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## **PREFACE**

This Cooperative Research Report (Parts 1 and 2) contains the Report of the Advisory Committee on Fishery Management (ACFM) prepared and issued in 1995. 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) and the European Commission (EC).

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.

In this publication the extracts referred to above have, with the exception of the report to NASCO which is 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 1994 ACFM adopted a new format for its report. A revised description of the format is also given in the introduction.

ICES Fishery Secretary and Secretary to ACFM  
ICES Headquarters, Copenhagen  
March 1996

**MEMBERS AND ALTERNATE MEMBERS OF  
THE ADVISORY COMMITTEE ON FISHERY MANAGEMENT  
IN 1995**

<b>Affiliation</b>	<b>Member</b>	<b>Alternate</b>
<b>Chairman</b>	Mr E. Kirkegaard	
Chairman of Demersal Fish Committee	Mr E. Aro Mr F. van Beek <sup>1</sup>	
Chairman of Pelagic Fish Committee	Dr R. L. Stephenson	
Chairman of Baltic Fish Committee	Mr B. Sjöstrand Mr E. Aro <sup>1</sup>	
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Canada	Mr J.-J. Maguire	Mr J.S. Beckett
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UK	Dr R.M. Cook	Dr J.W. Horwood
USA	Mr R. Mayo	Dr W. Gabriel

<sup>1</sup>From 1 November 1995.



# ADVISORY COMMITTEE ON FISHERY MANAGEMENT

## PARTICIPANTS AT MEETINGS, SPRING AND AUTUMN 1995

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Chairman, Demersal Fish Committee	Mr E. Aro	Mr. F. van Beek
Chairman, Pelagic Fish Committee	Dr R.L. Stephenson	Dr R.L. Stephenson
Chairman, Baltic Fish Committee	Mr B. Sjöstrand	Mr E. Aro
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Chairman, Arctic Fisheries Working Group		Mr K. Sunnanå <sup>1</sup>
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<sup>1</sup>Participated part time

<sup>2</sup>Substitute for Dr A. Järvik.

<sup>3</sup>Substitute for Dr G. Stefánsson.

# **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 1995**

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**

The information about each stock is given on a separate page. Where the information for a stock extends over more than one page, the pages are arranged so that the information can be seen on facing pages. In some cases this means that blank pages are included in the report.

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 of recommended TACs (Rec TAC), Agreed TACs and catches for the last eight years, in almost all cases in thousand tonne units. The "recommended TACs" are either the figure recommended by ACFM or, in cases where the advice is expressed in terms of fishing mortality, the estimated catch corresponding to the recommendation or advice.

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. lndgs") 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 recommended TACs, 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 1996**

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 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 short-term 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.

## 1.4 Requests for Advice

Listed on the following pages 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), Thirteenth Annual Meeting, November 1994

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 1996 and spawning stock biomass in 1997 for a range of fishing mortality rates; yield per recruit curves; evaluation of medium-term effects of different management options.
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 information is available ICES should include multispecies considerations in terms of TAC compatibility and biological interactions.
5. It is particularly requested to:
  - a) provide quantitative information on the distribution, migration and stock-identification of the *Sebastes mentella* stocks;

- b) provide advice on whether - for management purposes - the "Oceanic" *S. mentella* and the "Deep sea" *S. mentella* caught in pelagic trawls can be considered as one stock;
- c) provide advice on the medium-term consequences of setting catches at 5-15% of the estimated spawning stock biomass of "Oceanic" *S. mentella*;
- d) provide advice on the medium-term consequences of an adaptive harvesting strategy, based on a constant annual catch within each 5 year period, and set at a level required to obtain sustainable yields of "Oceanic" *S. mentella*;
- e) provide quantitative information on the present spatial and temporal distribution of the Norwegian spring-spawning herring stock;
- f) assess the impact of the *Ichthyophonus hoferi* disease on stocks of herring [and other pelagic fish];
- g) for blue whiting, evaluate the development of the total stock biomass and spawning stock biomass over a three-year period (1996-1998) if at all possible;
- h) update descriptions of deep water fisheries in waters inside and beyond coastal state jurisdiction south of 63° N, especially catch statistics by species, fleets and gear; and advise on any appropriate management action, if required.

### 1.4.2 Request from the International Baltic Sea Fishery Commission, Twentieth Session, September 1994

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

- a) assessments of the state of the stocks of Cod, Herring, Sprat and Salmon by appropriate areas. Advice on the appropriateness of assessing Herring in the Gulf of Riga as a separate unit.
- b) advice on catch options for Cod, Herring and Sprat for 1996 (including biological reference points) inside safe biological limits and to review the advice for Cod for 1995,
- c) identify and evaluate the interaction between the stocks of Herring, Sprat, Cod and Salmon,

- d) for Cod stocks, advice on appropriate mesh sizes in exit windows installed in codends of Cod trawls with 105 mm codend and in codends with standard diamond meshes corresponding to an  $L_{50}$  of 38 cm,
- e) any new information on the state of the Flatfish and Sea Trout stocks in the Baltic,
- f) advice on catch options for 1996 (in numbers of fish) for Salmon by gear and by Sub-divisions with the objectives to:
  - i) optimise utilisation of reared Salmon stocks
  - ii) safeguard the wild stocks and the genetic diversity of Baltic Salmon
  - iii) maintain the current level and pattern of fishery in 1996
- g) advice on appropriate measures to increase the escapement of wild Salmon such as boundaries of the terminal fishing areas for reared fish and opening dates for the coastal fisheries by Sub-divisions,
- h) advice on establishment of closed areas and closed seasons in the river mouths and rivers supporting wild Salmon stocks,
- i) advice on the change of summer closure in Sub-division 29N similar to that applied in the Gulf of Finland and its effects on the proportion of wild Salmon in the catches,
- j) review the data on predation by seal population on Salmon in the fishing gears in Sub-division 29N and advice on appropriate measures to reduce this predation,
- k) advice on the delayed release of Salmon concept as a basis for future decisions to be taken by the Contracting Parties of the IBSCF,
- l) a description and review of the research activities and information needed to carry out reliable assessments of the fish resources in the Baltic Sea and initiate co-ordination of existing national research vessel surveys with the objective of establishing international surveys.

#### **1.4.3 Request from the North Atlantic Salmon Conservation Organization, Eleventh Annual Meeting, June 1994**

1. With respect to Atlantic salmon in each Commission area, where relevant:
  - a) describe the events of the 1994 fisheries with respect to catches (including unreported

catches), gear, effort, composition and origin of the catch (including fish farm escapees and sea-ranched fish) and rates of exploitation;

- b) describe the status of the stocks (including the contribution of these stocks of fish farm escapees and sea-ranched fish) occurring in the Commission area, and where possible evaluate spawning escapement against targets;
  - c) specify data deficiencies and research needs.
2. Evaluate the effects of the following management 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.
    - c) the suspension of commercial fishing activity at West Greenland.
  3. With respect to the fishery in the West Greenland Commission area:
    - a) provide catch options with an assessment of risks relative to the management objective of achieving target spawning escapement;
    - b) review the target spawning level in US rivers in the light of the present condition of the rivers and the stocks.
  4. With respect to fisheries and stocks in the North-East Atlantic Commission area:
    - a) provide estimates of spawning targets for optimal production;
    - b) develop methods which could be used in providing advice on catch quotas in relation to stock abundance and, if possible, provide catch options.
  5. Report on significant research developments which might assist NASCO with the management of salmon stocks, with special reference to:
    - a) the impacts of fish farm escapees and sea-ranched fish on the wild stocks;
    - b) criteria for identifying recruitment overfishing of Atlantic salmon;

- c) predictive models of annual migration and distribution of Atlantic salmon stock complexes;
  - d) biological (such as maturation, predation, forage base) and environmental (such as oceanographic, productivity) variables which provide interpretation of trends in salmon abundance.
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 1994.

#### **1.4.4 Request from the European Commission Directorate General for Fisheries, September 1994**

The list on page 9 shows the management units for which the European Union establishes total allowable catches. The list will be most likely expanded in 1995 following the accession of Norway, Sweden and Finland, and it is believed that the new stocks will be already covered by the requests for advice from these countries, NEAFC and the IBSFC.

ICES is requested to review the state of the stocks, except for common prawn in French Guyana, and to provide management advice for all the management units in question on a biological stock basis. It is known that some of these management units represent sub-divisions of biological stocks while others may represent aggregations of stocks. The descriptions of the management areas also include in many cases sub-areas where the species either does not occur at all or occurs rarely. These subareas are included for enforcement purposes.

For each stock for which the data are available to make an analytical assessment and a catch forecast, ICES is requested to provide graphs of estimated catches in 1995 and spawning stock biomass as at 1.01.1996 for a range of fishing mortality rates which cover the range -50% to +25% of the current fishing mortality as well as yield per recruit curves. The likely consequences on yield and SSB in the medium term should also be expressed.

For other stocks, depending upon 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.

The Commission would again strongly emphasize the need for ICES to use yield per recruit models in order to advise on the state of stocks for which it is not possible to advise on annual catch possibilities. The Commission is seriously concerned that a lack of scientific advice, even on the probable level of

exploitation of a stock, can be used to argue that regulation of that stock is unjustified. On the other hand, analyses of this type are also useful for a sound handling of the fishing effort independently of TAC regulations, and give important clues in relation to improvement of exploitation patterns.

In the context of the new form of ACFM advice, the Commission reiterates its view that a single and precise management option is required only when a stock is in a likely danger of approaching its MBAL (minimum biologically acceptable level), is already at that level or is below it. In all other cases, ranges of options as above described are preferable. Whenever ICES considers appropriate to make specific recommendations concerning measures other than catch limitations, it is requested to identify and examine different options. Should technical interactions occur, the impact of proposed measures in respect of one species/stock on fisheries for other species should be examined. As a minimum, these other fisheries and possible management problems should be identified.

For all stocks, and more particularly for those mentioned above, risk-type analysis should also be conducted. The Commission would welcome an evaluation, even in qualitative terms, of the likely risk of an unwanted event to occur when moving away from a management action.

