27.84	0.984
1975	122.12	43.74	28.98	0.757
1976	200.64	55.23	35.80	1.096
1977	209.45	32.67	26.22	0.891
1978	121.23	29.22	20.45	0.686
1979	328.04	37.02	20.16	0.775
1980	63.90	34.33	15.11	0.600
1981	85.36	59.88	16.44	0.419
1982	88.13	52.38	20.06	0.447
1983	233.12	41.58	21.98	0.633
1984	200.42	32.19	24.12	0.792
1985	116.06	28.84	23.56	1.112
1986	758.54	24.90	13.41	0.824
1987	107.06	26.14	49.45	0.860
1988	147.08	31.64	23.14	1.107
1989	101.33	16.01	11.60	0.953
1990	217.47	22.14	10.04	0.575
1991	363.84	24.03	12.01	0.487
1992	288.26	36.04	(24.88)	(0.584)
1993	372.70	52.67	(22.73)	(0.572)
1994	287.61	56.57	(32.29)	(0.699)
1995	347.14	59.22	(30.96)	(0.658)
Average	211.86	38.09	22.43	0.808
Unit	Millions	1000 tonnes	1000 tonnes	-

(Uncertain)

Table 3.7.4.b.1 Nominal catch (tonnes) of WHITING in Division VIb, 1983–1995, as officially reported to ICES.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
France	-	3	2	-	-	-	...	...	...	...	...	...	...
Ireland													
Spain	88	16	123	-	-	-	-	-	-	-	32	10	4
UK (Engl. & Wales) ³	+	2	+	5	4	-	16	6	1	5	10	2	...
UK (N. Ireland) ³	-	-	-	-	-	-	-	-	-	-	-	-	...
UK (Scotland) ³	5	25	6	13	108	23	18	482	459	283	86	68	...
UK (all)													54
Total	93	46	131	18	112	23	34	488	460	288	128	80	58

¹Preliminary.

²Included in Division VIa.

³1989–1994 revised. N. Ireland included with England and Wales.

Table 3.7.5.1 Nominal catch (tonnes) of SAITHE in Sub-area VI, 1982-1995, as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Belgium	-	-	-	2	-	12	14	15	-	6	2	2	+	-
Denmark	4	-	-	-	-	7	+	2	-	+	1	2	+	+
Faroe Islands	5	-	-	-	-	-	8	-	-	24	1	-	-	-
France	17,102	13,470	19,706	19,120	26,521	24,581	24,656	17,106 ²	12,961 ²	12,423 ²	6,777 ²	11,142 ²	9,672 ²	7,221 ²
Germany, Fed. Rep.	441	179	713	838	2,345	1,486	1,584	1,116	275	590	685	222	524	163
Ireland	322	698	599	670	660	704	544	593	520	260	278	317	438	530
Netherlands	-	32	-	-	-	-	-	-	-	-	-	-	-	-
Norway	19	55	66	51	72	38	50	72	64	31	67	88 ¹	74 ¹	38
Spain	243	330	882	624	824	533	857	65	70	49	n/a	n/a	n/a	n/a
UK (Engl. & Wales) ³	1,966	2,760	1,800	1,349	1,259	1,708	1,193	462	855	593	540	799	744	...
UK (N. Ireland) ³	7	12	49	15	21	26	13	-	-	-	-	-	-	...
UK (Scotland) ³	2,141	2,642	3,170	3,118	3,697	3,442	3,925	2,971	3,258	3,885	2,708	2,903	2,828	...
UK (total)														3,571
Total	22,250	26,178	26,985	25,787	35,399	32,537	32,844	22,402	18,003	17,861	11,059	15,475	14,280	11,523
Unallocated	1,634	2,712	-5,344	808	4,487	-1,168	1,334	3,175	1,862	-866	745	-801	-1,459	220
Total figures used by WG	23,884	28,890	21,641	26,595	39,886	31,369	34,178	25,577	19,865	16,995	11,804	14,674	12,821	11,743

¹Preliminary.²Includes Division Vb (EC).³1989-1994 revised. N. Ireland included with England and Wales.

n/a = Not available.

Table 3.7.5.2 Saithe N-W Coast of Scotland, N. Ireland and Rockall (Sub-area VI).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1963	30.79	12.15	6.59	0.259
1964	20.47	16.83	13.60	0.381
1965	20.51	22.09	18.40	0.540
1966	32.65	19.20	18.58	0.476
1967	23.24	27.83	16.03	0.336
1968	37.60	28.05	12.79	0.252
1969	26.96	34.56	17.12	0.291
1970	37.75	45.54	14.54	0.226
1971	34.49	50.93	19.86	0.258
1972	33.54	65.53	29.22	0.299
1973	31.83	85.56	33.83	0.365
1974	33.40	93.93	35.97	0.339
1975	24.90	75.61	30.80	0.365
1976	17.23	84.76	41.75	0.493
1977	18.28	60.13	27.21	0.447
1978	20.06	78.88	31.37	0.424
1979	22.73	61.65	21.60	0.332
1980	31.03	62.16	22.10	0.311
1981	29.96	59.63	23.57	0.307
1982	39.87	50.68	23.88	0.320
1983	40.55	55.88	28.89	0.328
1984	43.36	49.94	21.64	0.245
1985	22.11	59.84	26.60	0.283
1986	29.71	54.77	39.89	0.585
1987	29.90	52.21	31.37	0.491
1988	20.91	44.26	34.18	0.550
1989	20.69	26.54	25.58	0.814
1990	16.45	21.04	19.87	0.718
1991	15.51	17.00	17.00	0.709
1992	15.19	12.78	11.80	0.533
1993	11.80	13.10	14.67	0.517
1994	12.76	16.00	12.82	0.522
1995	16.44	19.19	11.74	0.433
Average	26.14	44.79	22.87	0.417
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.7.6.1 MEGRIM in Sub-area VI. Nominal landings (tonnes) as officially reported to ICES, 1984–1995.

A. Division VIa

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Belgium	-	-	-	1	1	1	-	1	-	+	1	-
Denmark	-	-	-	-	-	1	-	-	+	-	-	-
France	1,398	1,411	777	997	1,295	457 ^{1,2}	398 ^{1,2}	455 ^{2,1}	504 ¹	517 ^{1,3}	469 ^{1,2}	459 ²
Germany, Fed.Rep.	1	+	-	-	2	+	+	-	+	-	+	-
Ireland	134	151	243	403	685	474	317	260	317	329	304	535
Spain	310	422	137	102	121	43	91	48	n/a	n/a	n/a	n/a
UK (Engl.& Wales) ³	14	84	55	369	284	122	25	167	392	298	327	...
UK (N. Ireland) ³	-	-	+	11	70							...
UK (Scotland) ³	862	919	660	991	1,068	1,169	1,093	1,223	887	896	866	...
UK												1,257
Total	2,719	2,987	1,872	2,874	3,525	2,267	1,924	2,154	2,100	2,040	1,967	2,251
As used by Working Group							2,924	2,672	2,321	2,262	n/a	n/a

¹Preliminary.

²Includes Divisions Vb (EC) and VIb.

³1989–1994 revised. N. Ireland included with England and Wales.

n/a = Not available.

B. Division VIb

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
France	9	6	11	2	1	... ^{1,2}	... ^{1,2}	... ^{1,2}	... ¹	... ¹	... ^{1,2}	... ²
Ireland					-	-	196	240	139	128	176	117
Spain	640	646	730	583	751	205	363	587	n/a	n/a	n/a	n/a
UK (Engl.& Wales) ³	6	32	88	261	77	18	19	14	53	56	38	...
UK (N. Ireland) ³	-	-	-	-	-							...
UK (Scotland) ³	10	82	79	174	185	178	226	204	198	147	258	...
UK												179
Total	665	766	908	1,020	1,014	401	804	1,045	390	331	472	296

¹Preliminary.

²Included in Division VIa.

n/a = Not available.

³1989–1994 revised. N. Ireland included with England and Wales.

C. Total for Sub-area VI (official landings)

1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
3,384	3,753	2,780	3,894	4,539	2,668	2,728	3,199	2,490	2,371	2,439	2,547

Table 3.7.7.1 ANGLERFISH in Sub-area VI. Nominal landings (tonnes) as officially reported to ICES, 1984–1995.

A. Division VIa

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Belgium	-	4	2	15	2	8	-	3	2	9	6	5
Denmark	-	-	-	4	+	34	+	1	3	4	5	11
Faroe Islands	-	-	-	-	-	1	-	-	-	-	-	-
France	1,723	2,036	1,505	1,601	2,329	1,901 ^{1,2}	2,182 ^{1,2}	1,910 ^{1,2}	2,308 ¹	2,467 ^{1,2}	2,724 ^{1,2}	2,051 ²
Germany, Fed.Rep.	4	24	3	4	9	10	+	1	2	60	67	74
Ireland	172	119	295	187	324	556	398	250	403	428	303	720
Norway	6	5	6	3	8	27	8	6	14	8 ¹	6 ¹	4
Spain	355	281	142	130	269	15	35	7	n/a	n/a	n/a	n/a
UK (Engl.& Wales) ³	56	52	36	241	403	153	71	270	351	223	370	...
UK (N. Ireland) ³	2	-	2	2	30							
UK (Scotland) ³	1,617	1,522	1,099	1,768	2,629	3,024	2,921	2,613	2,385	2,346	2,133	...
UK												2,863
Total	3,935	4,043	3,090	3,955	6,003	5,729	5,615	5,061	5,468	5,545	5,614	5,728
As used by Working Group							5,799	5,357	4,632	4,999	n/a	n/a

¹Preliminary.

²Includes Divisions Vb(EC) and VIb.

³1989–1994 revised. N. Ireland included with England and Wales.

n/a = Not available.

B. Division VIb

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 ¹
Faroe Islands	5	4	-	-	6	1	-	-	2	-	-	-
France	35	13	19	4	4	... ^{1,2}	... ^{1,2}	... ^{1,2}	... ^{1,2}	29 ¹	... ²	... ²
Germany, Fed. Rep.	-	-	-	-	-	-	-	-	-	103	73	75
Ireland	-	-	-	-	-	-	400	272	417	96	135	133
Norway	14	7	9	11	7	13	16	18	10	17 ¹	24 ¹	14
Spain	598	642	990	730	1,340	81	138	333	n/a	n/a	n/a	n/a
UK (Engl.& Wales) ³	20	85	112	253	123	17	19	99	173	76	50	...
UK (N. Ireland) ³	-	-	-	-	-	-	-	-	-	-	-	...
UK (Scotland) ³	35	262	196	296	250	201	249	201	224	182	281	...
UK												303
Total	707	1,013	1,326	1,294	1,730	313	822	923	826	503	563	525

¹Preliminary.

²Included in Division VIa.

³1989–1994 revised. N. Ireland included with England and Wales.

n/a = Not available.

C. Total for Sub-area VI (official)

1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
4,642	5,056	4,416	5,249	7,733	6,041	6,437	5,984	6,294	6,048	6,177	6,253

Table 3.7.8.a1

HERRING in Division VIa (North). Catch in tonnes by country and year. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1982	1983	1984	1985	1986	1987	1988
Denmark	-	-	96	-	-	-	-
Faroes	74	834	954	104	400	-	-
France	2 069	1 313	-	20	18	136	44
Germany	8 453	6 283	5 564	5 937	2 188	1 711	1 860
Ireland	-	-	-	-	6 000	6 800	6 740
Netherlands	11 317	20 200	7 729	5 500	5 160	5 212	6 131
Norway	10 018	7 336	6 669	4 690	4 799	4 300	456
UK Eng. & Wales	90	-	-	-	-	-	1 892
UK Scotland	38 381	31 616	37 554	28 065	25 294	26 810	25 002
Unallocated	18 958	-4 059	16 588	502	37 840	18 038	5 229
Discards	-	-	-	-	-	-	-
Misreported(*)			11 270	4 819	8 987	18 902	11 839
Total in VIa (North)	89 360	63 523	63 864	39 999	71 712	44 105	35 515

Country	1989	1990	1991	1992	1993	1994	1995
Denmark	-	-	-	-	-	0	0
Faroes	-	326	482	-	-	0	0
France	1342	1287	1168	119	818	274	3 672
Germany	4 290	7 096	6 450	5 640	4 693	5 087	3 733
Ireland	8 000	10 000	8 000	7 985	8 236	7 938	3 548
Netherlands	5 680	7 693	7 979	8 000	6 132	6 093	7 808
Norway	-	1 607	3 318	2 389	7 447	8 183	4 840
UK Eng. & Wales	1 977	2 376	2 998	3 327	2 965	3 511	5 375
UK Scotland	27 897	35 877	29 630	29 403	29 637	27 165	37 286
Unallocated	2 123	2 397	-10 597	-5 485	-3 753	-3 587	-4 541
Discards	1 550	1 300	1 180	200	820	700	
Misreported(*)	19 094	25 185	18 218	22 697	24 155	30 089	32 468
Total in VIa (North)	33 765	44 774	32 390	28 881	32 840	25 275	29 253

Discards are included in national catches for some countries.

(*) Catches assumed misreported are catches reported from the area between 4°W and 5°W. They are not included in the catch totals, but are included in the catches by country.

Table 3.7.8.a2 Herring in the Northern part of Division VIa.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1976	650.35	101.31	93.64	1.053
1977	661.25	68.54	41.34	0.949
1978	971.31	67.30	22.18	0.641
1979	1,544.10	104.81	0.06	0.001
1980	938.85	178.23	0.31	0.002
1981	1,699.43	177.56	51.42	0.309
1982	812.79	161.74	89.36	0.546
1983	3,456.55	124.07	63.52	0.501
1984	1,287.27	225.45	63.86	0.347
1985	1,396.56	230.54	40.00	0.259
1986	1,148.52	214.65	71.71	0.418
1987	2,867.04	205.63	44.11	0.248
1988	1,466.39	289.63	35.52	0.191
1989	1,119.26	308.39	33.77	0.155
1990	735.65	300.70	44.77	0.178
1991	782.69	278.37	32.39	0.152
1992	1,474.34	267.79	28.88	0.112
1993	1,522.36	277.06	32.84	0.118
1994	956.01	307.32	25.28	0.070
1995	43.83	307.17	29.25	0.091
Average	1,276.73	209.81	42.21	0.317
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.7.8.b 1 Catches of HERRING from the Firth of Clyde. Spring and autumn-spawners combined. Catch in tonnes by country, 1955-1995.

Country	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
Scotland											
Other UK											
Unallocated ¹											
Discards											
Agreed TAC											
Total	4,050	4,848	5,915	4,926	10,530	15,680	10,848	3,989	7,073	14,509	15,096

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Scotland											
Other UK											
Unallocated ¹											
Discards											
Agreed TAC											
Total	9,807	7,929	9,433	10,594	7,763	4,088	4,226	4,715	4,061	3,664	4,139

Country	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Scotland						2,506	2,530	2,991	3,001	3,395	2,895
Other UK						-	273	247	22	-	-
Unallocated ¹						262	293	224	433	576	278
Discards						1,253	1,265	2,308 ³	1,344 ³	679 ³	439 ⁴
Agreed TAC								3,000	3,000	3,100	3,500
Total	4,847	3,862	1,951	2,081	2,135	4,021	4,361	5,770	4,800	4,650	3,612

Country	1988	1989	1990	1991	1992	1993	1994	1995
Scotland	1,568	2,135	2,184	713	929	852	608	392
Other UK	-	-	-	-	-	-	-	-
Unallocated ¹	110	208	75	18	-	-	-	-
Discards	245 ⁴	2	2	2	2	2	2	2
Agreed TAC	3,200	3,200	2,600	2,900	2,300	1,000	1,000	1,000
Total	1,923	2,343	2,259	731	929	852	608	392

¹Calculated from estimates of weight per box and in some years estimated by-catch in the sprat fishery³Based on sampling.²Reported to be at a low level, assumed to be zero.⁴Estimated assuming the same discarding rate as in 1986.

Table 3.7.9.1 Norway Pout. Annual landings (t) in Division VIa. (Data officially reported to ICES).