#### **1.4.5 Request from the Government of the Faroe Islands, April 1995**

In a letter dated 18 April 1995, ICES was asked to provide advice on demersal stocks in the Faroe area, giving due consideration to the following rebuilding strategies adopted by the Home Government of the Faroe Islands.

**Faroe Plateau cod:** A fixed TAC of 7,000 t is set for each year from 1994 to 1998. This figure was changed to 8,500 t for the quota year 1 September 1994 to 31 August 1995.

**Faroe haddock:** A fixed TAC of 6,200 t for each year 1994 to 1998.

**Faroe saithe:** A fixed TAC of 42,000 t for each year 1993-1998.

The basic idea behind these strategies is to maintain a low quota for a number of years rather than a zero quota in one year. One way of providing advice would be to consider other levels of fixed TACs and the effect of those on the probability of reaching the levels set for the spawning stocks.

#### **1.4.6 Request from the Government of the Faroe Islands, September 1995**

In a letter dated 29 September 1995, the Government of the Faroe Islands requested ICES to carry out a assessment of the cod, haddock and saithe stocks in the Faroe area in the light of the recent changes in ecological conditions and stocks.

#### **1.4.7 Request from the Government of Iceland, May 1995**

ICES has in the past provided advice on the utilisation of the Icelandic cod stock, both in the short-term and in the medium-term. In particular, this advice has considered some possible harvesting strategies based on taking a fixed percentage of the biomass of cod, of age four and older.

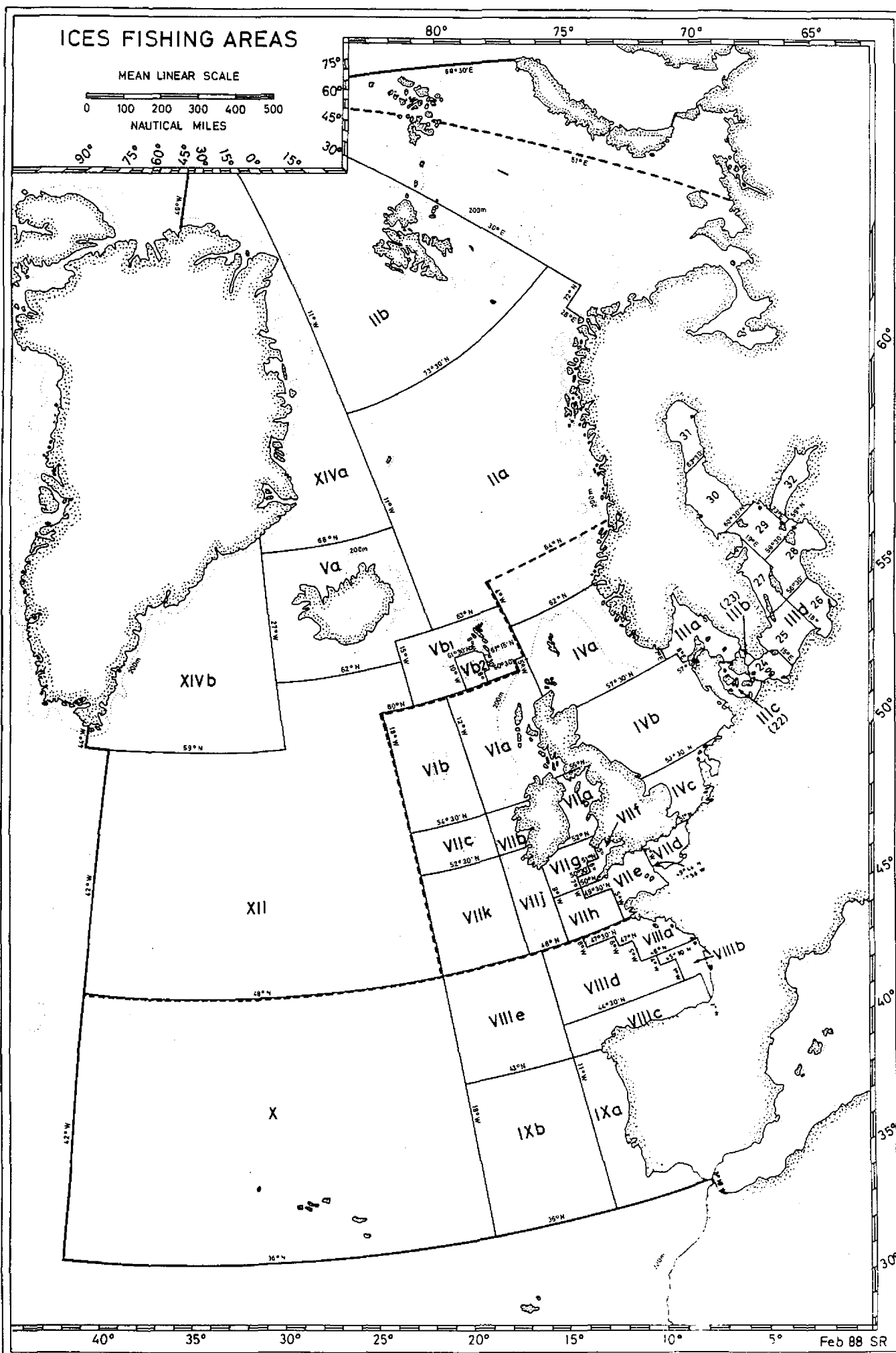
The Government of Iceland is currently investigating the possibility of enforcing such a rule for setting catch limits, beginning with the 12 month fishing year which starts on 1 September 1995.

The Ministry of Fisheries therefore requests advice from ICES on the short- and medium-term effects of a harvesting strategy which in principle takes 25% of the biomass of cod, of age four and older, available at the start of each fishing year, but initially maintains a lower limit of 155,000 t for the annual catch.

# STOCKS FOR WHICH THE EEC FIXES TACs

Herring	IIIa	Hake	VIIIabde
Herring	IIIbcd(1)	Hake	VIIIc,IX,X
Herring	IIa(1),IVab	Horse mackerel	IIa(1),IV(1)
Herring	IVc(7),VIId	Horse mackerel	Vb(1),VI,VII,VIII,XII,XIV
Herring	Vb(1),VIaN,VIb	Horse mackerel	VIIIc,IX
Herring	VIaS,VIIbc	Mackerel	IIa(1),IIIa,IIIbcd(1),IV
Herring	VIa Clyde	Mackerel	II,Vb(1),VI,VII,VIII,XII,XIV
Herring	VIIa	Mackerel	VIIIc,IX,X
Herring	VIIef	Plaice	IIIa Skagerrak
Herring	VIIghjk	Plaice	IIIa Kattegat
Sprat	IIIa	Plaice	IIIbcd(1)
Sprat	IIIbcd(1)	Plaice	IIa(1),IV
Sprat	IIa(1),IV(1)	Plaice	Vb(1),VI,XII,XIV
Sprat	VIIde	Plaice	VIIa
Anchovy	VIII	Plaice	VIIbc
Anchovy	IX,X	Plaice	VIIde
Salmon	IIIbcd(1)	Plaice	VIIIfg
Capelin	IIb	Plaice	VIIhjk
Cod	I, IIb	Plaice	VIII,IX,X
Cod	IIIa Skagerrak	Sole	IIIa,IIIbcd(1)
Cod	IIIa Kattegat	Sole	II,IV
Cod	IIIbcd(1)	Sole	Vb(1),VI,XII,XIV
Cod	IIa(1),IV	Sole	VIIa
Cod	Vb(1),VI,XII,XIV	Sole	VIIbc
Cod	VIIa	Sole	VIIId
Cod	VIIb-k,VIII,IX,X	Sole	VIIe
Haddock	IIIa, IIIbcd(1)	Sole	VIIIfg
Haddock	IIa(1),IV	Sole	VIIhjk
Haddock	Vb(1),VI,XII,XIV	Sole	VIIIab
Haddock	VII,VIII,IX,X	Sole	VIIIcde,IX,X
Saithe	IIa(1),IIIa,IIIbcd(1),IV	Megrim	Vb(1),VI,XII,XIV
Saithe	Vb(1),VI,XII,XIV	Megrim	VII
Saithe	VII,VIII,IX,X	Megrim	VIIIabde
Pollack	Vb(1),VI,XII,XIV	Megrim	VIIIc,IX,X
Pollack	VII	Anglerfish	Vb(1),VI,XII,XIV
Pollack	VIIIab	Anglerfish	VII
Pollack	VIIIc	Anglerfish	VIIIabde
Pollack	VIIId	Anglerfish	VIIIe
Pollack	VIIIe	Anglerfish	VIIIc,IX,X,
Pollack	IX,X	Penaeus	French Guyana
Norway pout	IIa(1),IIIa,IV(1)	N. deepwater prawn	IIIa Skagerrak
Blue whiting	IIa(1),IV(1)	Norway lobster	IIa,IIIbcd(1)
Blue whiting	Vb(1),VI,VII	Norway lobster	IIa(1),IV(1)
Blue whiting	VIIIabd	Norway lobster	Vb(1),VI
Blue whiting	VIIIe	Norway lobster	VII
Blue whiting	VIIIc,IX,X	Norway lobster	VIIIab
Whiting	IIIa	Norway lobster	VIIIc
Whiting	IIa(1),IV	Norway lobster	VIIId
Whiting	Vb(1),VI,XII,XIV	Norway lobster	IX,X,COPACE(1)
Whiting	VIIa		
Whiting	VIIb-k		
Whiting	VIII		
Whiting	IX,X		
Hake	IIIa, IIIbcd(1)		
Hake	IIa(1),IV(1)		
Hake	Vb(1),VI,VII,XII,XIV		

## 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 report 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, for example, Section 2.4).

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

## 2.4 Overview of *Nephrops* Stocks

### Functional Units and Management Areas

Functional units are defined by groupings of statistical rectangles according to present knowledge of the distribution pattern of various *Nephrops* stocks. Management areas are defined using as far as possible existing ICES Sub-area and Division boundaries. TACs are set for areas defined by ICES boundaries, which are often larger than the management areas considered appropriate.

Present TAC areas do not allow management of the stocks in individual functional units in a way which takes the different levels of exploitation into account. ICES reiterates the advice given in previous years that management of *Nephrops* stocks should take place at the Management Area level as defined in Figures 2.4.1–2.4.3 and Table 2.4.1

*Nephrops* stocks are considered to be particularly suitable for medium and long-term management. In practice, there was no basis this year to revise the advice given last year for any of the stocks. Because SSB and recruitment in most of the stocks are rather stable, ICES provides advice in this report for 1996 and 1997. A summary of recommended TACs, agreed TACs and landings by TAC areas is given in Table 2.4.2.

**Table 2.4.1** Description of Management Areas together with their *Nephrops* orking Group labels and the unctional Units contained within them

Working Group Label	Management Area Description	Functional Units	
A	Va	1	Iceland
B	Vb (non EC)	2	Faroe Islands
C	VIa	11	North Minch
		12	South Minch
		13	Clyde
D	Vb (EC) + VIb		None
E	IIIa	3+4	Skagerrak and Kattegat
F	IVa: rect. 44-48 E6-E7 + 44E8	9	Moray Firth
		10	Noup
G	IVa: remainder	7	Fladen
H	IVb, c E of 1°E	5	Botney Gut
I	IVb,c W of 1°E	6	Farn Deep
J	VIIa: excluding rect. 33 E2-E5	8	Firth of Forth
		14	Irish Sea East
		15	Irish Sea West
K	VIIId,e		None
L	VIIb,c,j,k	16	Porcupine Bank
		17	Aran Grounds
		18+19	Irish coast
M	VIIIf,g,h and VIIa 33E2-E5	20+21+22	Celtic Sea
N	VIIIa,b	23+24	Bay of Biscay
O	VIIIc	25	North Galicia
		31	Cantabrian Sea
P	VIIIId,e		None
Q	IXa	26	West Galicia
		27	N Portugal
		28+29	S and SW Portugal
		30	Gulf of Cadiz
R	IXb + X		None

Table 2.4.2

Recommended TACs, agreed TACs and landings for *Nephrops* stocks by TAC areas (thousand tonnes)

TAC Area	Year	Recommended TAC (total)	Agreed TAC	Landings
IIIa, b,c,d (EU zone)	1992	4.0	3.5	2.9
	1993	4.3	3.5	3.2
	1994	2.9	3.5	2.8
	1995	2.9	4.8	
IIa, IV (EU zone)	1992	10.6	12.0	9.6
	1993	10.1	12.0	12.8
	1994	12.4	13.0	13.6
	1995	12.4	15.2	
Vb (EU zone), VI	1991	11.7	13.5	10.5
	1992	11.4	12.0	10.8
	1993	11.3	12.0	11.4
	1994	11.3	12.6	10.8
	1995	11.3	12.6	
VII	1992	16.5	20.0	15.8
	1993	17.2	20.0	16.7
	1994	17.2	20.0	15.3
	1995	17.2	20.0	
VIIIa,b	1991	5.2	6.5	4.80
	1992	6.8	6.8	5.70
	1993	6.8	6.8	5.00
	1994	6.8	6.8	3.60
	1995	6.8	6.8	
VIIIc	1991	0.51	0.6	0.56
	1992	0.51	0.8	0.52
	1993	0.51	1.0	0.37
	1994	0.51	1.0	0.39
	1995	0.51	1.0	
VIII d,e	1995	0.0	0.05	
IX, X	1991	1.8	3.0	1.3
	1992	1.3	2.5	1.3
	1993	1.3	2.5	1.1
	1994	1.3	2.5	0.9
	1995	1.3	2.3	

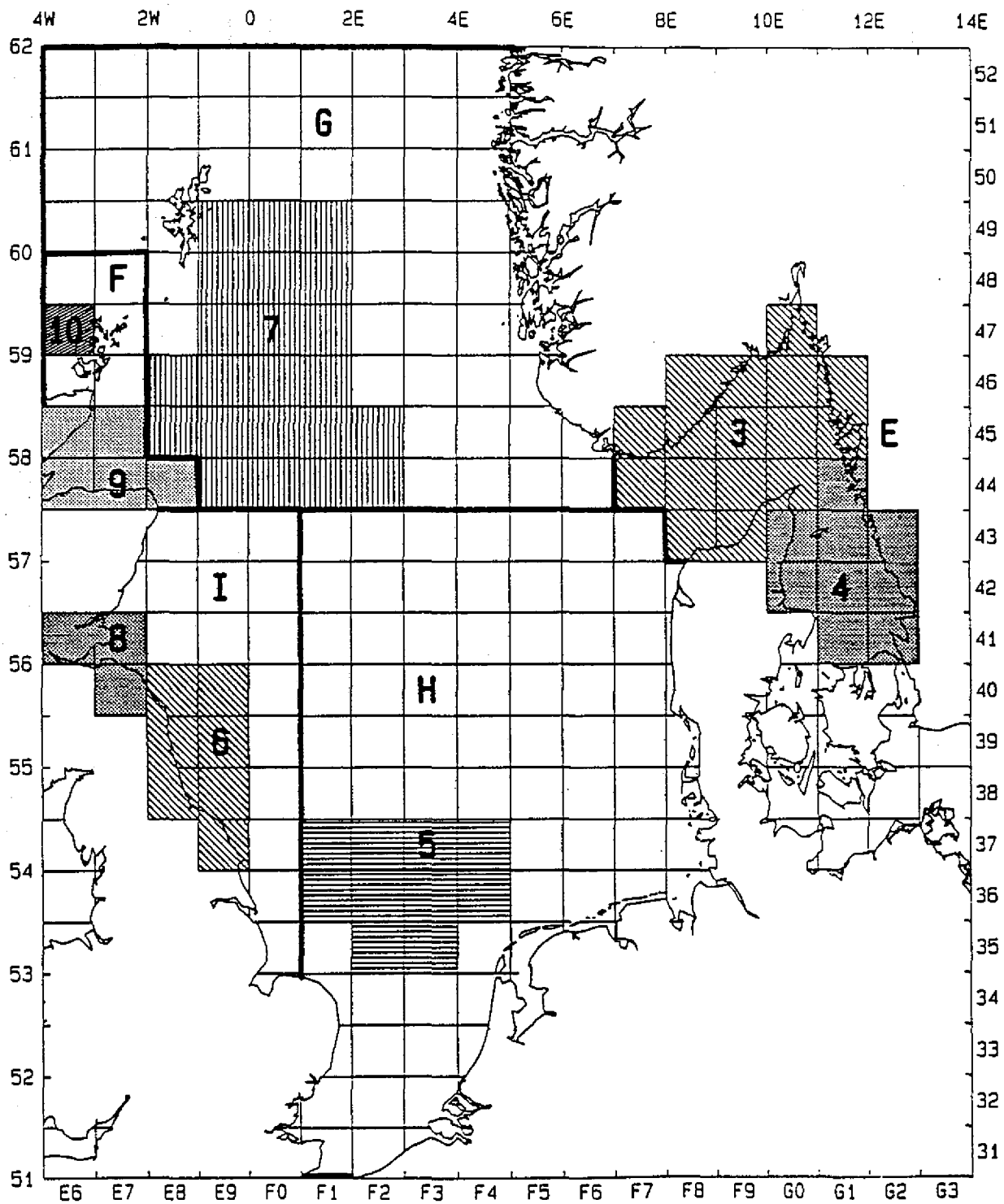


Figure 2.4.1 Functional Units and Management Areas in IIIa and IV. (Letters and figures refer to Management Areas and Functional Units given in Table 2.4.1).

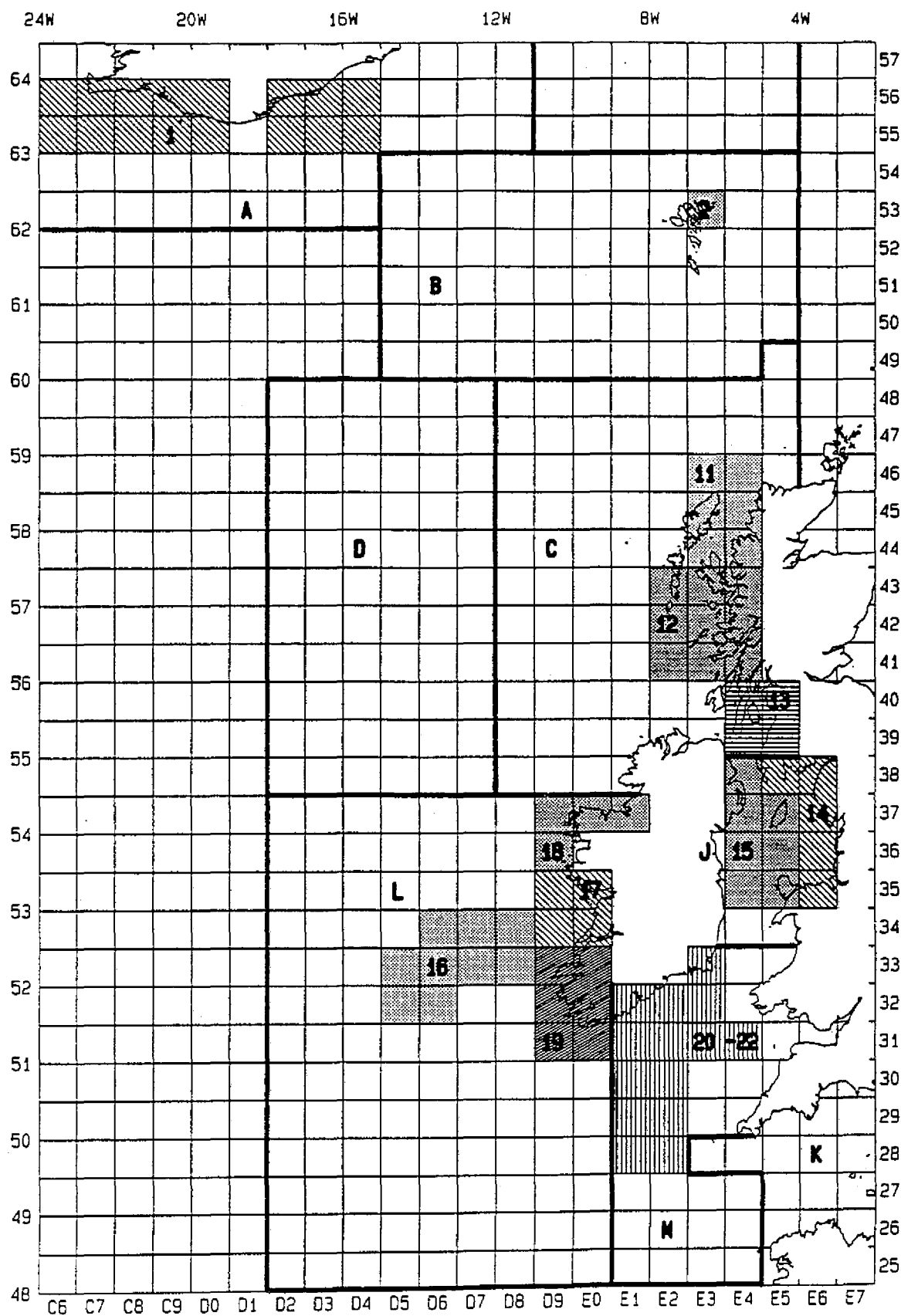


Figure 2.4.2 *Nephrops* Functional Units and Management Areas in V, VI and VII. (Letters and figures refer to Management Areas and Functional Units given in Table 2.4.1).