Country	1974	1975	1976	1977	1978	1979	1980	1981
Denmark	-	193	-	-	4,443	15,609	13,070	2,877
Faroes	1,581	1,524	6,203	2,177	18,484	4,772	3,530	3,540
Germany	179	-	8	-	-	-	-	-
Netherlands	-	322	147	230	21	98	68	182
Norway	144 ³	-	82 ³	-	-	-	-	-
Poland	75	-	-	-	-	-	-	-
UK (Scotland) ²	4,702	6,614	6,346	2,799	302	23	1,202	1,158
Russia	40	2	7,147	-	-	-	-	-
Total	6,721	8,655	19,933	5,206	23,250	20,502	17,870	7,757

Country	1982	1983	1984	1985	1986	1987	1988	1989
Denmark	751	530	4,301	8,547	5,832 ⁴	37,714 ⁵	5,849 ⁵	28,180 ⁵
Faroes	3,026	6,261	3,400	998	-	-	376	11
Germany	-	-	70	-	-	-	-	-
Netherlands	548	1,534	-	139	-	-	-	-
Norway	-	-	-	-	-	-	-	-
Poland	-	-	-	-	-	-	-	-
UK (Scotland) ²	586	-	23	13	-	553	517	5
Russia	-	-	-	-	-	-	-	-
Total	4,911	8,325	7,794	9,697	5,832	38,267	6,742	28,196

Country	1990	1991	1992	1993	1994	1995 ¹
Denmark	3,316 ⁵	4,348	5,147	7,338	14,147	24,431
Faroes	-	-	-	-	-	-
Germany	-	-	-	-	-	1
Netherlands	-	-	10	-	-	7
Norway	-	-	-	-	-	-
Poland	-	-	-	-	-	-
UK (Engl. & Wales)	-	-	2	-	1	-
UK (Scotland)	+	-	-	-	+	-
Russia	-	-	-	-	-	-
Total	3,316	4,348	5,159	7,338	14,148	24,439

¹Preliminary.²Amended using national data.³Including by-catch.⁴Includes Division VIb.⁵Included in Division IVa.

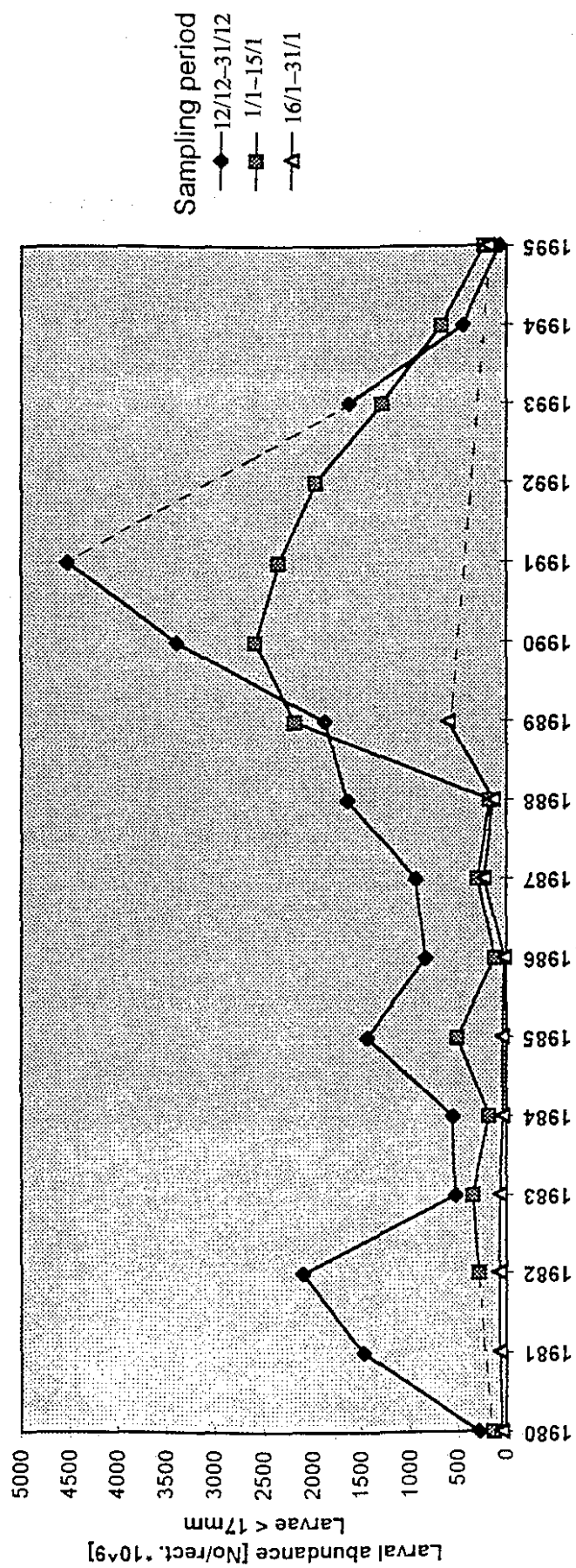
Table 3.7.10.1 Sandeel, Division VIa
Landings (tonnes), 1981-1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Denmark	-	-	-	-	-	-	-	-	-	-
UK, Scotland	5972	10786	13051	14166	18586	24469	14479	24465	18785	16515
Total	5972	10786	13051	14166	18586	24469	14479	24465	18785	16515

Country	1991	1992	1993	1994	1995*
Denmark	-	-	80	-	-
UK, Scotland	8532	4935	6156	10627	7111
Total	8532	4935	6236	10627	7111

* Preliminary

Figure 3.5.8 b1 Herring larval abundance in Divisions IVc and VIId during the period 1980–1995.



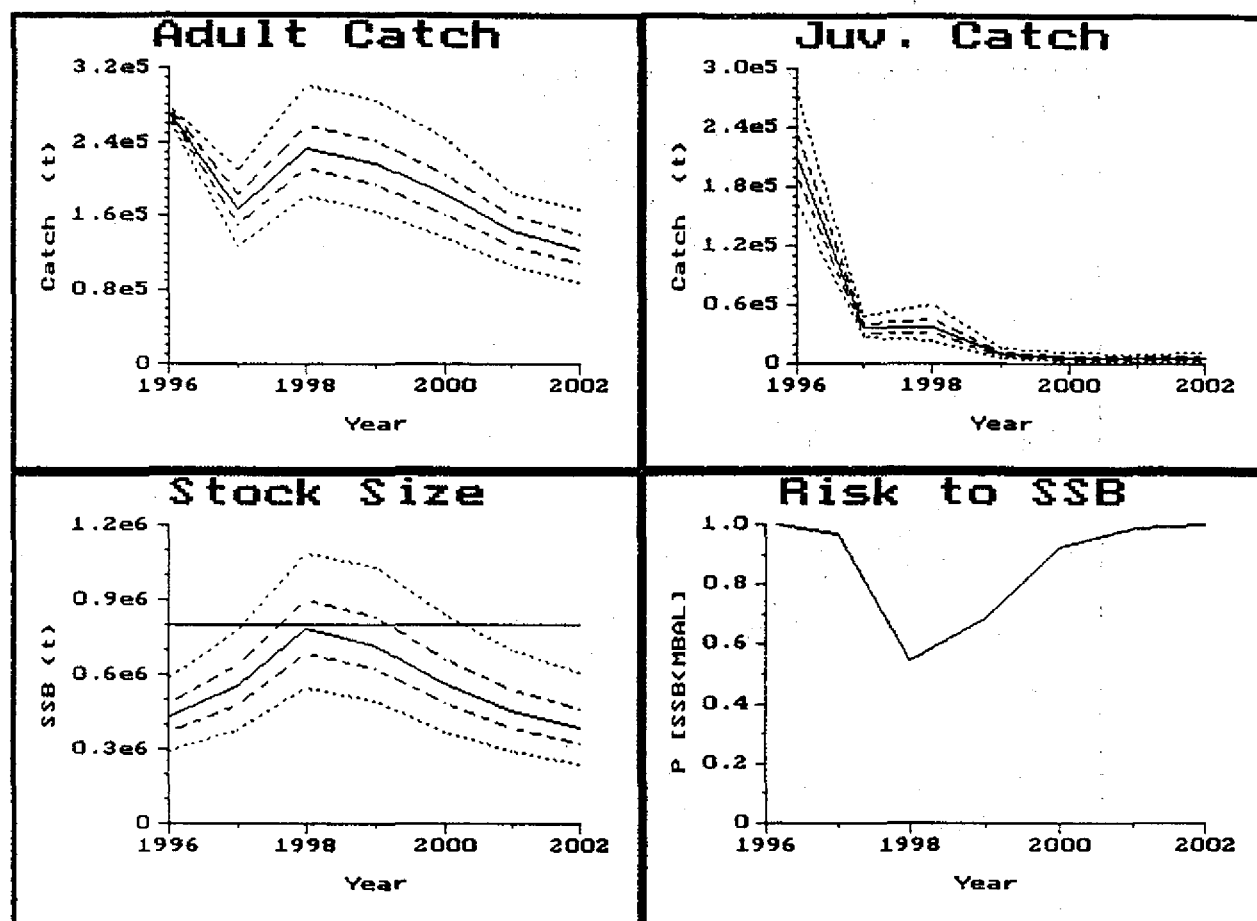


Figure 3.5.8.c.1 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 1: F(Adult) = 0.3
 F(Juvenile) = 0.0
 Recruitment = 0.1. Geometric Mean (1958–1995)

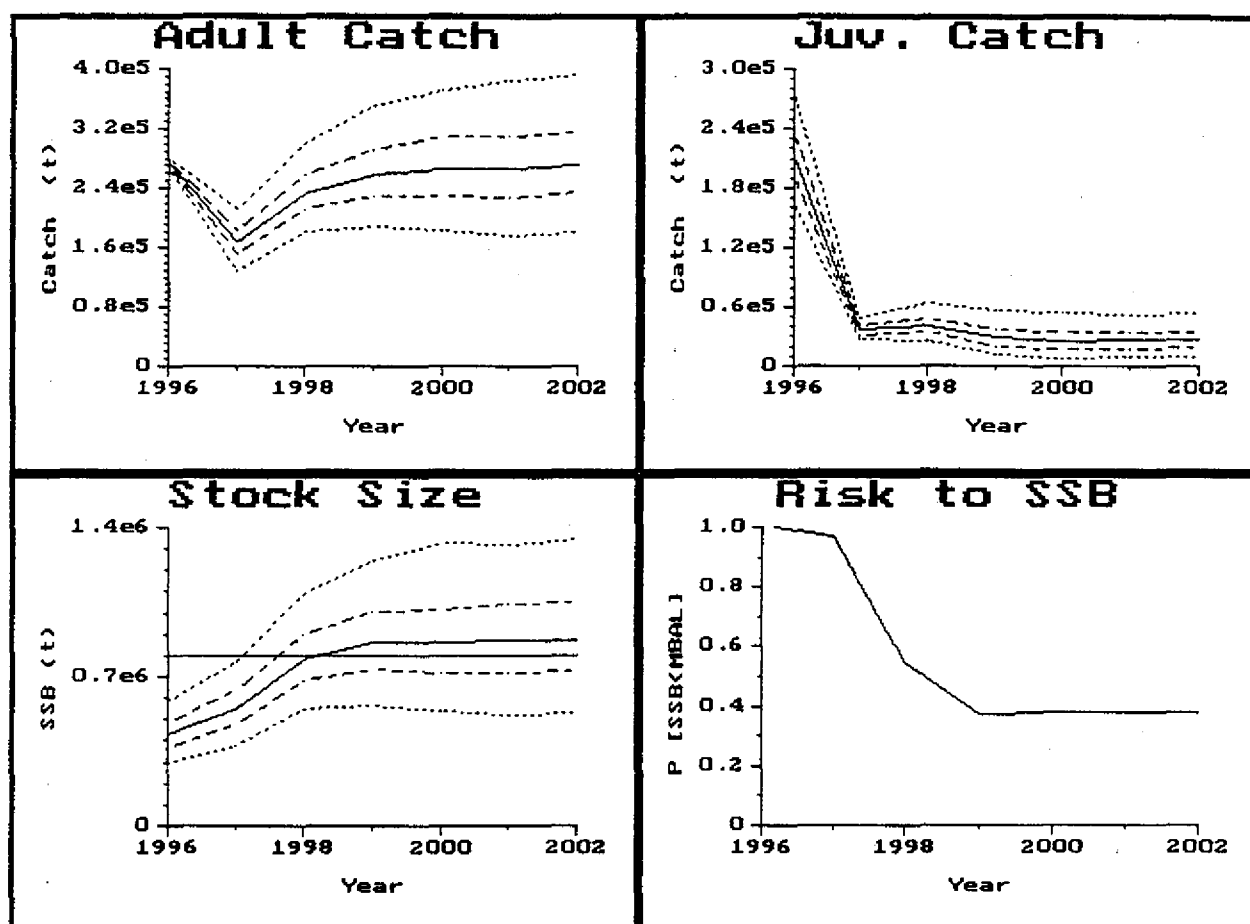


Figure 3.5.8.c.2 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 2: F(Adult)= 0.3
 F(Juvenile)= 0.0
 Recruitment= 0.5. Geometric Mean (1958–1995)

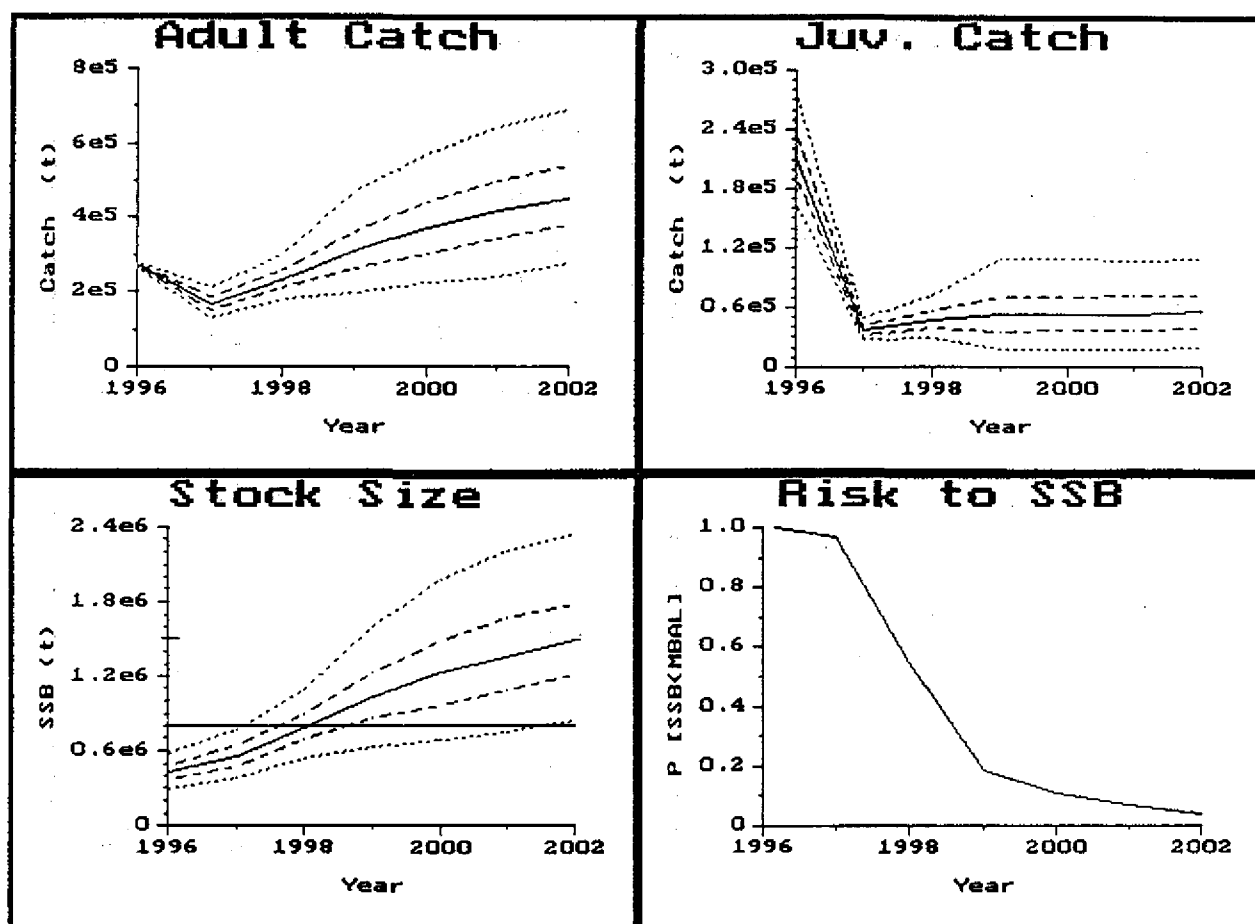


Figure 3.5.8.c.3 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75 percentiles. Dotted lines, 5th and 95th percentiles.