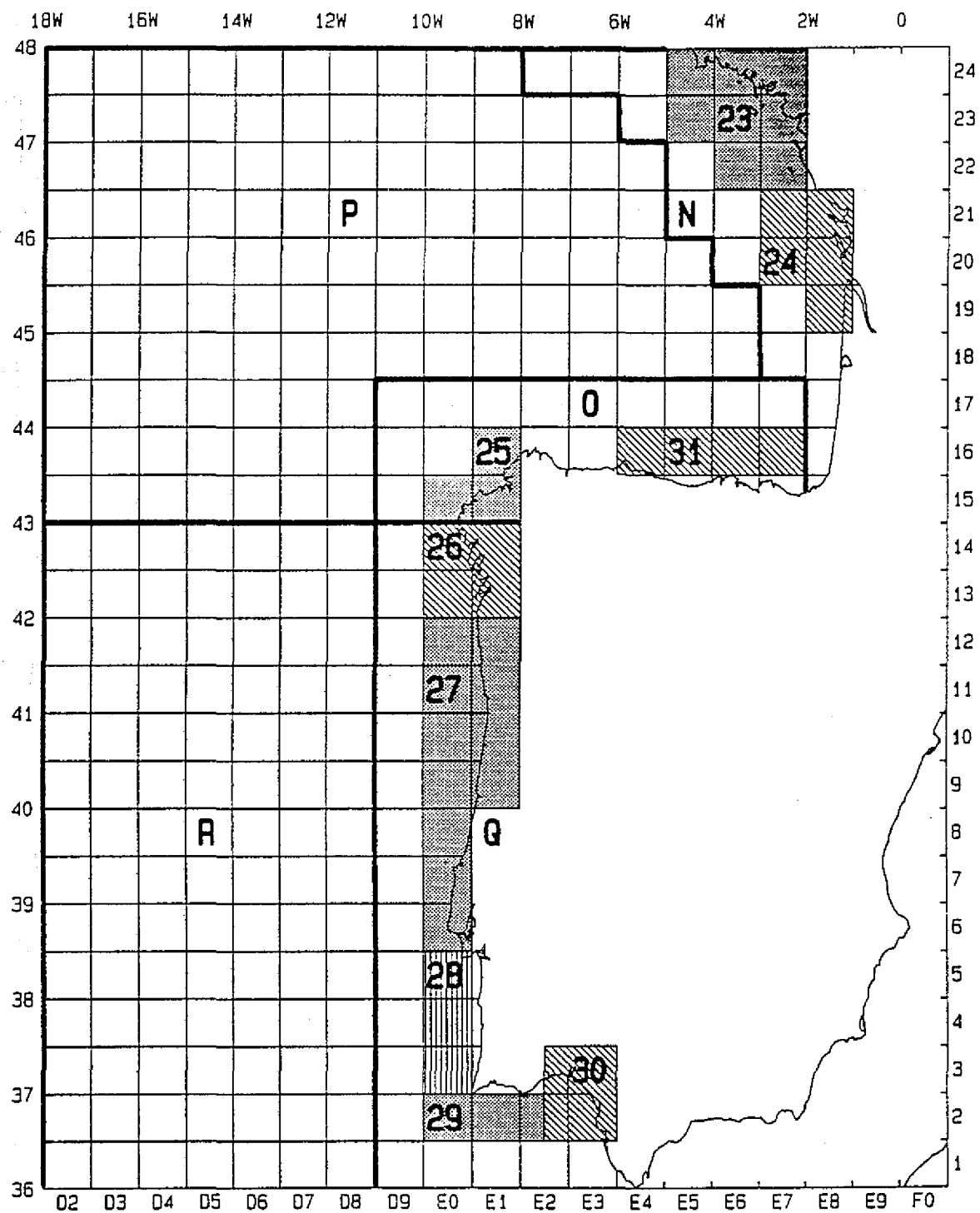


Figure 2.4.3 *Nephrops* Functional Units and Management Areas in VIII to X. (Letters and figures refer to Management Areas and Functional Units given in Table 2.4.1).

### 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 1994 were 1.9 million t. In addition 48,000 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 catfish, redfish, immature blue whiting, Greenland halibut and flatfishes (e.g. long rough dab, plaice) occur demersally on the shelf and at the continental slope, with blue ling and tusk found also at the slope and in deeper waters. In 1994, landings of 1.1 million tonnes were taken from the stocks of cod, haddock, saithe, redfish and Greenland halibut. An additional catch of 100,000 t was taken from demersal stocks, including shrimp, not assessed at present.

The major pelagic stocks are capelin, herring and polar cod. Adult mackerel and blue whiting extend their feeding migrations seasonally into the southern parts of this region. In 1994, after an absence of about 26 years, the herring stock expanded its feeding migration into historical feeding areas in the Norwegian Sea. An international fishery commenced, with landings of 0.4 million t in 1994 and preliminary herring catch figures for 1995 of over 0.9 million t. Only very small landings of capelin in Division IIa were reported in 1994, and landings of pelagic stocks not presently assessed are about 6,000 t (polar cod). Landings of the highly migratory pelagic species, mackerel and blue whiting, amounted to 190,000 t.

Invertebrate species of krill, copepods and amphipods are considered to be important food resources for the fish stocks in this area. Marine mammals are thought to play an important role as predators on fish. Small levels of landings are reported for a variety of other species of fish, invertebrates, and elasmobranchs, including salmon, halibut, hake, pollack, whiting, anglerfish, horse mackerel, dogfishes, skates, crustaceans and molluscs.

##### Fleets and Fisheries

The fleets operating in this area are:

1. Factory trawlers and freezer trawlers in the whole area all around the year targeting mainly cod and taking the 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 in Sub-area I and Division IIa all year around targeting mainly cod and taking the other species as bycatch. The number of these vessels has been reduced in recent years.
3. Freezer trawlers 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 and capelin in seasonal fisheries in this region. These vessels fish 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) 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 modernized or replaced, there is a trend towards medium-sized (ca 15 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.

The present stock situation with TAC settings and rather low abundance of other resources seems to have stabilized the overall effort in the fisheries. 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 legitimate 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 the EEZ.



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 summarized in the following. There are no major new developments in demersal stocks. The cod stock remains at a safe biological level but the recent trend of increasing fishing mortality may cause concern in the medium term. The same increasing trend in fishing mortality is seen for the haddock stock, and this may reduce the spawning stock below its long-term average level in the short term. The saithe stock improved as spawning stock and recruitment increased recently. The stocks of *Sebastes mentella* and Greenland halibut remain below 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 and a recovery is not expected soon, due to poor recruitment expected at least until 1999. The herring stock is subject to occasional periods of high recruitment and is increasing at present due to the recruitment of two strong year classes.

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 still unclear. 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. Influx of Atlantic waters to larger areas of the Barents Sea shelf in certain years has been associated with the occurrence of good 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	Rec. TAC <sup>1</sup>	Agreed TAC <sup>1</sup>	Off. Indgs.	ACFM catch <sup>1</sup>	Unreported catches
1987	<645	560	552	523	
1988	530	590	459	435	
1989	363	451	343	332	
1990	172	160	187	212	25
1991	215	215	269	319	50
1992	250 <sup>2</sup>	356	383	513	130
1993	385 <sup>2</sup>	500	532	582	50
1994	649 <sup>2</sup>	700	770	775	25
1995	681 <sup>2</sup>	700			

<sup>1</sup>Norwegian coastal cod not included. <sup>2</sup>Catch 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. In 1978 quotas

were introduced in trawler fleets and in 1989 in the coastal fleets. In addition to quotas the fishery is regulated by a minimum catching size (see Section 3.1.1) in trawls and Danish seines, a maximum by-catch of undersized fish, closure of areas with high density of juveniles and by seasonal and area restrictions.

**State of stock:** The stock is considered to be within safe biological limits. Fishing mortality has doubled since 1990 and is now above  $F_{med}$  (0.46). The spawning stock biomass is above the Minimum Biologically Acceptable Level (MBAL). MBAL is currently estimated at 500,000t. Recent year classes are at or above average.

Details given in Table 3.1.2.a.3.