Option 3: F(Adult)= 0.3
 F(Juvenile)= 0.0
 Recruitment= Geometric Mean (1958–1995)

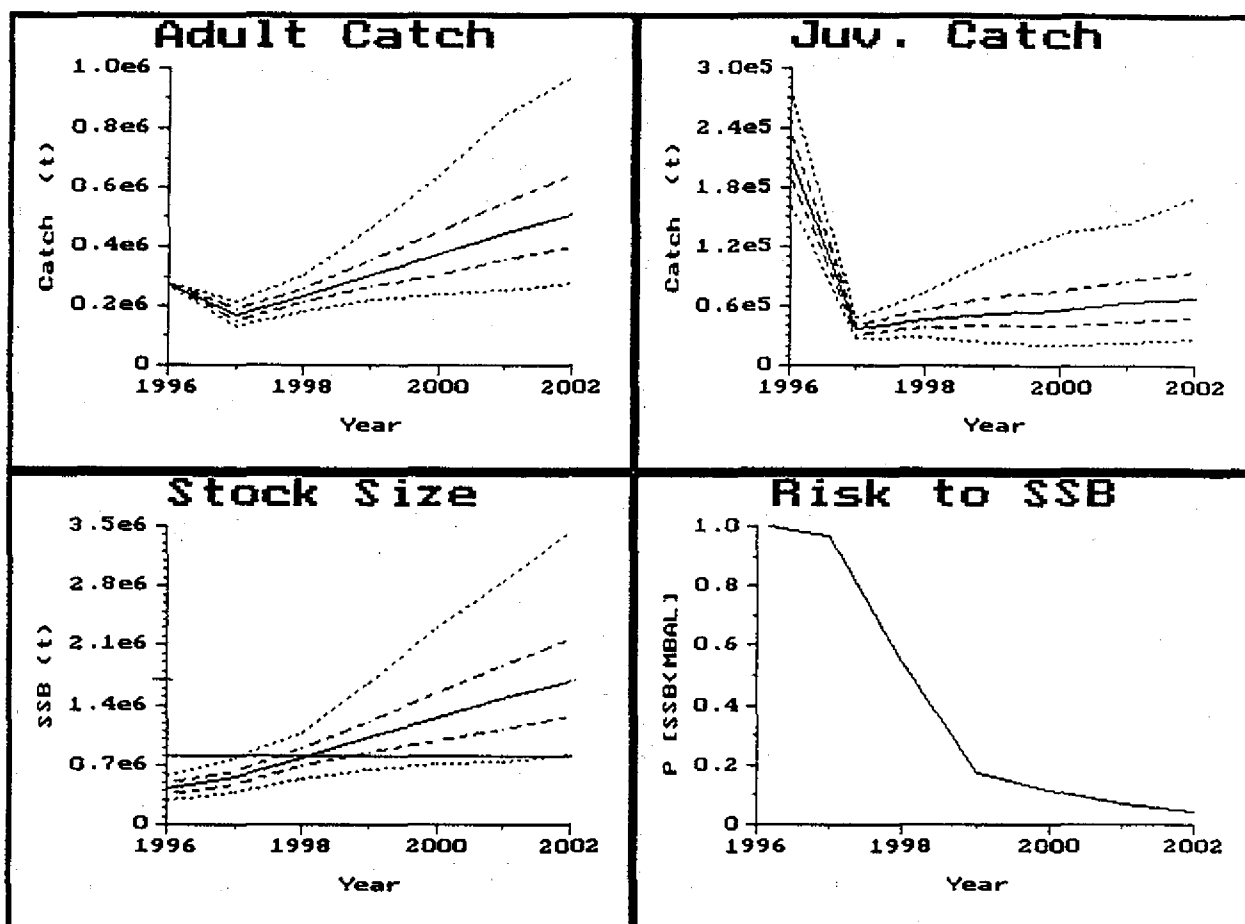


Figure 3.5.8.c.4 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 4: F(Adult)= 0.3
 F(Juvenile)= 0.0
 Recruitment= Autocorrelated stochastic recruitment around fitted Beverton-Holt Stock-Recruit relationship.

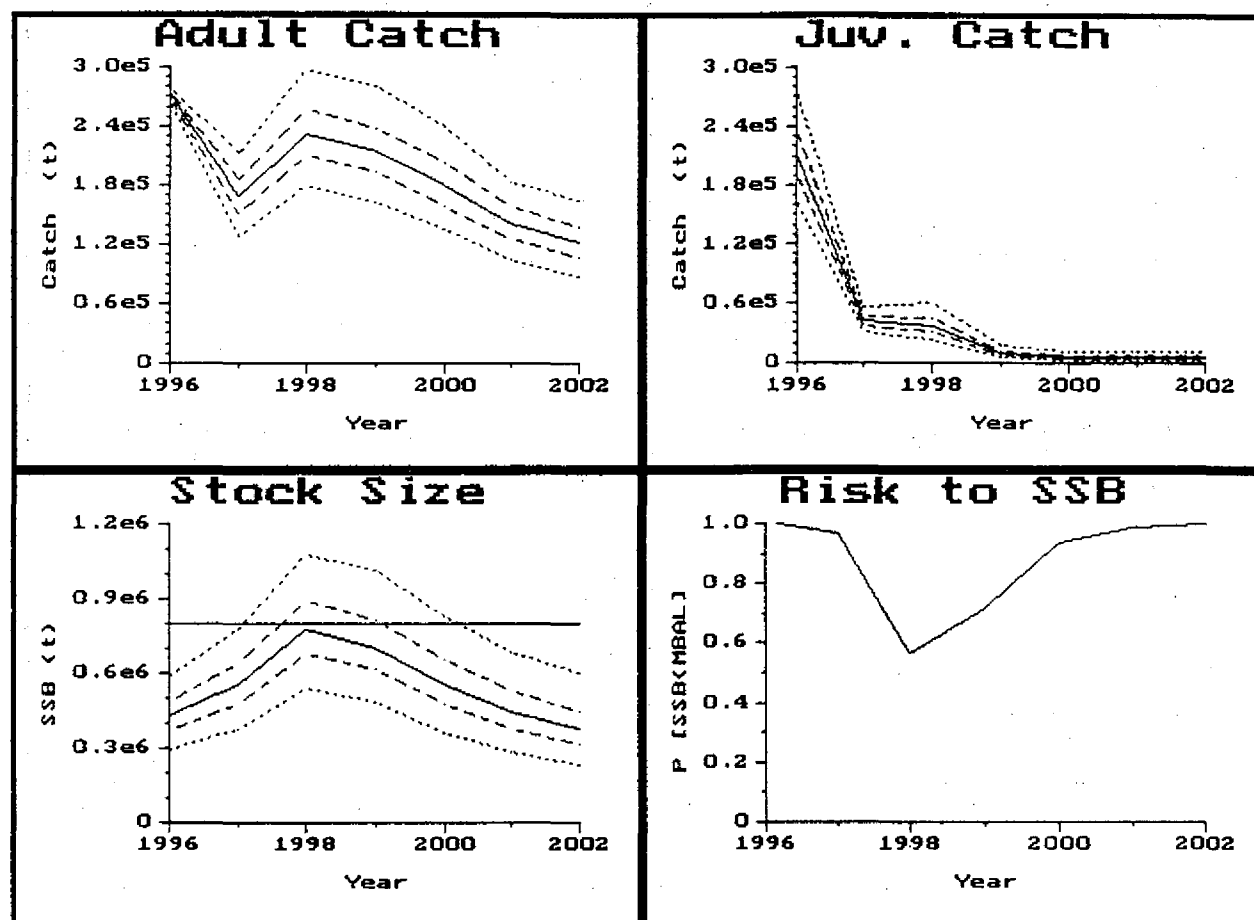


Figure 3.5.8.c.5 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 5: F(Adult)= 0.3
 F(Juvenile)= 0.02
 Recruitment= 0.1. Geometric Mean (1958–1995)

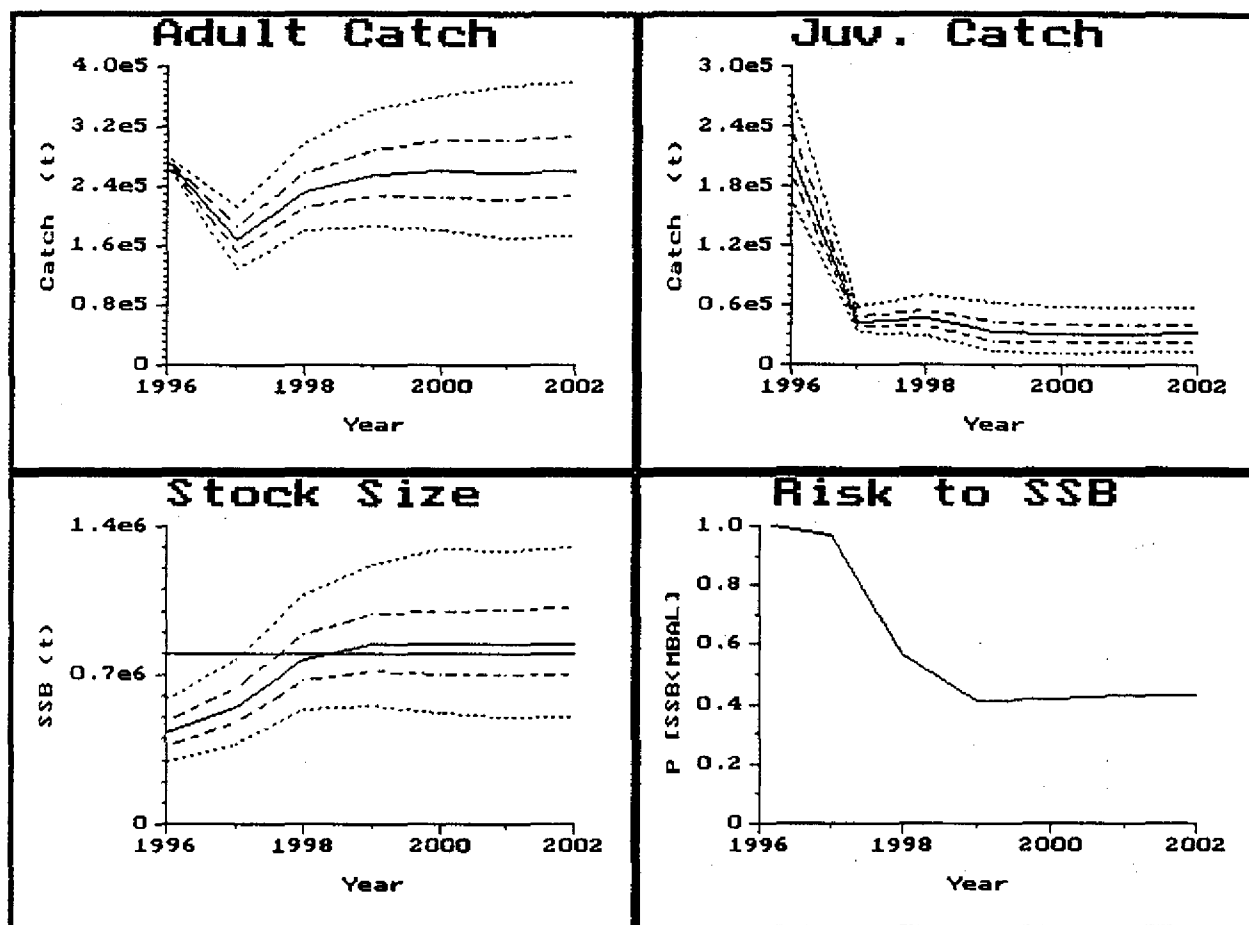


Figure 3.5.8.c.6 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 6: $F(\text{Adult}) = 0.3$
 $F(\text{Juvenile}) = 0.02$
 Recruitment = 0.5. Geometric Mean (1958–1995)

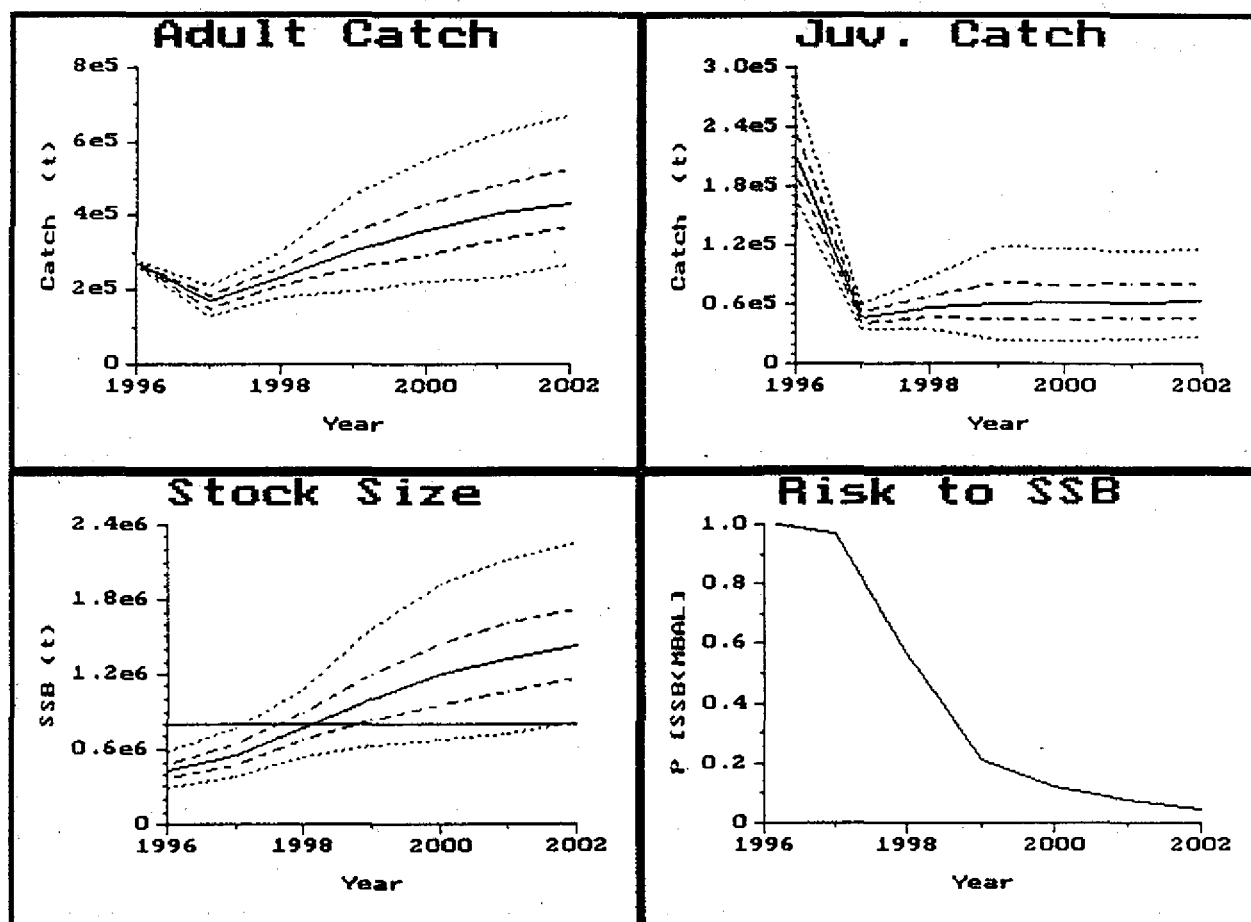


Figure 3.5.8.c.7 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 7: $F(\text{Adult}) = 0.3$
 $F(\text{Juvenile}) = 0.02$
 Recruitment = Geometric Mean (1958–1995)

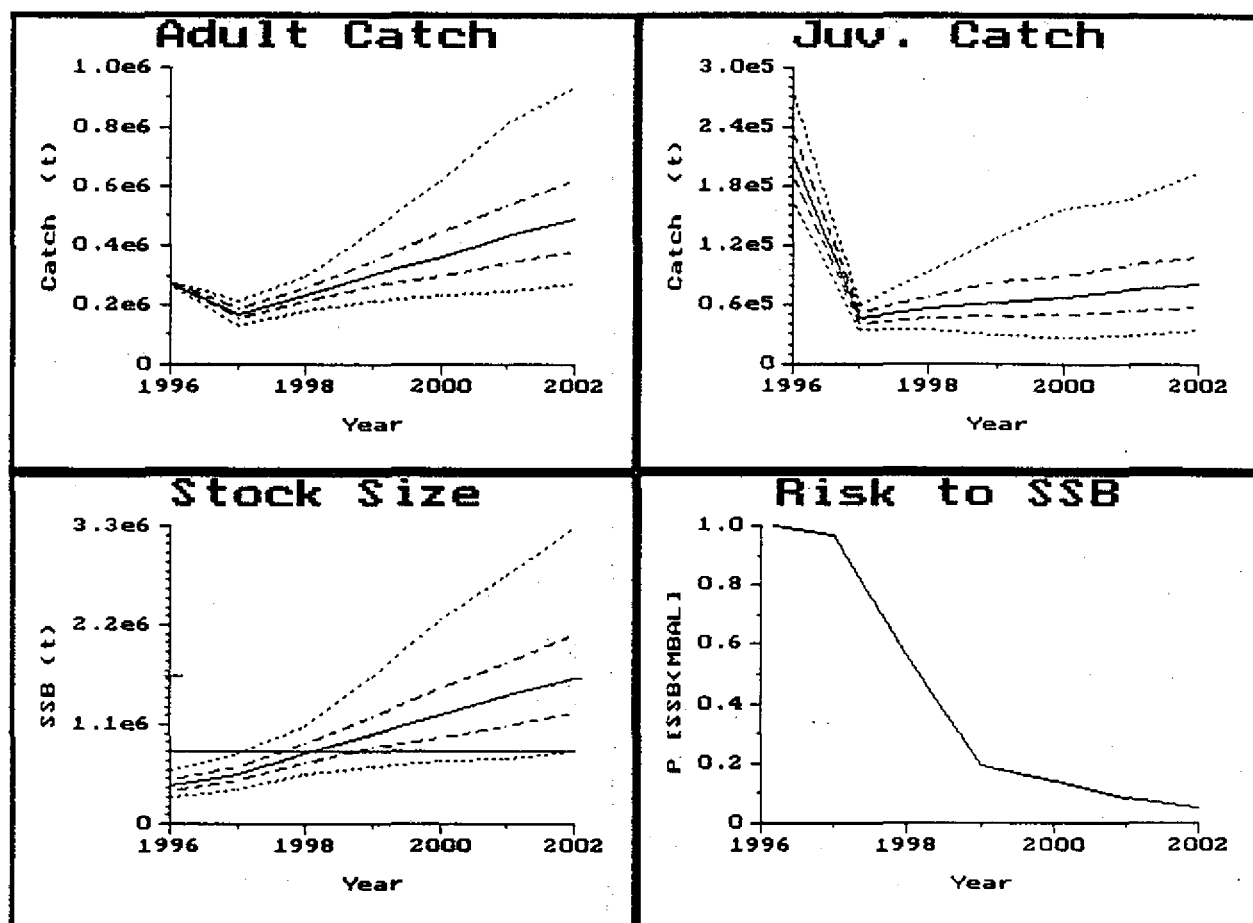


Figure 3.5.8.c.8 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 8: $F(\text{Adult}) = 0.3$
 $F(\text{Juvenile}) = 0.02$
 Recruitment = Autocorrelated stochastic recruitment around fitted Beverton-Holt Stock Recruit relationship

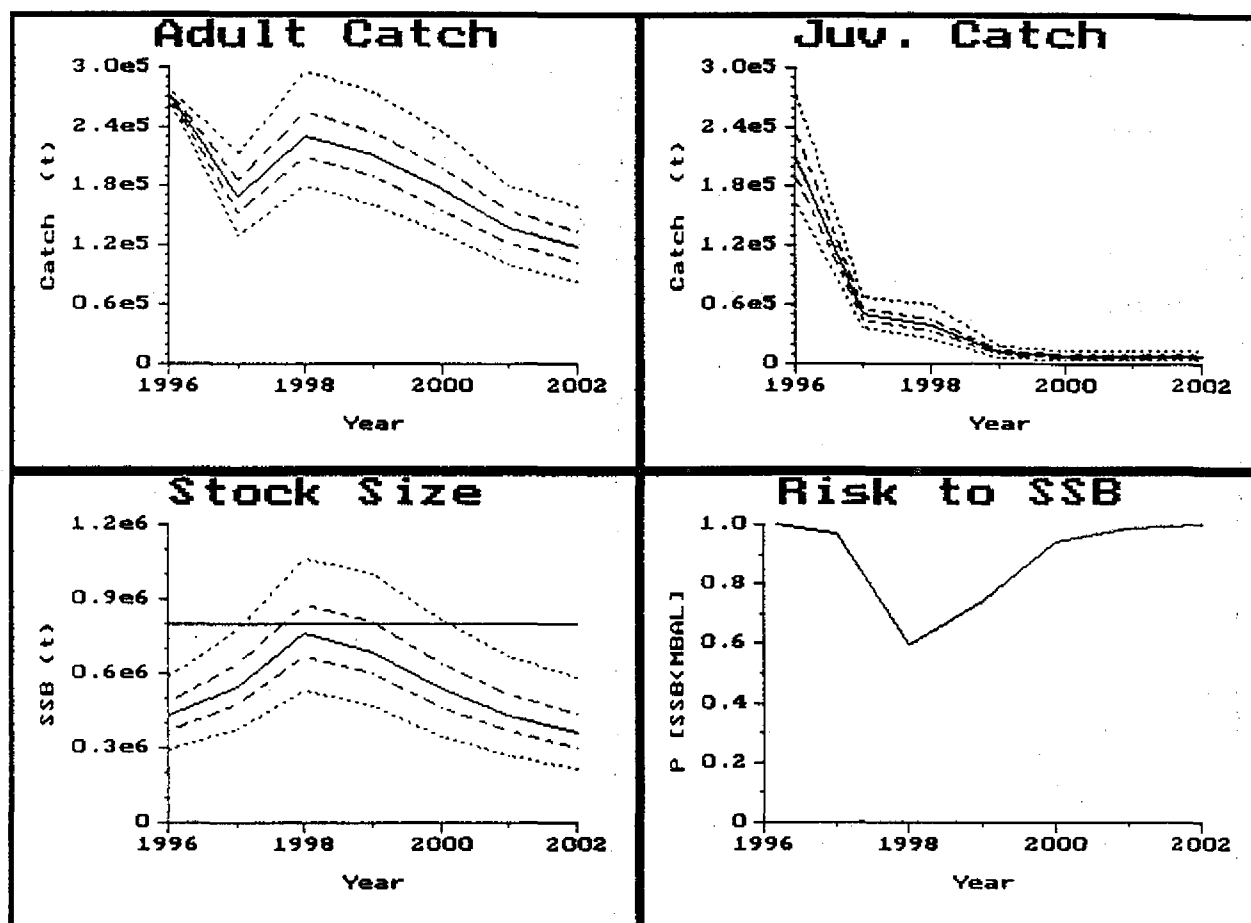


Figure 3.5.8.c.9 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 9: F(Adult)= 0.3
 F(Juvenile)= 0.05
 Recruitment= 0.1. Geometric Mean (1958–1995)

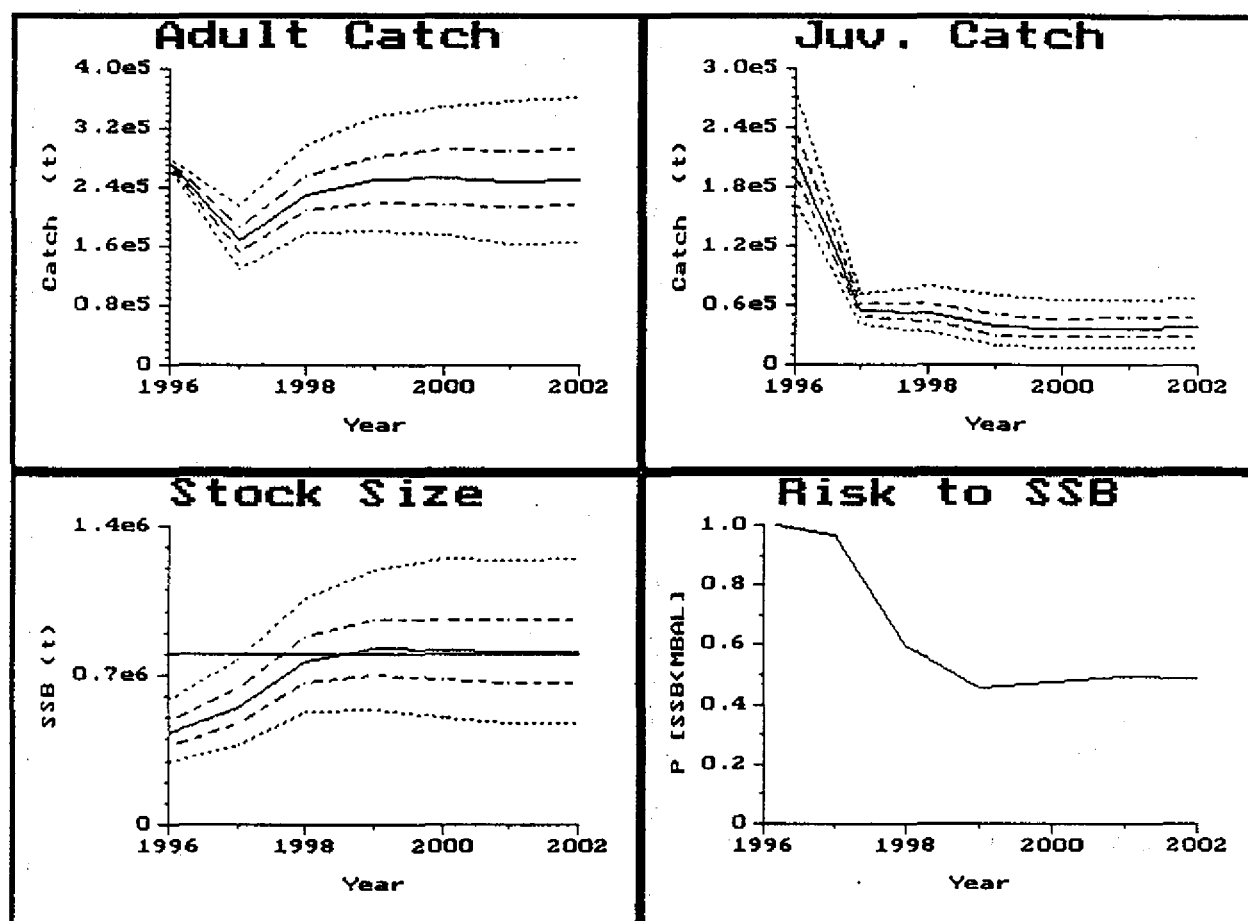


Figure 3.5.8.c.10 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 10: F(Adult)= 0.3
 F(Juvenile)= 0.05
 Recruitment= 0.5. Geometric Mean (1958–1995)

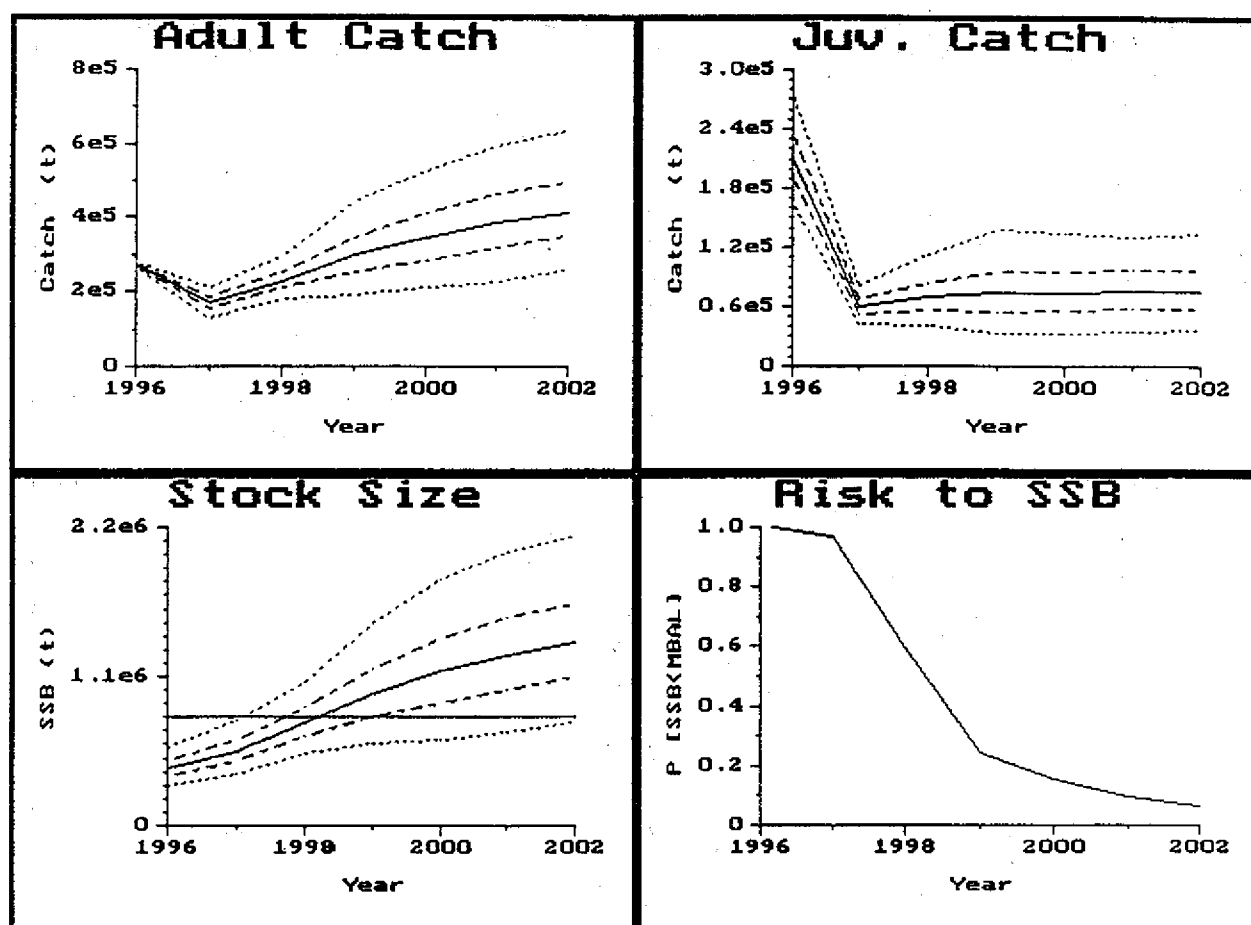


Figure 3.5.8.c.11 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 11: F(Adult)= 0.3
 F(Juvenile)= 0.05
 Recruitment= Geometric Mean (1958–1995)

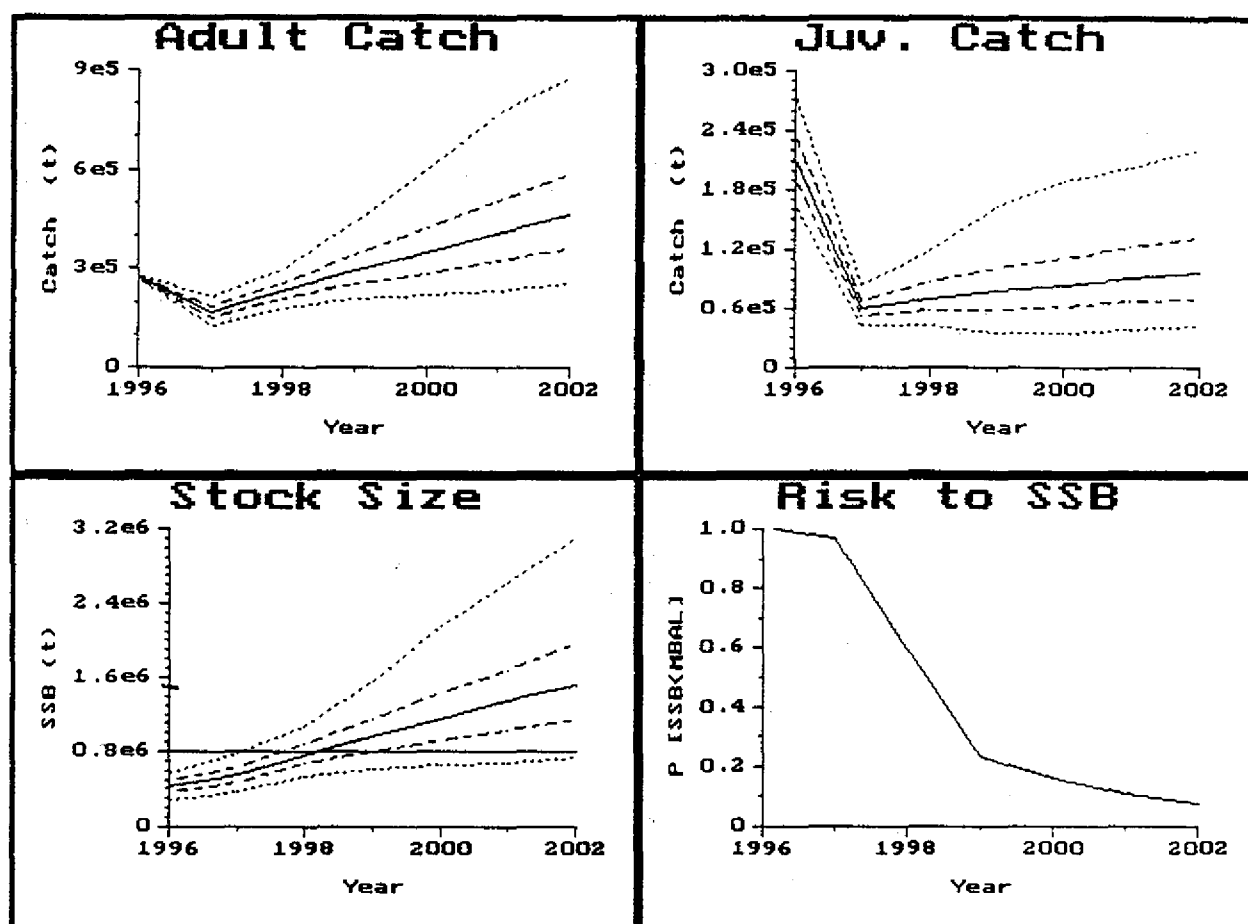


Figure 3.5.8.c.12 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 12: $F(\text{Adult}) = 0.3$
 $F(\text{Juvenile}) = 0.02$
 Recruitment = Autocorrelated stochastic recruitment around fitted Beverton-Holt Stock-Recruit relationship