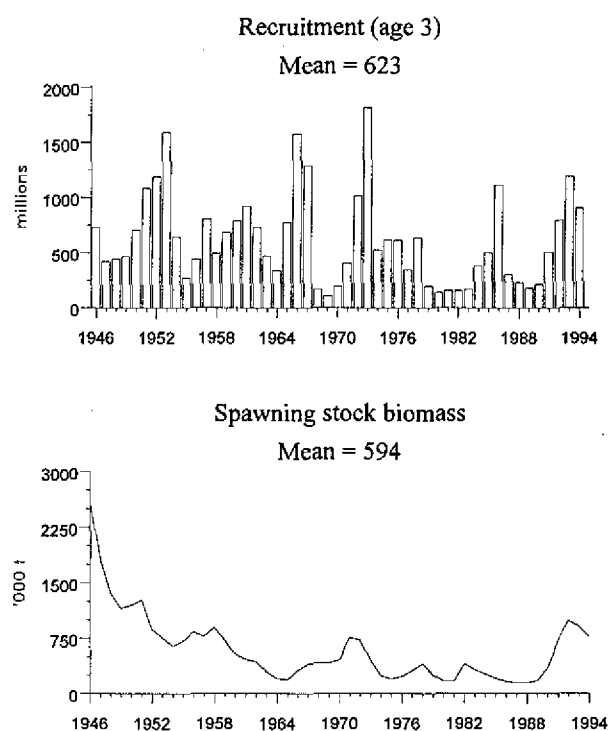
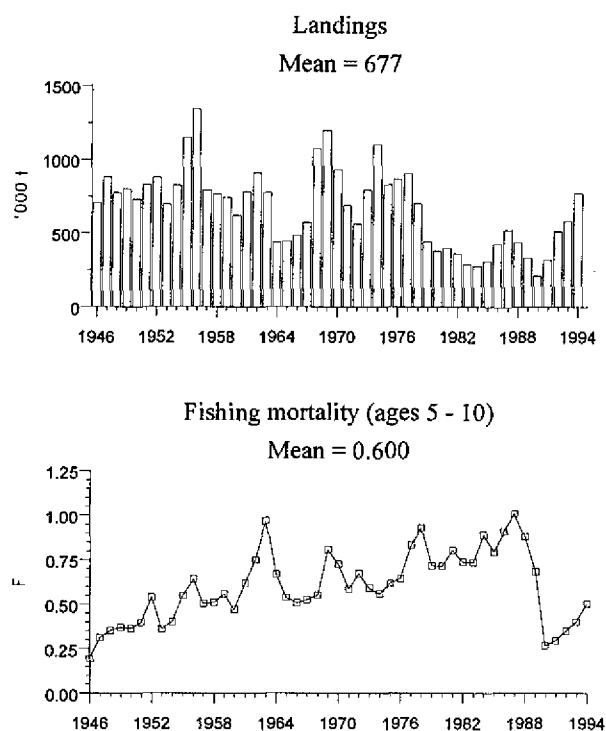
**Forecast for 1996:**

SSB(95) = 705,  $F(95) = 0.50$ , Basis: Expected Catch (95) = 750 ~  $F_{status\ quo}$ , Landings(95) = 750.

Option	Basis	F (96)	SSB (96)	Catch (96)	SSB (97)
A	0.4 $F_{94}$	0.20	697	346	1011
B	0.6 $F_{94}$	0.30		494	901
C	0.8 $F_{94}$	0.40		626	803
D	$F_{med}$	0.46		693	754
E	1.0 $F_{94}$	0.51		746	716
F	1.2 $F_{94}$	0.61		854	640

Weights in '000 t.

Options A-D will give an increase in spawning stock and



option F will reduce it. All options show that SSB will remain above the MBAL level in 1997.

**Management advice:** There are no long-term benefits in yield from increasing fishing mortality above the present level.

**Special comments:** The growth of cod is predicted to be low in the near future because of the decrease in the capelin stock. A low mean weight at age has therefore been used in the forecast. Cannibalism is now accounted for in the assessment indicating a high rate of cannibalism in 1993 and 1994 due to low abundance of capelin. Although the year classes 1989-1992 are still abundant, the subsequent year classes may be severely reduced by cannibalism before they recruit to the fishery. The starting population for the prediction is corrected for cannibalism on age group 3 but it is impossible to indicate the impact of cannibalism in the catch forecast especially in the medium term.

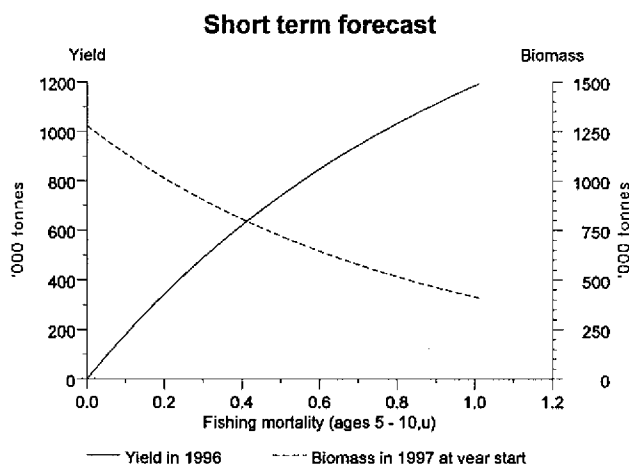
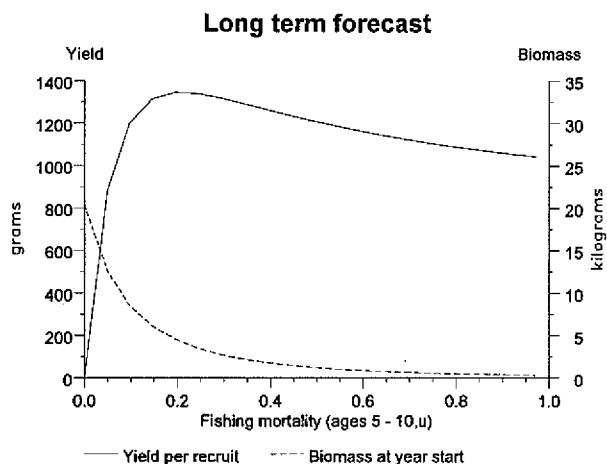
If the increasing trend in fishing mortality is continued, for instance by keeping a constant TAC of 750,000 t until 1999, the spawning stock biomass will be reduced to a size below MBAL by the year 2000. If the expected decrease in mean weight at age is confirmed and incoming year classes suffer from cannibalism, fishing mortality and catches have to be reduced from the current level to prevent spawning stock biomass falling below MBAL in the medium term.

The ongoing review of historical data including mean weight at age and maturity may change the historical perception of spawning stock biomass.

**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 recent years. Cod cannibalism is included in the assessment.

**Source of information:** Report of the Arctic Fisheries Working Group, August 1995 (C.M.1996/Assess: 4).

## Yield and Spawning Stock Biomass



### 3.1.2.b Coastal cod

Catch data (Table 3.1.2.b.1):

Year	Rec. TAC <sup>1</sup>	Agreed TAC <sup>2</sup>	Official landings	ACFM catch <sup>3</sup>
1987		40	31	31
1988		40	22	22
1989		40	17	17
1990		40	24	24
1991		40	25	25
1992		40	35	35
1993		40	43	44
1994		40	48	48
1995		40		

<sup>1</sup>No separate TAC recommended. <sup>2</sup>Added to the agreed TAC of North-East Arctic cod. <sup>3</sup>Norwegian landings from Division IIa (see also Table 3.1.2.b.1). Weights in '000 t.

**Historical development of the fishery:** 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:** Acoustic trawl surveys in the period 1992 – 1994 indicate a total Coastal cod stock of about 200,000t, including approximately 150,000t of spawning stock. The distribution of this stock is found to be along the Norwegian coast from 62°N northwards.

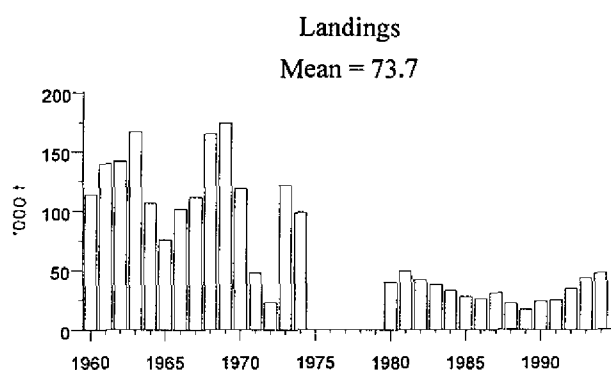
**Forecast for 1996:** Not available.

**Special comments:** ACFM advises that annual surveys should be conducted and that sampling from the landings should be improved.

**Data and assessment:** Catch-at-age data for coastal cod in Sub-areas I and II are not available. Acoustic and trawl surveys were conducted on parts of this stock in 1992-1994.

**Source of information:** Report of the Arctic Fisheries Working Group, August 1995 (C.M.1996/ Assess:4).

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).





### 3.1.3 North-East Arctic haddock

#### Catch data (Tables 3.1.3.1-2):

Year	Rec. TAC <sup>1</sup>	Agreed TAC <sup>1</sup>	Official landings	ACFM catch <sup>1</sup>
1987	160	250	155	151
1988	<240	240	95	92
1989	<103	83	60	55
1990	- <sup>2</sup>	25	27	26
1991	- <sup>2</sup>	28	34	34
1992	35	63	58	54
1993	56 <sup>3</sup>	72	83	78
1994	97	120	125	121
1995	122	130		

<sup>1</sup>Haddock in Norwegian coastal areas not included. <sup>2</sup>No directed fishery <sup>3</sup>Predicted catch at *status quo*. <sup>4</sup>Predicted 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 seine, 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. Spawning stock biomass is estimated to be 100,000 t. This is an increase since last year and well above the historical low levels observed in the mid 1980s. Recent recruitment has been at or above the long-term geometric mean. The fishing mortality has more than doubled since 1990.

Details in Table 3.1.3.3.