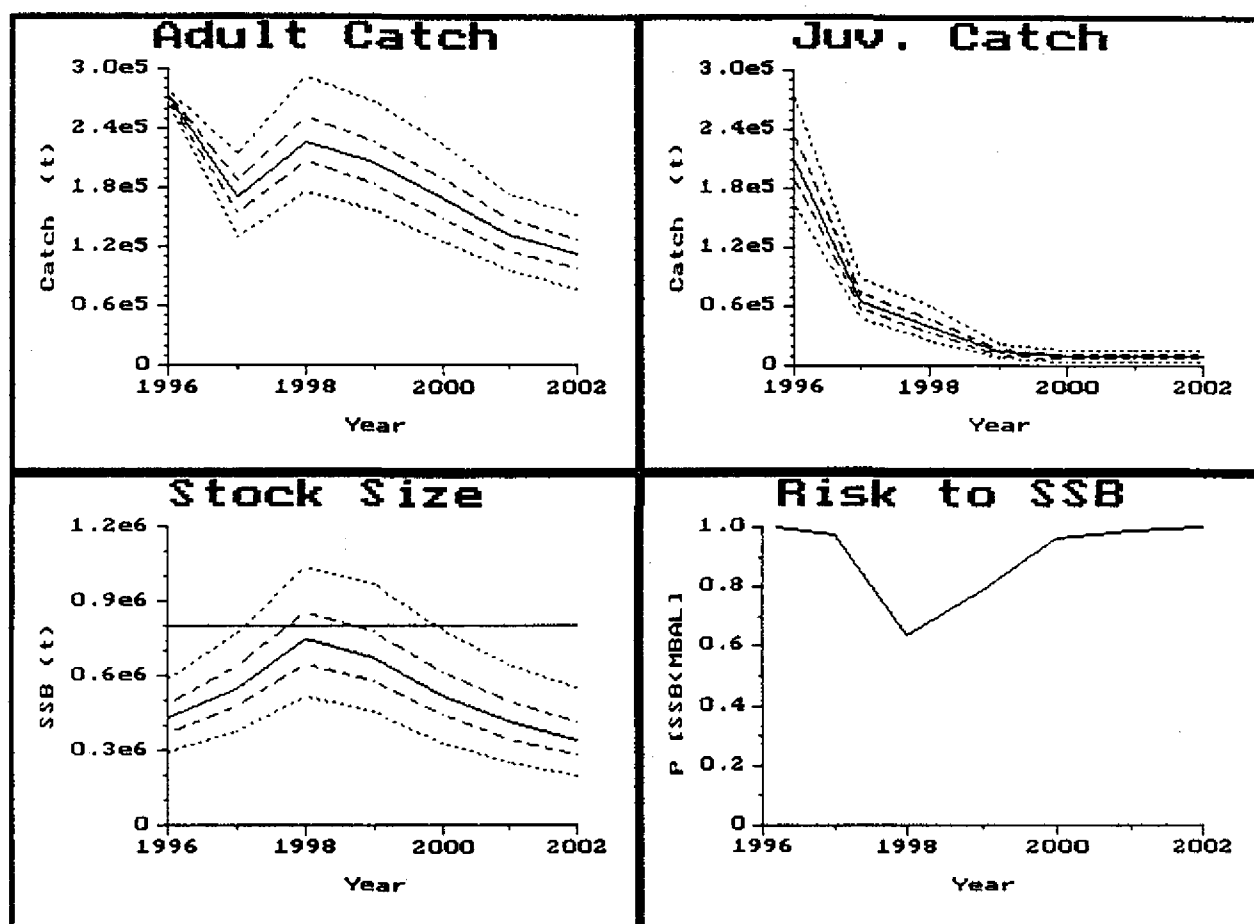


Figure 3.5.8.c.13 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 13: F(Adult)= 0.3
 F(Juvenile)= 0.1
 Recruitment= 0.1. Geometric Mean (1958–1995)

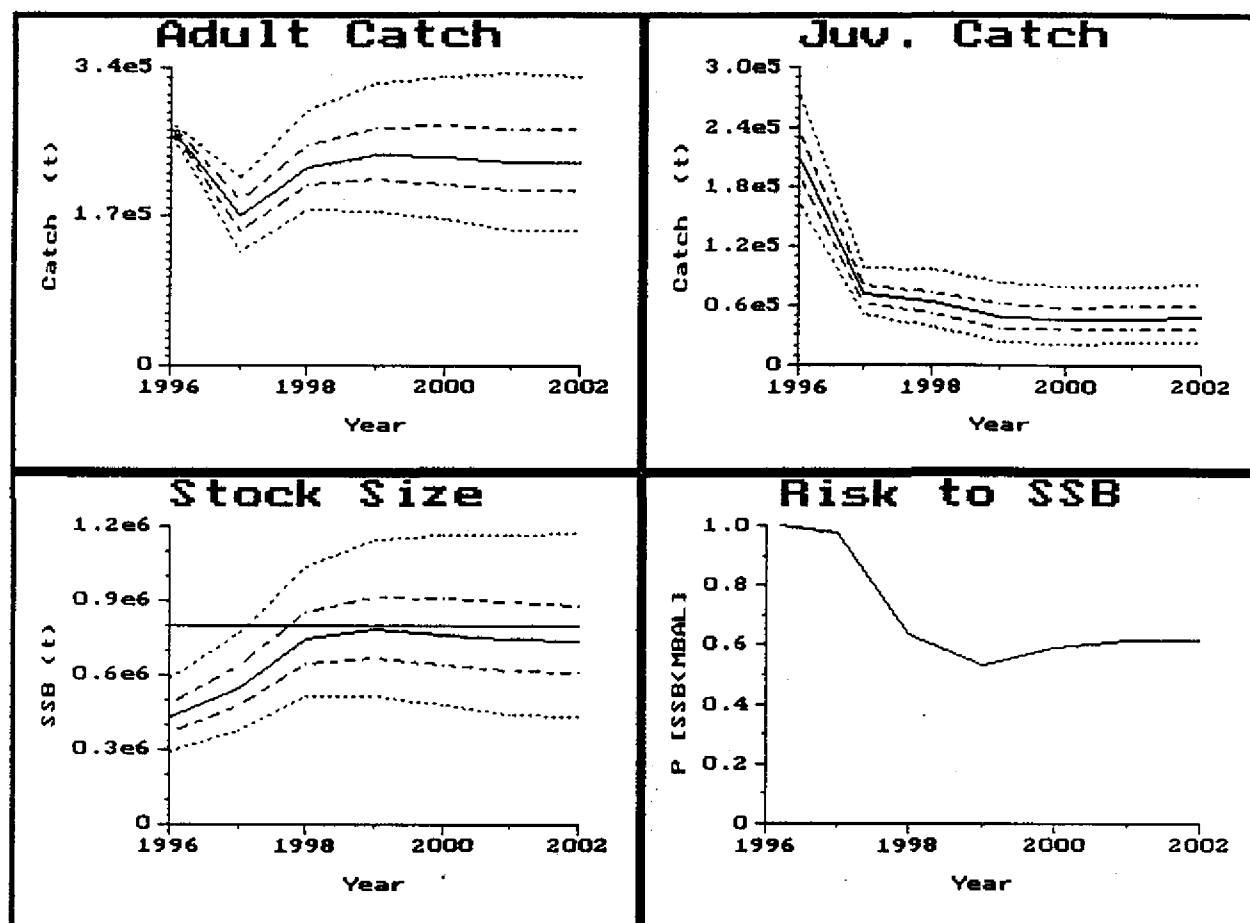


Figure 3.5.8.c.14 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 14: F(Adult)= 0.3
 F(Juvenile)= 0.1
 Recruitment= 0.5. Geometric Mean (1958–1995)

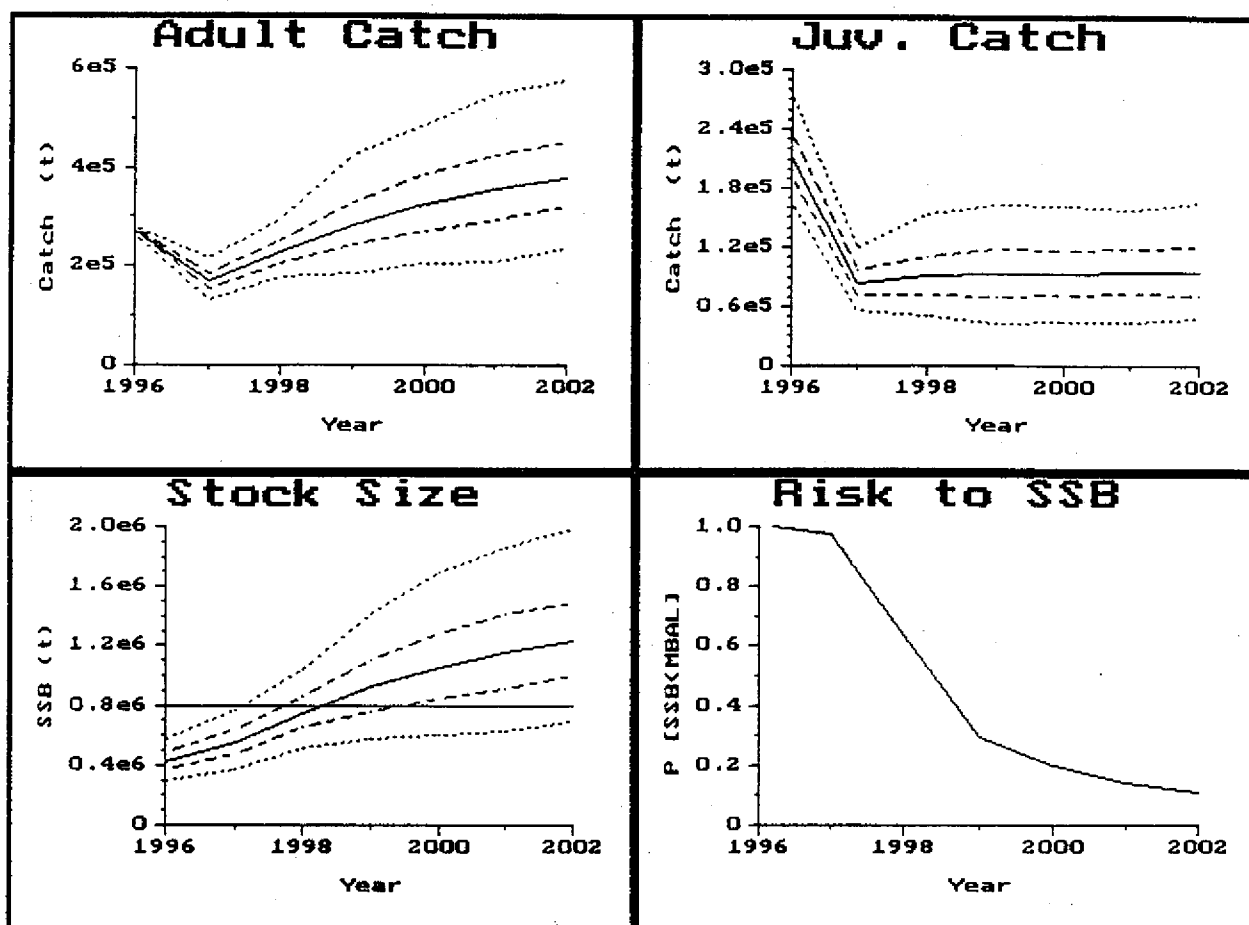


Figure 3.5.8.c.15 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 15: F(Adult)= 0.3
 F(Juvenile)= 0.1
 Recruitment= Geometric Mean (1958–1995)

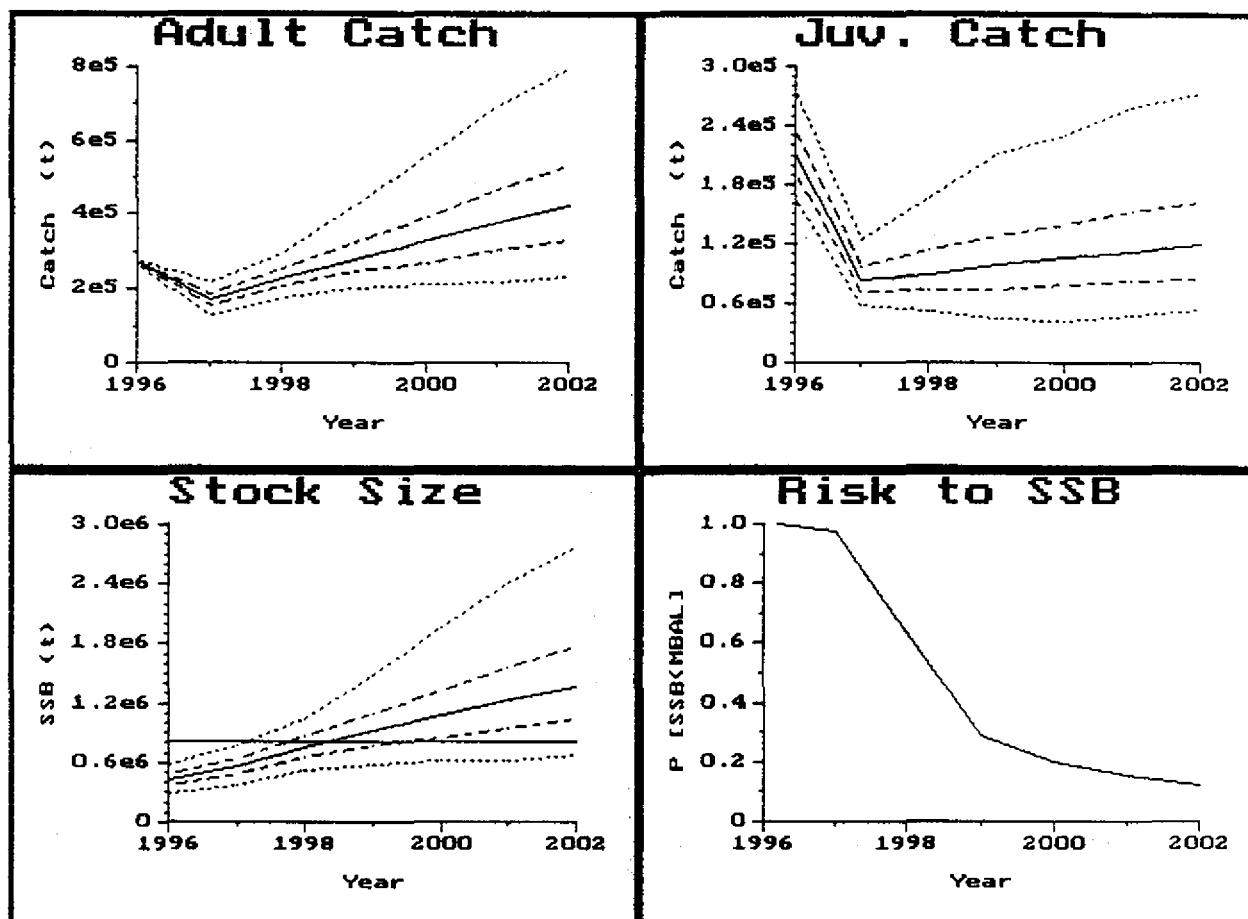


Figure 3.5.8.c.16 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 16: $F(\text{Adult}) = 0.3$
 $F(\text{Juvenile}) = 0.1$
 Recruitment = Autocorrelated stochastic recruitment around fitted Beverton-Holt Stock-Recruit relationship