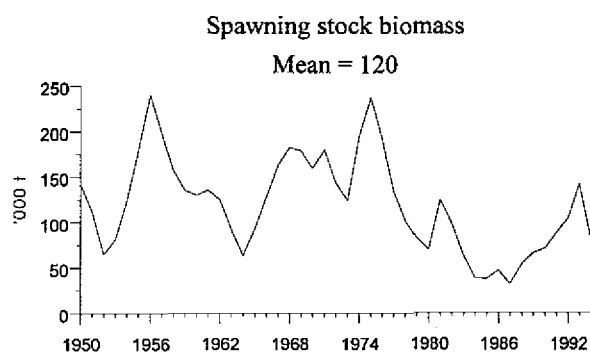
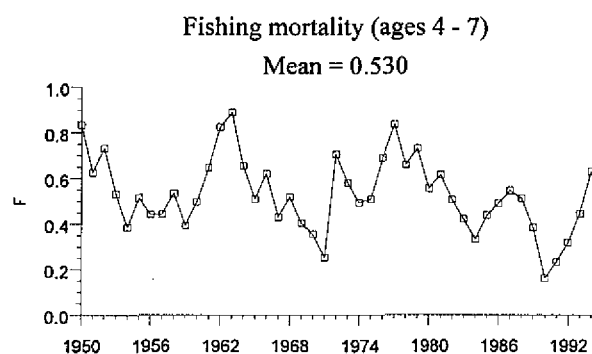
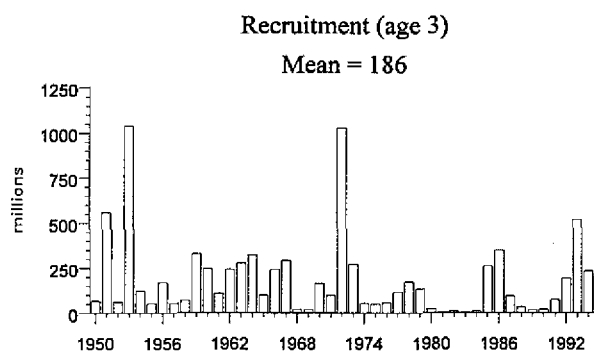
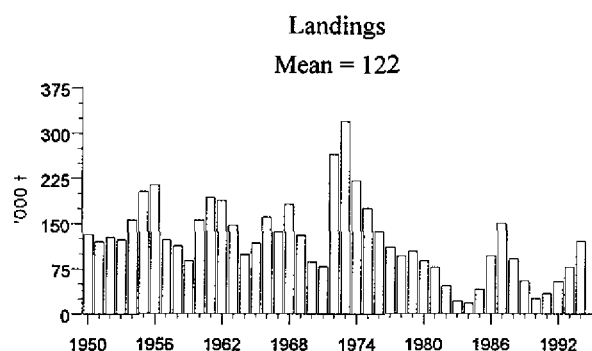
#### Forecast for 1996:

SSB(95) = 100;  $F(95) = 0.40$ ; Basis: Expected catch (95) = 130; Landings (95) = 130.

Option	Basis	F (96)	SSB (96)	Catch (96)	SSB (97)
A	$0.4F_{95}$	0.16	175	85	280
B	$0.6F_{95}$	0.24		123	254
C	$0.8F_{95}$	0.32		158	230
D	$F_{med}$	0.35		169	223
E	$1.0F_{95}$	0.40		192	210
F	$1.2F_{95}$	0.48		216	191

Weights in '000 t.

For all options the SSB will increase in 1997 and remain well above the long-term average level.



**Management advice:** There are no long-term benefits in yield to be expected from increasing fishing mortality beyond  $F_{med}$ .

**Special comments:** The assessment results are considered as a conservative stock description. Although a considerable increase in  $F$  is indicated this is believed to be an overestimate of  $F$  implying an underestimation of the stock size.

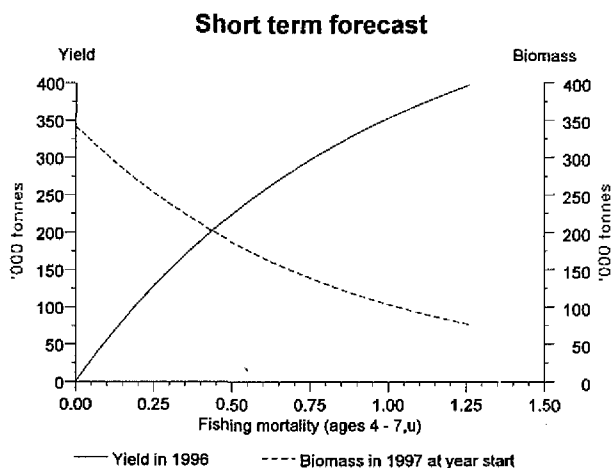
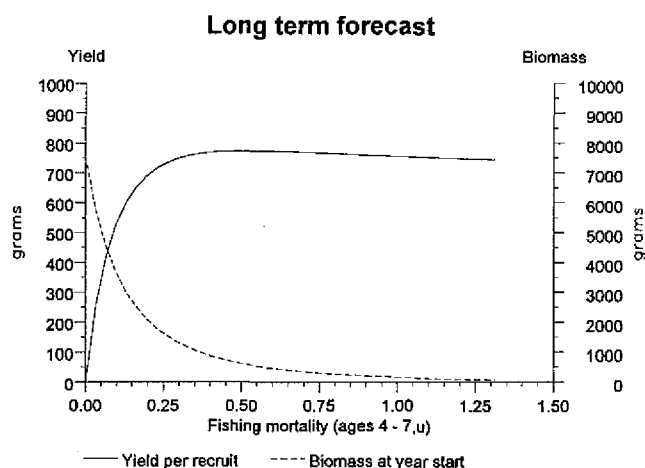
The unweighted average mean  $F$  in 1994 is believed to be biased by high fishing mortality on ages 6 and 7 implied by the sudden increase in catches of these weak year classes. The average  $F$  related to the expected catch in 1995 is therefore considered to better reflect the *status quo* level and is used as the basis of the prediction.

Based on the *status quo*  $F$  ( $F_{95}$ ) spawning stock biomass is predicted in the medium term to be above the long-term average.

**Data and assessment:** Analytical assessment based on catch-at-age, surveys and commercial CPUE.

**Source of information:** Report of the Arctic Fisheries Working Group, August 1995 (C.M.1996/Assess:4).

## Yield and Spawning Stock Biomass



### 3.1.4 North-East Arctic saithe

Catch data (Table 3.1.4.1):

Year	Rec. TAC	Agreed TAC <sup>2</sup>	Official landings	ACFM catch
1987	<90	-	92	92
1988	<83	-	114	115
1989	120	120	122	123
1990	93	103	96	95
1991	90	100	108	107
1992	115	115	128	128
1993	132 <sup>1</sup>	132	146	146
1994	158 <sup>1</sup>	145	142	142
1995	221 <sup>1</sup>	165		

<sup>1</sup> Predicted catch at *status quo* F. <sup>2</sup> Target set by Norwegian authorities. Weights in '000 t.

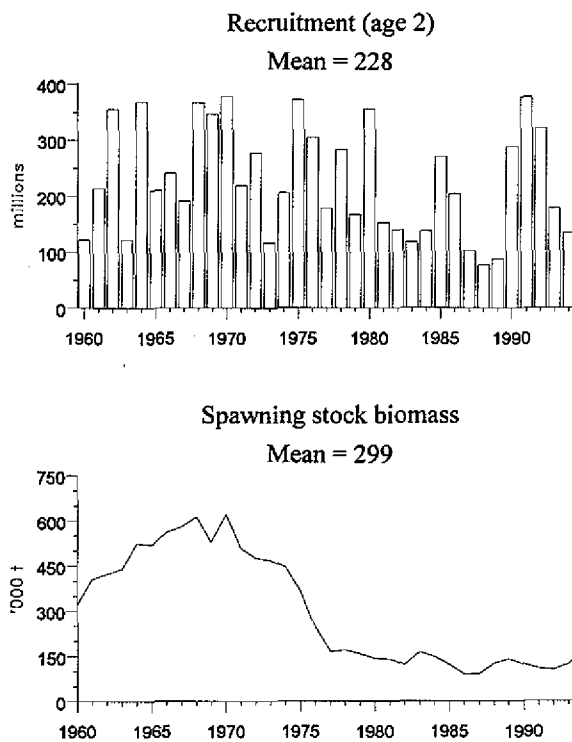
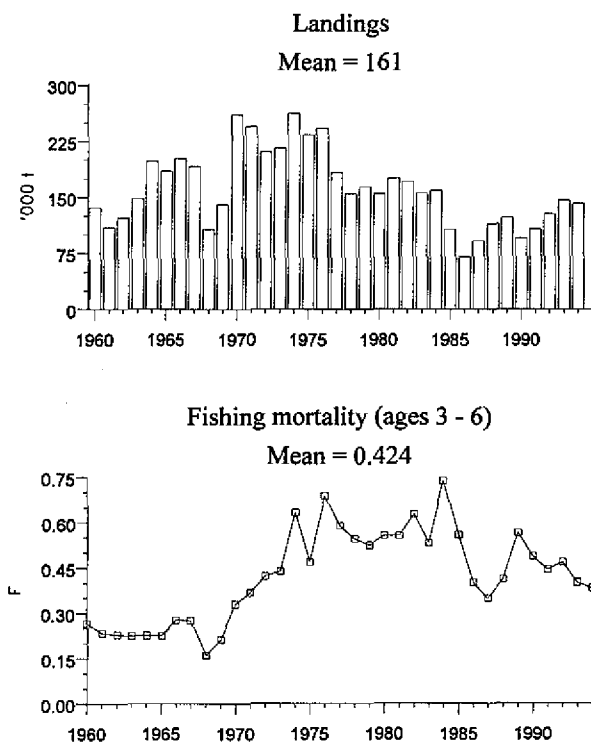
**Historical development of the fishery:** The fishery since the early 1960s has been dominated by purse seine and trawl, with a traditional gill net fishery for spawning saithe as the third major component. The purse seine fishery is carried out in coastal areas and fjords and typically exploits

somewhat smaller fish than the trawlers. Over the years purse seine and trawl have taken roughly equal shares of the catches, but since 1992 the purse seine catches have been reduced substantially and the trawl catches correspondingly increased, accounting for more than half of the catches.

Based on target catch and estimated catches of other gears based on recent trends the quotas have been set for purse seine and trawl. In the Norwegian fisheries, 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 now considered to be inside safe biological limits. The spawning stock biomass is increasing after almost 20 years at low levels and is now above MBAL which is currently estimated at about 170,000t. Recruitment has been above average in four of the last five years. There is a declining trend in fishing mortality over the last 10 years and F is now at about  $F_{med}$  (0.38).

Details in Table 3.1.4.2.





### Forecast for 1996:

SSB(95) = 238, F(95) = 0.40, Basis: Expected Catch(95) = 165 (target for management based on quotas for major fleets), Landings (95) = 165.

Option	Basis	F (96)	SSB (96)	Catch (96)	SSB (97)
A	0.4F <sub>94</sub>	0.15	240	73	293
B	0.6F <sub>94</sub>	0.23		104	262
C	0.8F <sub>94</sub>	0.30		132	235
D	1.0F <sub>94</sub> - F <sub>med</sub>	0.38		158	211
E	1.2F <sub>94</sub>	0.46		181	190

Weights in '000 t.