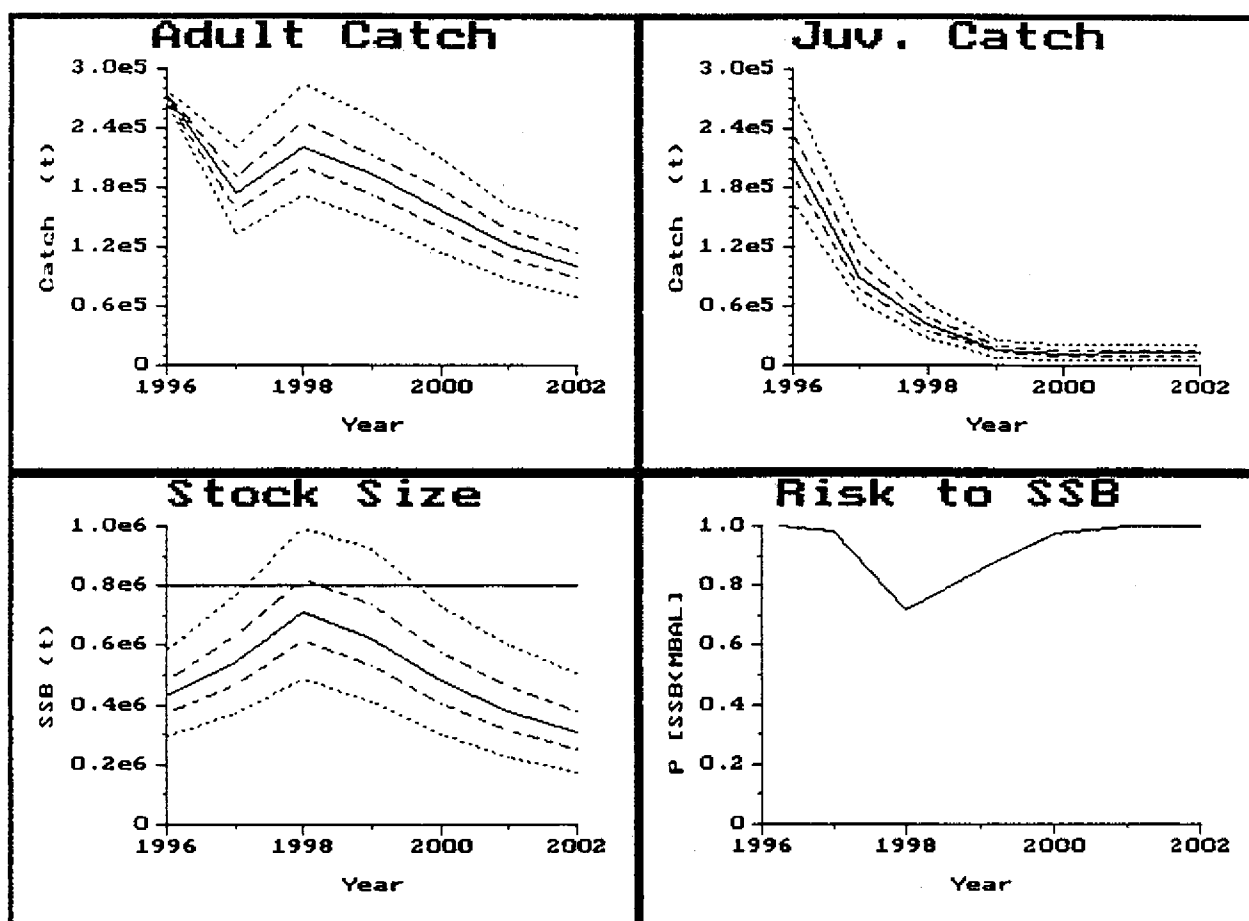


Figure 3.5.8.c.17 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 17: F(Adult)= 0.3
 F(Juvenile)= 0.2
 Recruitment= 0.1. Geometric Mean (1958–1995)

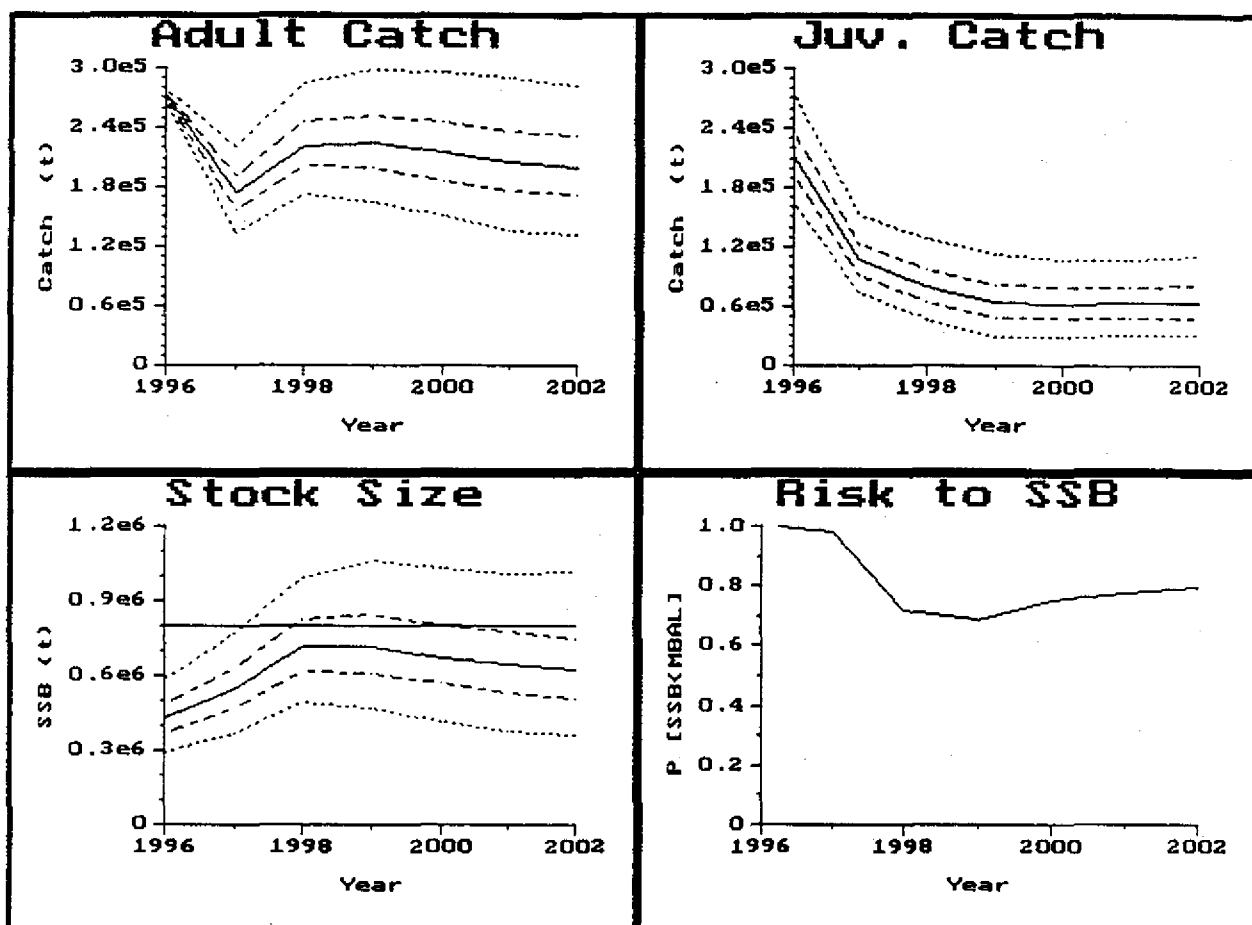


Figure 3.5.8.c.18 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 18: F(Adult)= 0.3
 F(Juvenile)= 0.2
 Recruitment= 0.5. Geometric Mean (1958–1995)

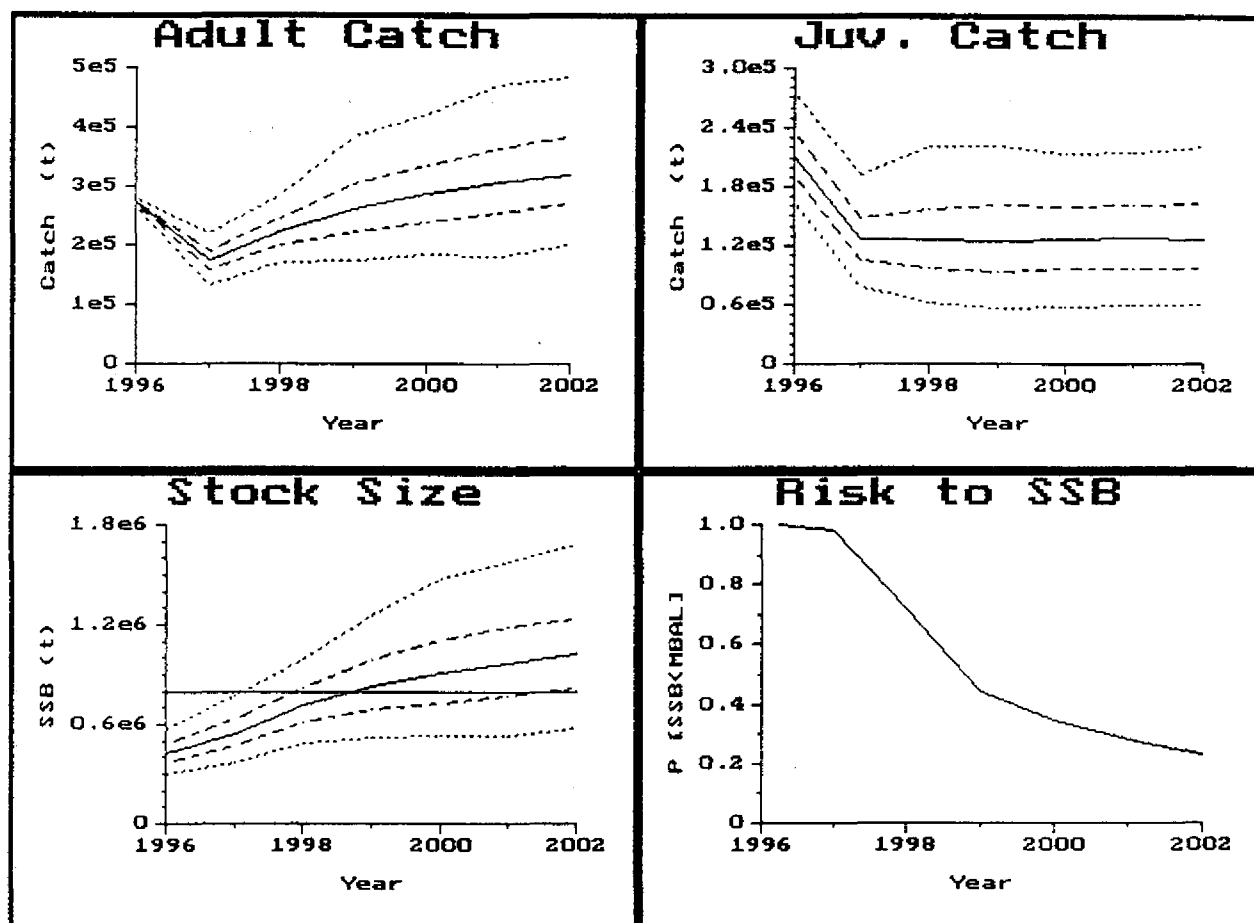


Figure 3.5.8.c.19 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 19: F(Adult)= 0.3
 F(Juvenile)= 0.2
 Recruitment= Geometric Mean (1958–1995)

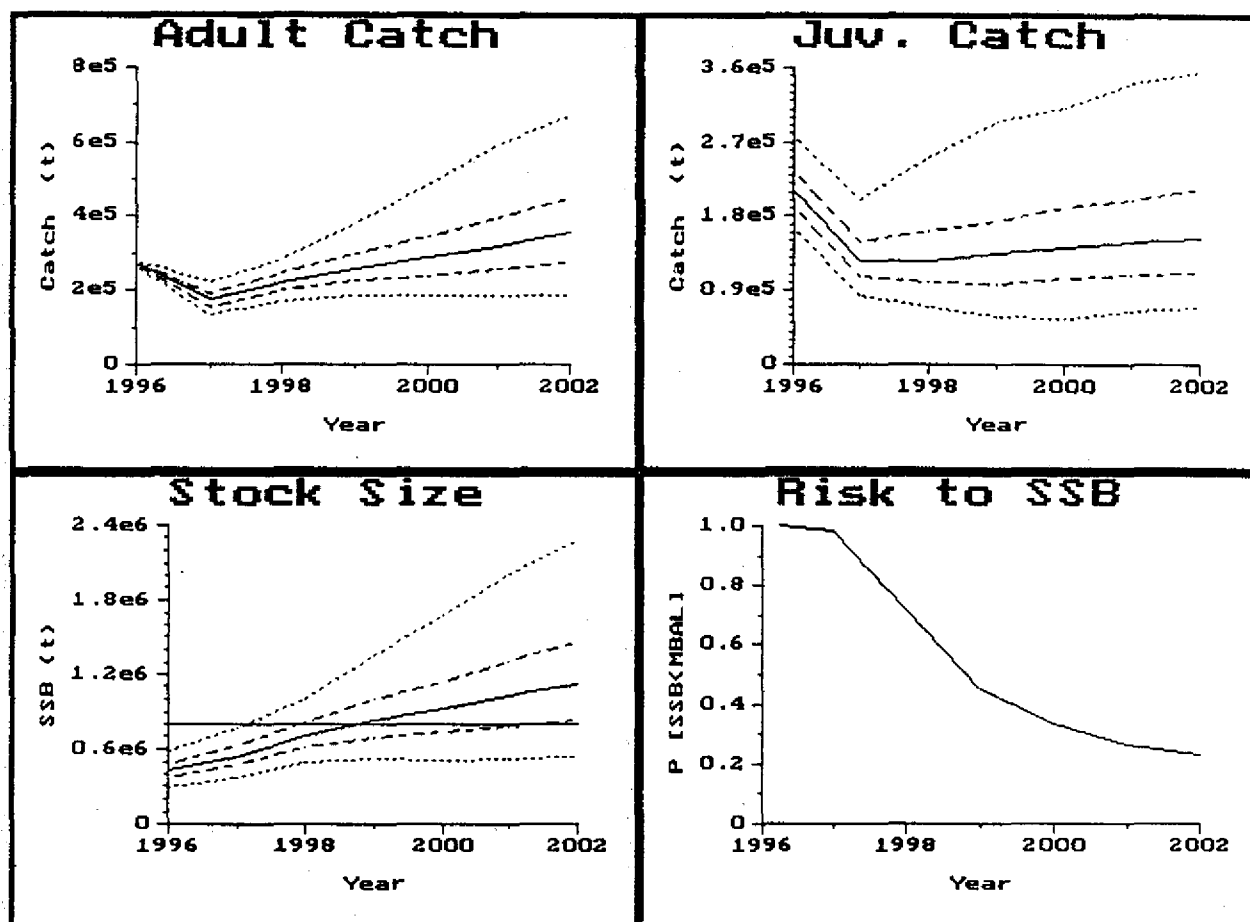


Figure 3.5.8.c.20 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 20: $F(\text{Adult}) = 0.3$
 $F(\text{Juvenile}) = 0.2$
 Recruitment = Autocorrelated stochastic recruitment around fitted Beverton-Holt Stock-Recruit relationship

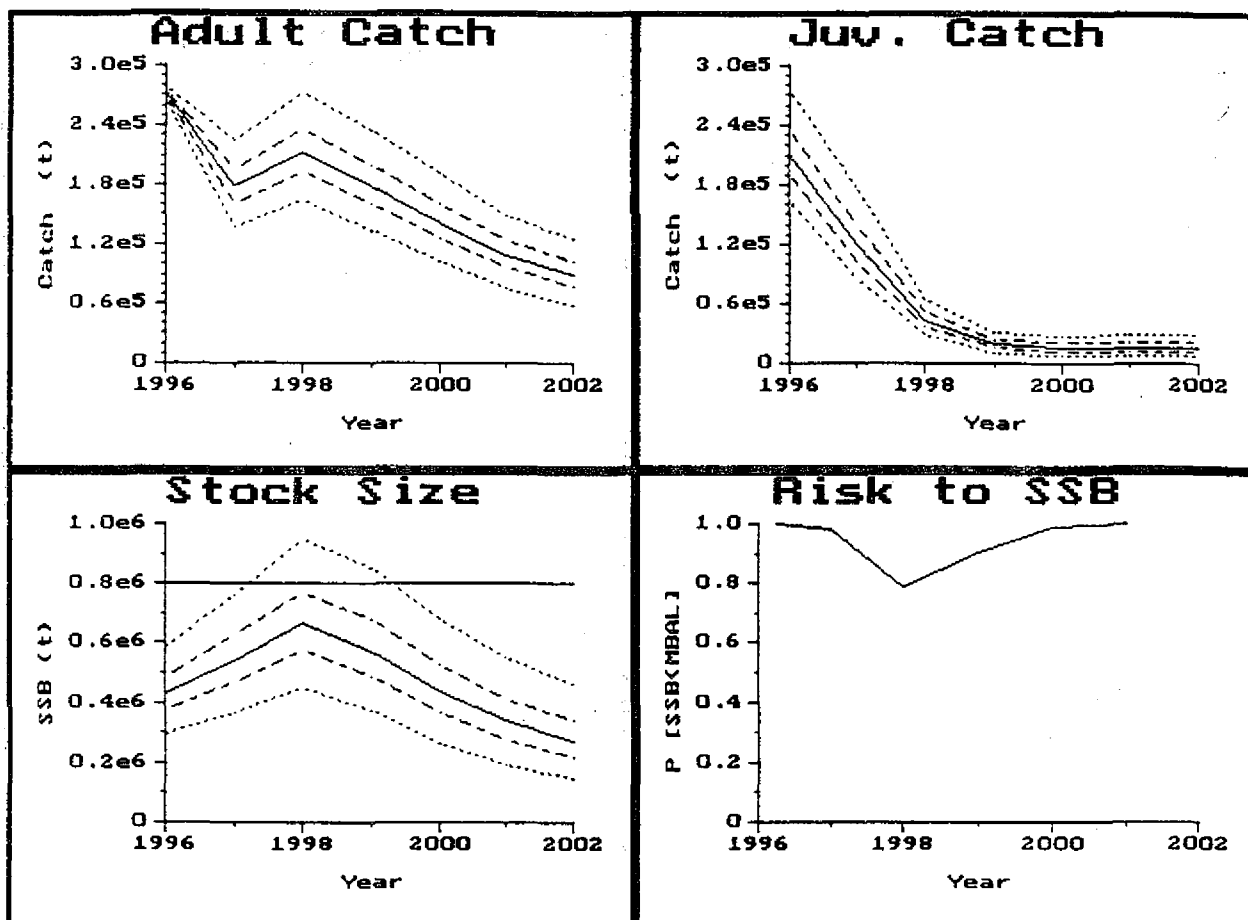


Figure 3.5.8.c.21 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 21: F(Adult)= 0.3
 F(Juvenile)= F(1995)
 Recruitment= 0.1. Geometric Mean (1958–1995)