Options A and B show increases in SSB. Options C to E show a decline in SSB in 1997 compared to 1995. The spawning stock biomass will remain within safe biological limits for all options, but a decline can be expected from 1998 onwards if recruiting year classes are less abundant than the strong 1988-1990 year classes.

**Management advice:** The fishing mortality in 1996 should not be allowed to increase above the 1994 level.

**Special comments:** The assessment of the stock appears to have become more reliable after including the acoustic survey data. In particular, the estimation of recruiting year classes seems to have improved.

Maturity ogives have been revised based on historical data. Accordingly the spawning stock biomass figures have been revised as well as MBAL which is now considered to be at 170,000 t.

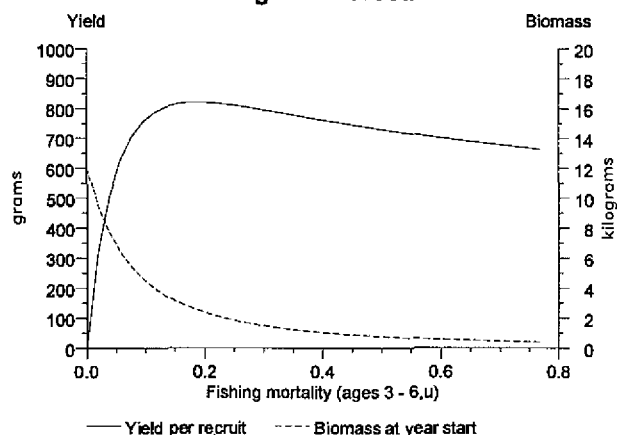
Present levels of fishing mortality leave spawning stock biomass close to MBAL in the medium term. Any increase in fishing mortality or decrease in recruitment may result in a decline in spawning stock biomass below MBAL.

**Data and assessment:** Analytical assessment based on catch-at-age data. Catch per unit effort data from Norwegian purse seiners and trawlers and abundance indices from an acoustic trawl survey.

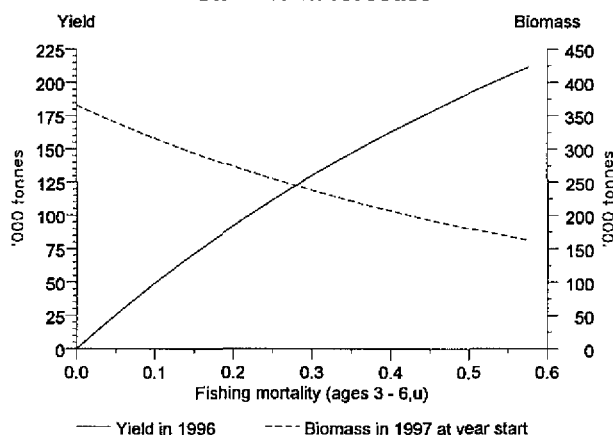
**Source of information:** Report of the Arctic Fisheries Working Group, August 1995 (C.M.1996/Assess:4).

## Yield and Spawning Stock Biomass

Long term forecast



Short term forecast



### 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	Rec. TAC	Agreed TAC	Official landings <sup>3</sup>	ACFM catch
1987	70 <sup>1</sup>	85	35	11
1988	11	-	41	16
1989	12	-	47	23
1990	18	-	63	35
1991	12	-	68	49
1992	22 <sup>1</sup>	-	32	16
1993	18	18	26	11
1994	- <sup>1</sup>	-	29	12
1995	- <sup>4</sup>	-		13 <sup>2</sup>

<sup>1</sup>Precautionary TAC. <sup>2</sup>Expected catch. <sup>3</sup>Includes both *S. mentella* and *S. marinus*. <sup>4</sup>Lowest possible level. 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 nearly only inhabited 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 CPUE data indicate that the spawning stock is at a historically low level. The 1991 - 1993 year classes as 0-group are the lowest on record.

**Forecast for 1996:** Not available.

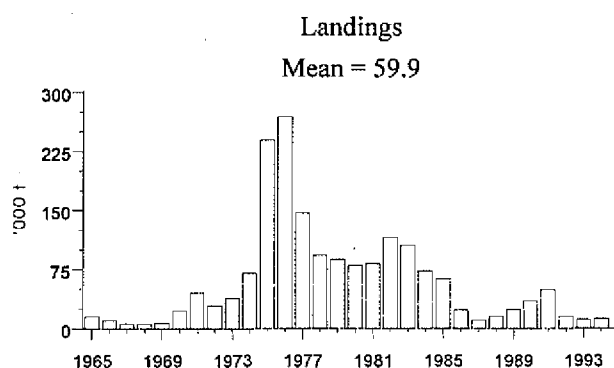
**Management advice:** ACFM recommends that catches should be at the lowest level possible until a significant increase in spawning stock biomass has been detected.

**Special comments:** In order to monitor the stock it is of vital importance that scientific surveys be encouraged. The surveys should be either stratified-random bottom trawl surveys or acoustic surveys covering the entire area of the stock distribution.

The assessment has improved and showed the trends in the stock development to very low levels. However, it cannot be used for predictions.

**Data and assessment:** Catch at age, CPUE and survey data are available. An analytical assessment was attempted, but considered unreliable.

**Source of information:** Report of the Arctic Fisheries Working Group, August 1995 (C.M.1996/Assess:4).



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

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

Year	Rec. TAC	Agreed TAC	Official landings <sup>3</sup>	ACFM catch
1987	-	-	35	24
1988	15	-	41	26
1989	24	-	47	23
1990	23	-	63	28
1991	24	-	68	19
1992	25 <sup>1</sup>	-	32	16
1993	12 <sup>1</sup>	12	26	15
1994	- <sup>1</sup>	-	29	17
1995	- <sup>1</sup>	-		16 <sup>2</sup>

<sup>1</sup>Precautionary TAC. <sup>2</sup>Expected catch. <sup>3</sup>Includes both *S. mentella* and *S. marinus*. 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 Moere area (Svinøey), Halten Bank, outside Lofoten and Vesteraalen, 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.

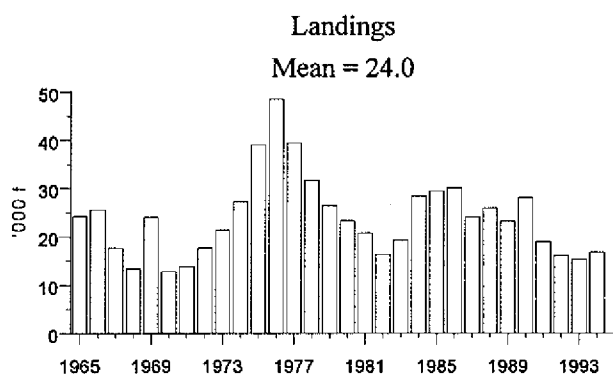
**State of stock:** An assessment of the state of the stock is not available. Indices from surveys in young fish areas in the Barents Sea and Svalbard waters indicate a fairly stable situation for this part of the stock in these areas.

**Forecast for 1996:** Not available.

**Management advice:** If a TAC is to be implemented for this stock, a precautionary TAC should be set on the basis of recent catch levels in 1992-1994.

**Data and assessment:** Catch-at-age and tuning data are improving for this stock. An analytical assessment was attempted, but the results were not considered reliable.

**Source of information:** Report of the Arctic Fisheries Working Group, August 1995 (C.M.1996/Assess:4).



### 3.1.6 Greenland halibut in Sub-areas I and II

Catch data (Tables 3.1.6.1-4):

Year	Rec. TAC	Agreed TAC	Official landings	ACFM catch
1987	-	-	19	19
1988	19	-	20	20
1989	21	-	20	20
1990	15	-	23	23
1991	9	-	30	33
1992	6	7 <sup>1</sup>	8	9
1993	7	7 <sup>1</sup>	12	12
1994	<12	11 <sup>1</sup>	9	9
1995	0	2.5 <sup>2</sup>		

<sup>1</sup>Target set by Norwegian authorities.

<sup>2</sup>Target set by Norwegian authorities for the non-trawl fishery. Unavoidable bycatch 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 a level of about 80,000 t in the early

1970s. However, landings decreased in the 1980s. 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.

**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. Recruitment has failed in recent years.

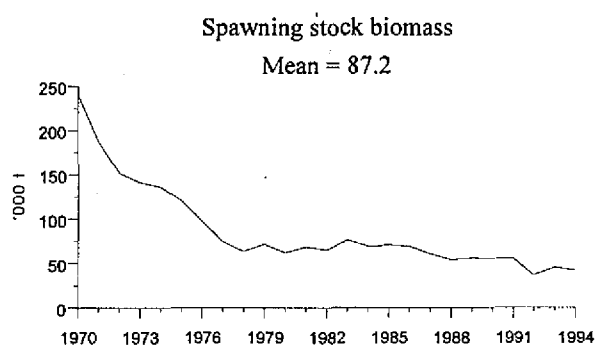
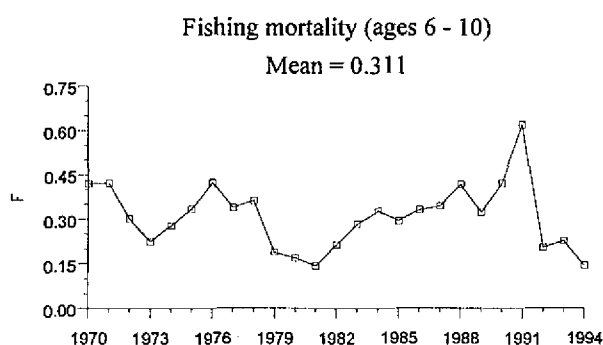
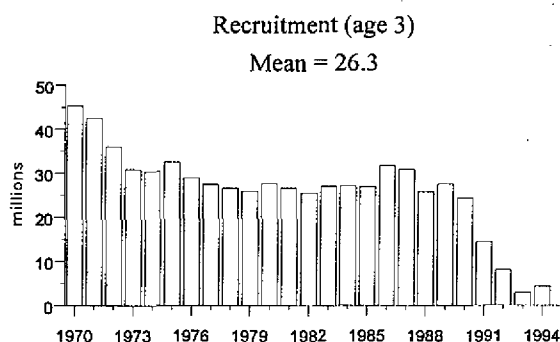
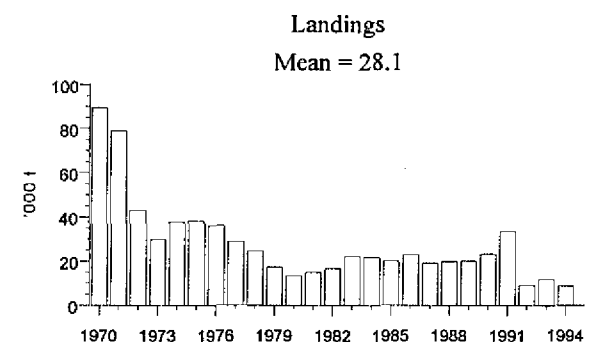
Details in Table 3.1.6.5.