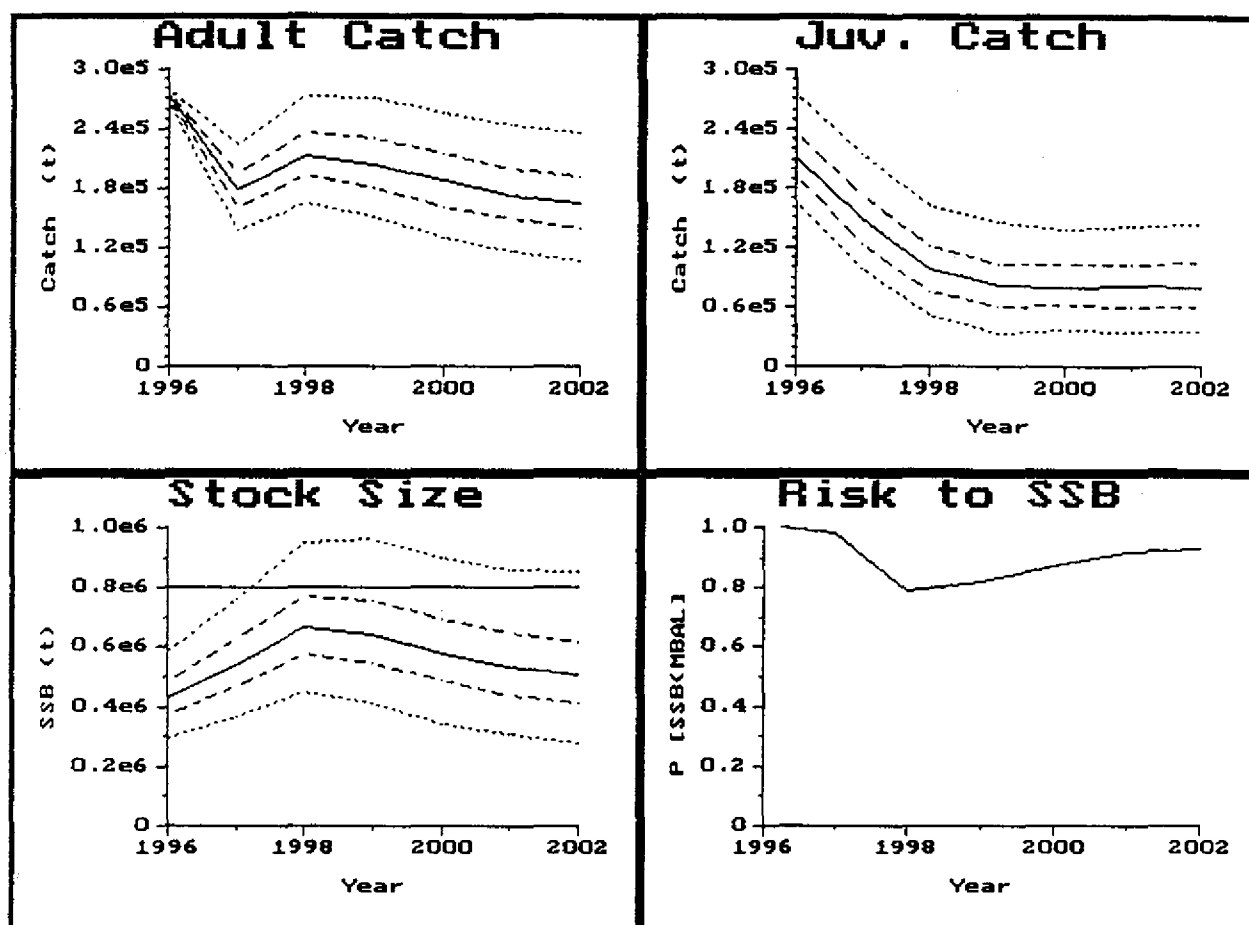


Figure 3.5.8.c.22 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 22: $F(\text{Adult}) = 0.3$
 $F(\text{Juvenile}) = F(1995)$
 Recruitment = 0.5. Geometric Mean (1958–1995)

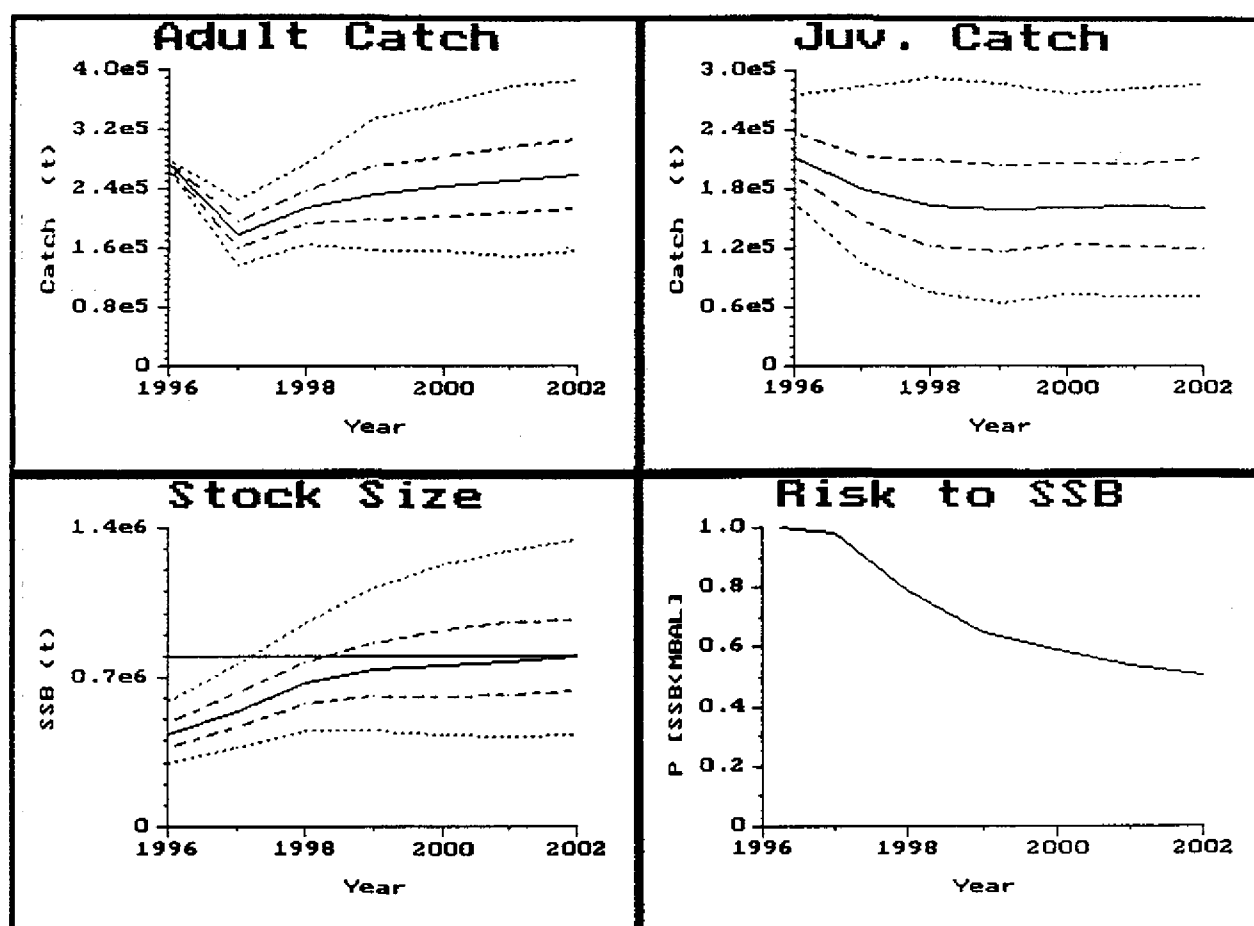


Figure 3.5.8.c.23 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 23: F(Adult)= 0.3
 F(Juvenile)= F(1995)
 Recruitment= Geometric Mean (1958–1995)

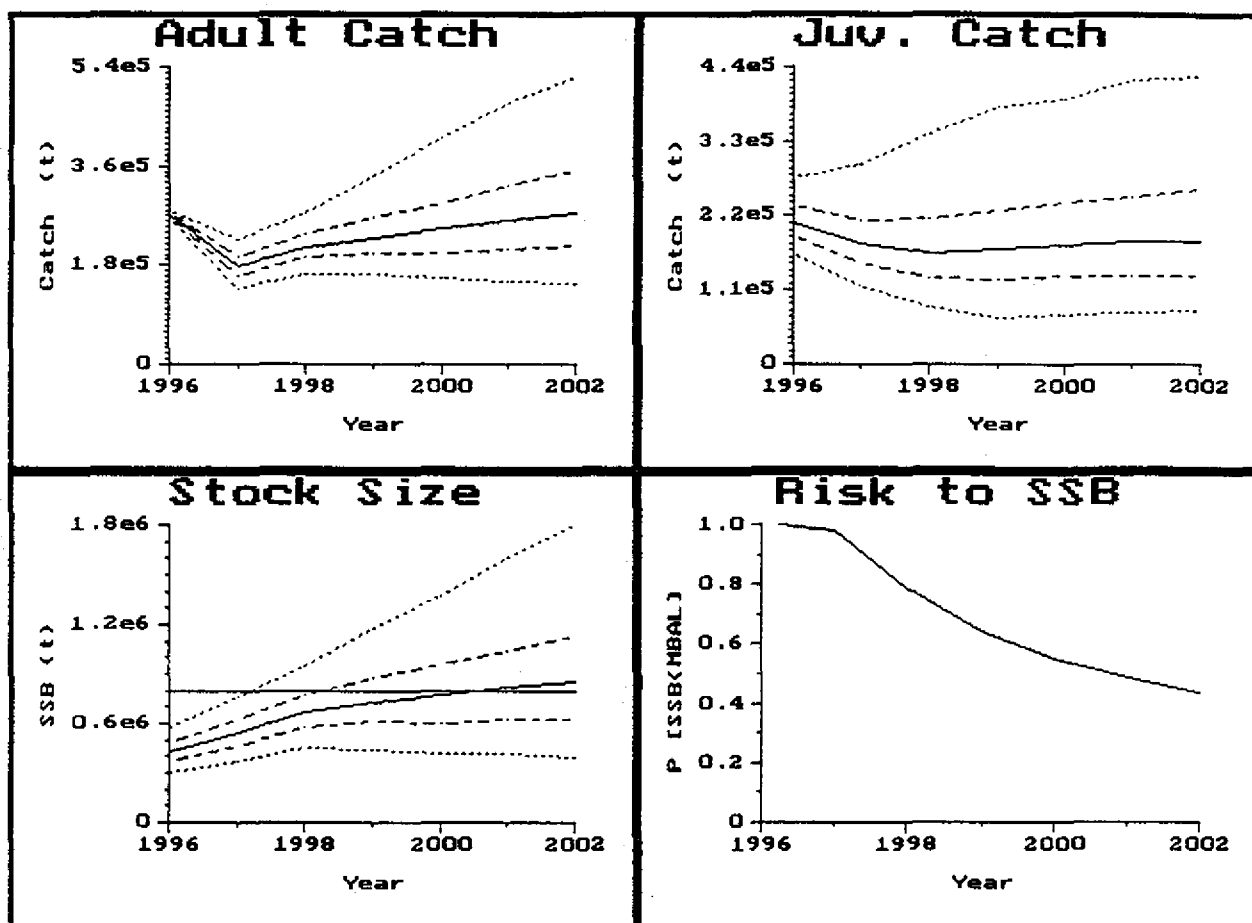


Figure 3.5.8.c.24 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Option 24: F(Adult)= 0.3
 F(Juvenile)= F(1995)
 Recruitment= Autocorrelated stochastic recruitment around fitted Beverton-Holt
 Stock-Recruit relationship

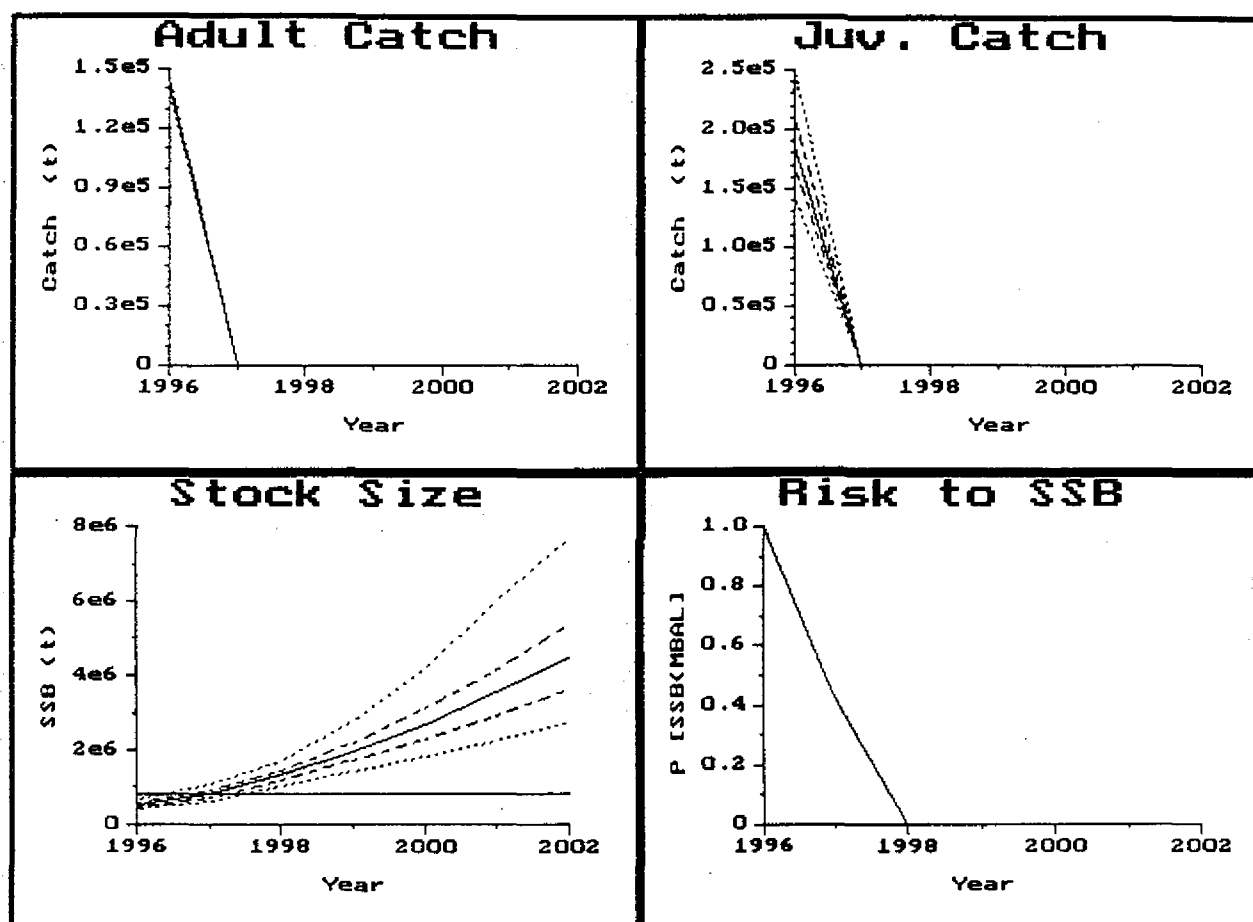


Figure 3.5.8.c.25 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Additional option A:

1996

Fleet A (Adult) catch

156,000 t

Fleets B-E (Juvenile) fishing mortality

F(1995)

1997-2002

F(Adult)= 0.0

F(Juvenile)= 0.0

Recruitment= Autocorrelated stochastic recruitment around fitted Beverton-Holt Stock-Recruit relationship

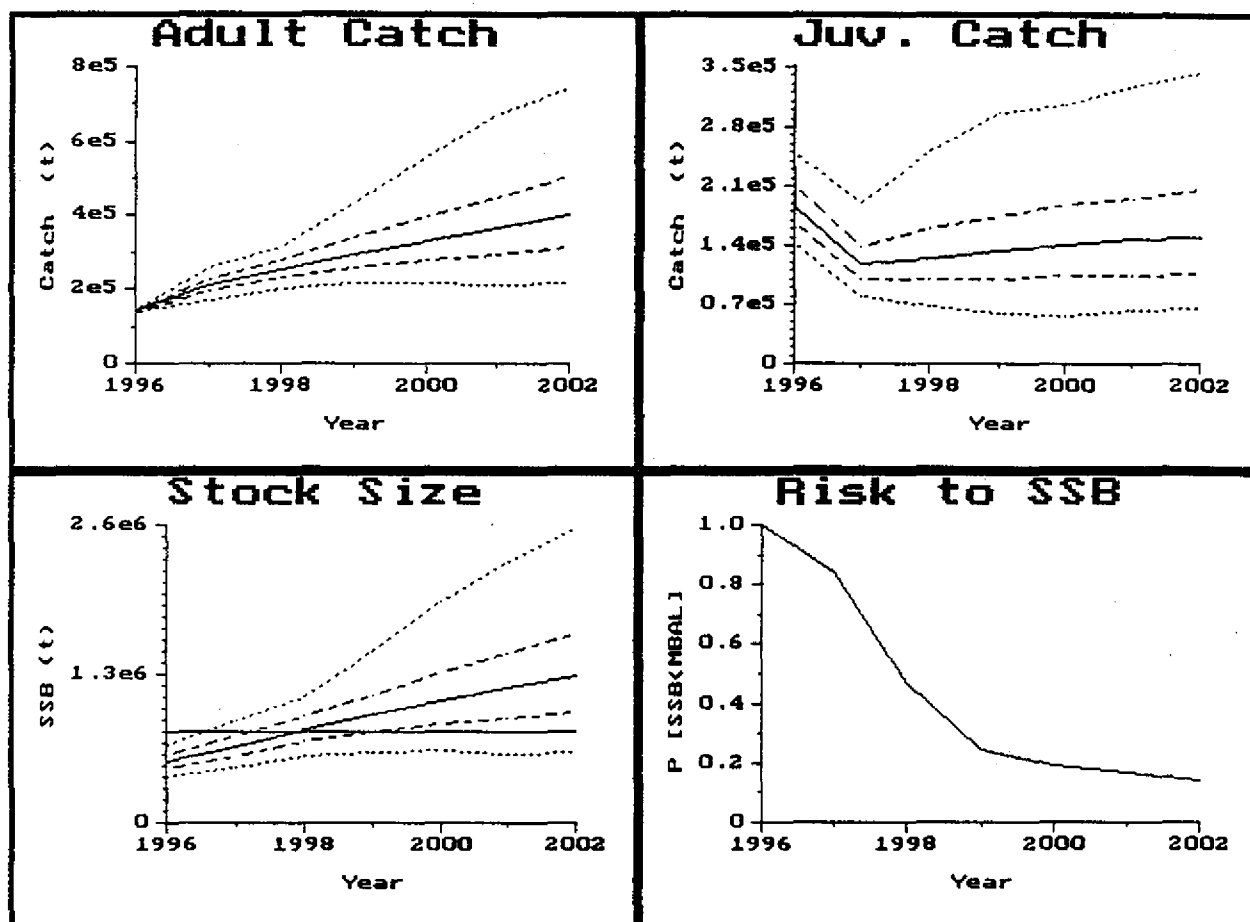


Figure 3.5.8.c.26 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Additional option B:

1996

Fleet A (Adult) catch

156,000 t

Fleets B-E (Juvenile) fishing mortality

F(1995)

1997-2002

F(Adult)= 0.3

F(Juvenile)= 0.5 F(1995)

Recruitment= Autocorrelated stochastic recruitment around fitted Beverton-Holt Stock-Recruit relationship

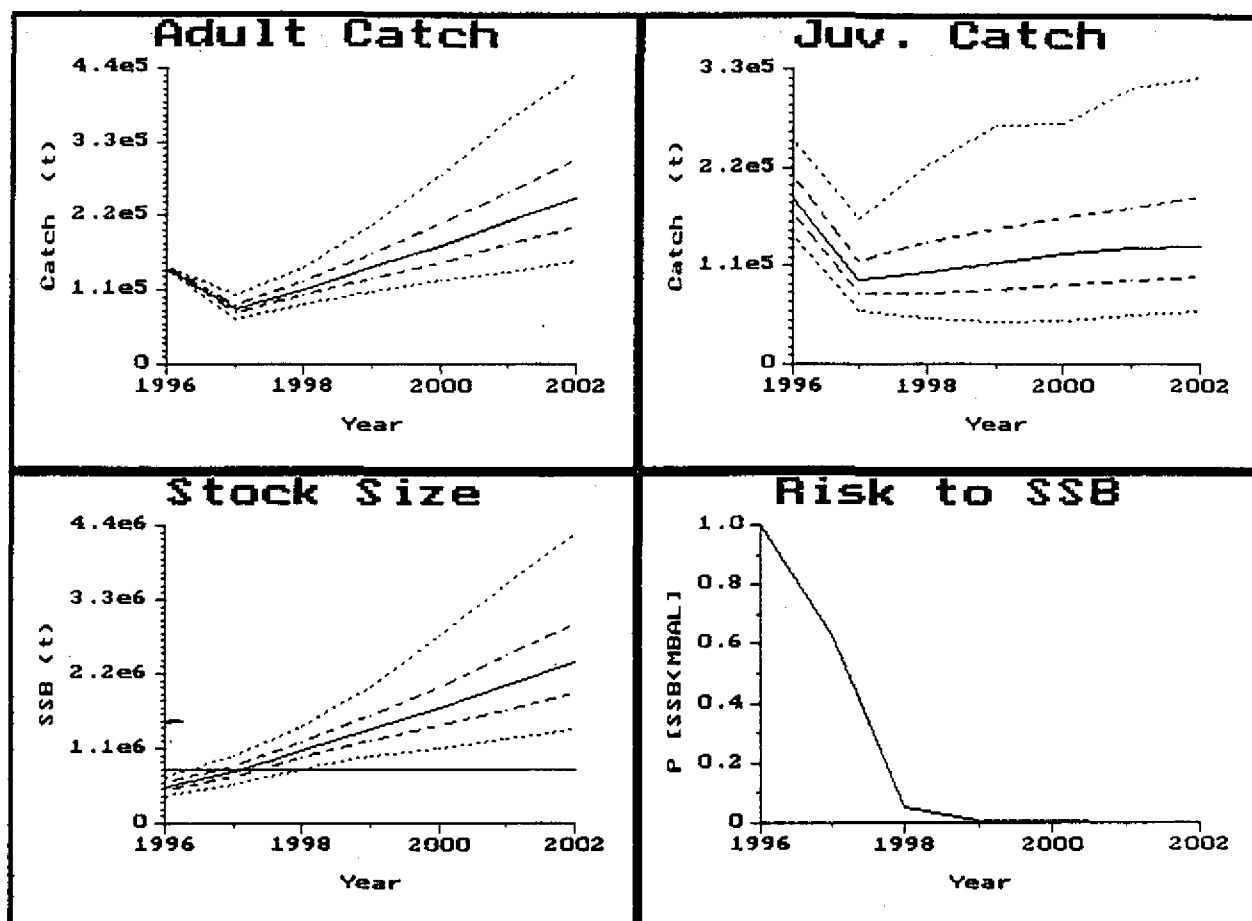


Figure 3.5.8.c.27 Estimated trajectories of catches of adult (mature) fish, catches of juvenile (immature) fish, and of spawning biomass at spawning time, with corresponding estimates by year of the probability that the stock will be below the 800,000 t MBAL. Full line, 50th percentile. Summary of results from 1000 Monte-Carlo simulations. Dashed lines, 25th and 75th percentiles. Dotted lines, 5th and 95th percentiles.

Additional option C:

1996

Fleet A (Adult) catch

156,000 t

Fleets B-E (Juvenile) fishing mortality

F(1995)

1997-2002

F(Adult)= 0.1

F(Juvenile)= 0.5 F(1995)

Recruitment= Autocorrelated stochastic recruitment around fitted Beverton-Holt Stock-Recruit relationship

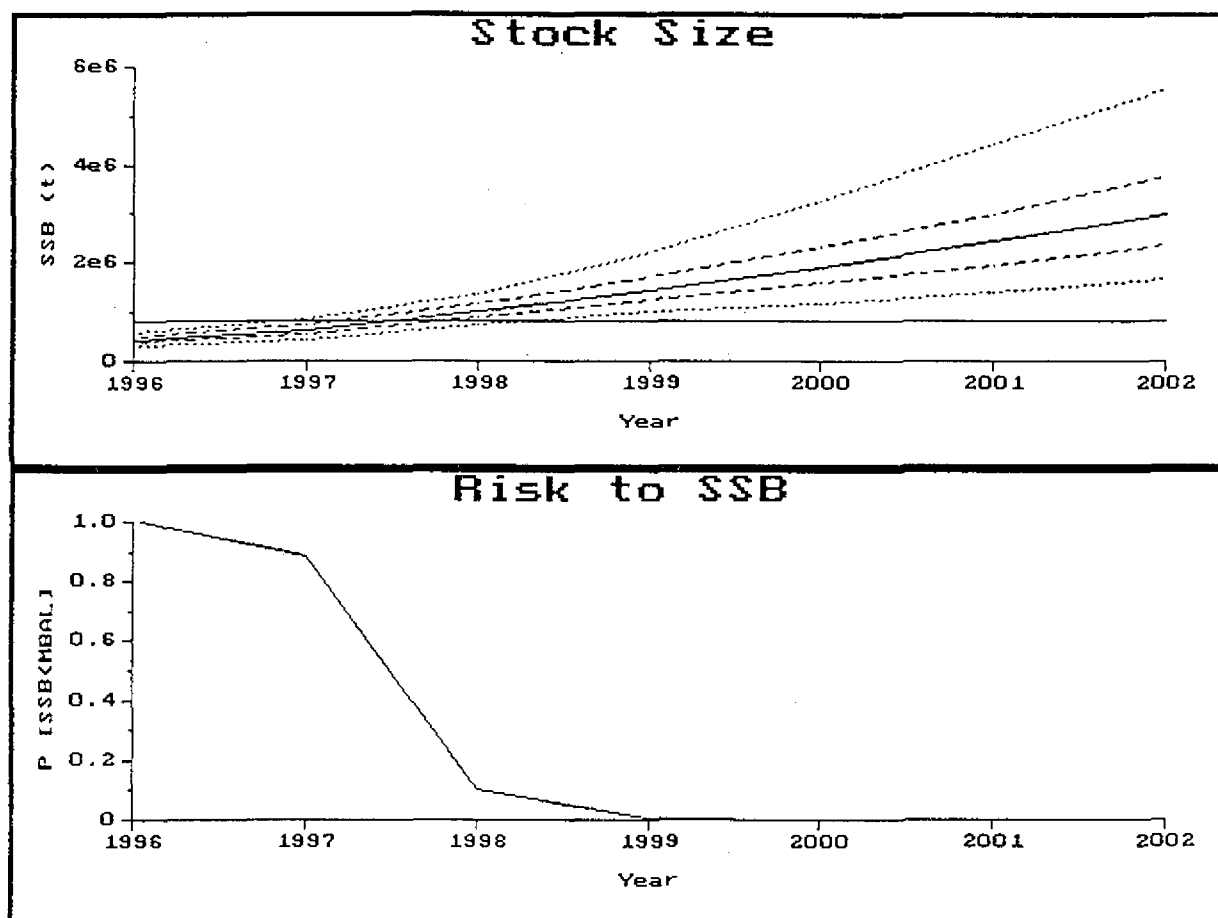


Figure 3.5.8.c.28 North Sea herring. Medium-term projections assuming fishing at $F=0.1$ by the human consumption fleet in the North Sea (Fleet a), with an assumption of 50% reduction in fishing mortality by the other fleets, relative to 1995. Dotted lines indicate 5th and 95th percentiles, dashed lines indicate 25th and 75th percentiles, fine line indicates the 50th percentile. Trajectory of spawning stock size, and the corresponding estimates of risk that the spawning stock may fall below 800,000 t.

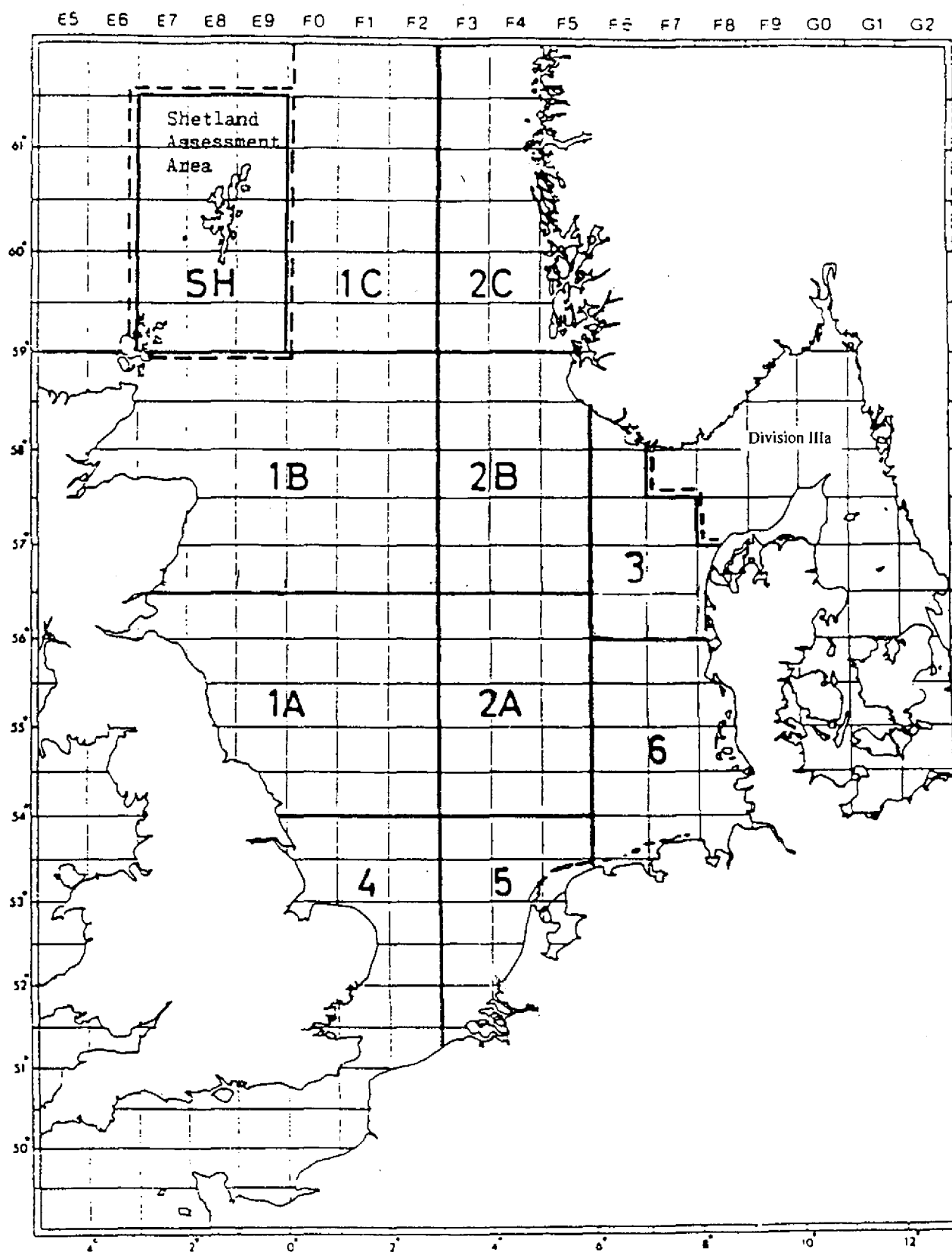


Figure 3.5.13.1 Danish sandeel areas and assessment areas used by ICES.