**Forecast for 1996:** At *status quo* fishing mortality ( $F_{96} = F_{94} = 0.15$ ) the catch in 1996 is predicted to be 10,000 t.

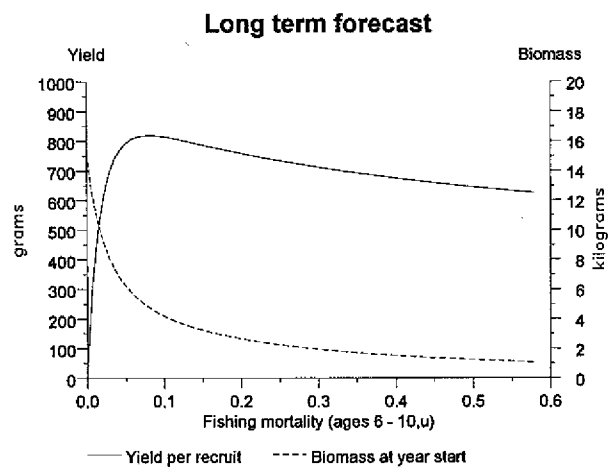
**Management advice:** In order to allow an increase of the spawning stock biomass, ACFM recommends that no fishing should take place in 1996.

**Data and assessment:** Analytical assessment based on catch-at-age data. Three 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 1995 (C.M.1996/ Assess:4).



## Yield and Spawning Stock Biomass



### 3.1.7 Norwegian spring-spawning herring

Catch data (Tables: 3.1.7.1-2):

Year	Rec TAC	Agreed TAC	ACFM Catch
1987	150	115	127
1988	120-150	120	135
1989	100	100	104
1990	80	80	86
1991	0	76	85
1992	0	98	104
1993	119	200	232
1994		450	479
1995	513	None	

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 coastal waters. Since 1992 the coastal fishery has increased sharply. During the summer of 1994 there was 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 at least six nations participating.

**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 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.

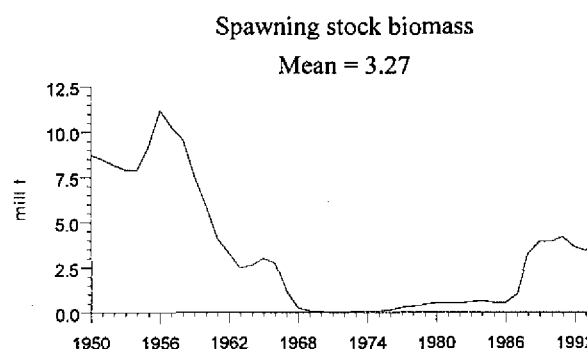
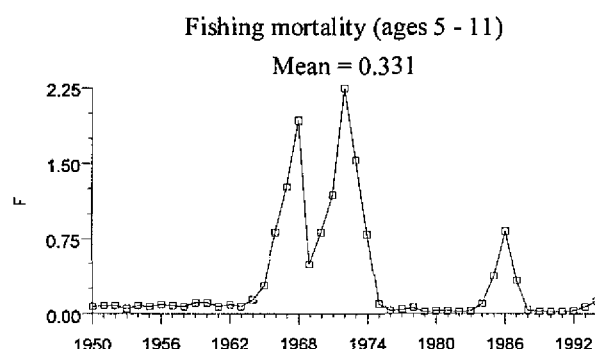
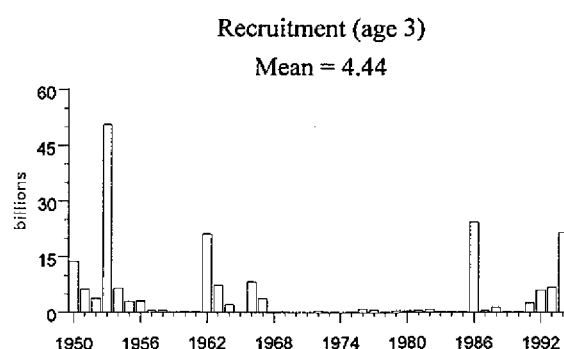
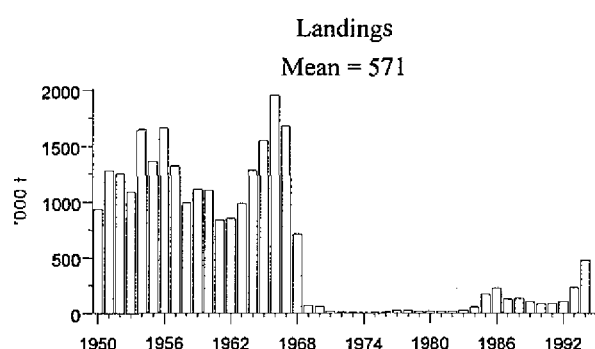
Details in Table 3.1.7.3.

**Forecast for 1996:** Due to the uncertainty in the current stock level a precise catch forecast for 1996 cannot be given. However, to show the likely development in SSB and catch a *status quo* forecast based on the likely predicted catch is presented below:

SSB(95) = 3907 F(95)=0.18, Basis: Expected total catch in 1995, Catch(95)=914, Landings(95)=914.

Scenario	Basis	F (96)	SSB (96)	Catch (96)	Landgs (96)	SSB (97)
A	1.0 F <sub>94</sub>	0.125	4792	966	966	6753

(Weights in '000 t).



The SSB is estimated to be well above the minimum biologically acceptable level (MBAL) of 2.5 million tonnes in 1996, and the forecast increase of the spawning stock in 1997 and coming years is due to the expected recruitment of the strong year classes 1991 and 1992.

**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 prospects for the 1994 and 1995 year classes are also regarded as poor. Medium-term simulations show that the stock will increase in the coming 2-4 years, after which the stock will decline again if no further strong year classes appear.

**Management advice:** ACFM 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. The management objectives for the medium term are discussed above.

**Special comments:** The present forecast of the SSB for 1996 is about 1 million t more than forecast in 1994. The increase is due to revision of the tuning method which now gives a better fit to survey data in later years but a poorer fit to the older estimates. In addition, the survey data for 1995 indicate that the adult stock is higher than the level estimated last year. Further, natural mortality has been revised due to the low prevalences of *Ichthyophonus* in the stock at present.

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 year classes 1993 to 1995. The interaction between cod-capelin and herring in the Barents Sea is 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.

The recruitment pattern in this herring stock suggests that the fishery will be dependent on a strong year class for a long period. In order to ensure the maintenance of the fishery and prevent the SSB from falling below the MBAL in the long-term perspective a low exploitation rate is needed.

**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 recover to, and be kept at, a level above MBAL. In the 1950s and 1960s the spawning stock was in the order of 5-10 million t.

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

**Information on *Ichthyophonus hoferi*:** The overall prevalence in recent samples is in the order of 1.2%. This, together with the clearly declining trend in the prevalence of the disease in the oldest year classes, indicates that the disease in Norwegian spring-spawning herring is fading away.

In year classes 1988 and younger the prevalence seems to have been low since 1991 so the value of natural mortality for these year classes has been set at the same value as before the *Ichthyophonus* outbreak. For the year classes 1987 and older the value of natural mortality is unchanged from last year. It is pointed out that the value of natural mortality is very uncertain. Low values are used in the forecast for all age groups.

**Quantitative information on the spatial and temporal distribution of the Norwegian spring-spawning herring stock.**

In a request from NEAFC, ICES was requested to "provide quantitative information on the present spatial and temporal distribution of the Norwegian spring-spawning herring stock."

Quantification of the spatial and temporal distribution pattern is difficult. It requires a summary of all stages in the life history including:

- occurrence and migration of the fishable stock
- occurrence of juveniles and prerecruit fish
- spawning areas and distribution of eggs and larvae

It is therefore not relevant to select only one or some few years to characterize the quantitative distribution.

The Norwegian spring-spawning herring stock spawns along the Norwegian coast. Juveniles are distributed in the Barents Sea and in Norwegian fjords, and adults migrate widely between spawning areas, feeding areas and over-wintering areas.

The stock has changed its distribution in recent years, gradually extending its distribution away from the Norwegian coast. In recent years spawning areas (Norwegian coast) and wintering areas (Norwegian fjords) seem to have been quite consistent. The feeding areas for the adult stock, however, have gradually been extended. In 1994 for the first time in twenty-six years, this stock appeared in the offshore areas of the Norwegian Sea. In April-June 1995 herring were distributed over large areas of the Norwegian Sea as far west as the eastern border of the East Icelandic current (Figure 3.1.7.1).

In September 1995 the Governments of Faroes, Iceland, Norway and Russia set up a meeting of scientists from these countries to estimate the quantitative distribution of the Norwegian spring-spawning herring since the second World War (see Source of Information). That group used an age-disaggregated biomass-time model based on quarterly information about distribution, fishing mortality and mean weight. The model did not include the egg and larvae stages. The strong year classes 1950, 1959, 1973 and 1983 were chosen to represent the time periods 1945-1962, 1963-1971, 1972-1985 and the present respectively. These time periods represent different migration patterns exhibited by this stock historically. The quantitative distribution in these time periods varied greatly (in the case of the Norwegian EEZ, for example, from 22 to 100%), reflecting changes in both the migration pattern and the distribution and intensity of fishing.

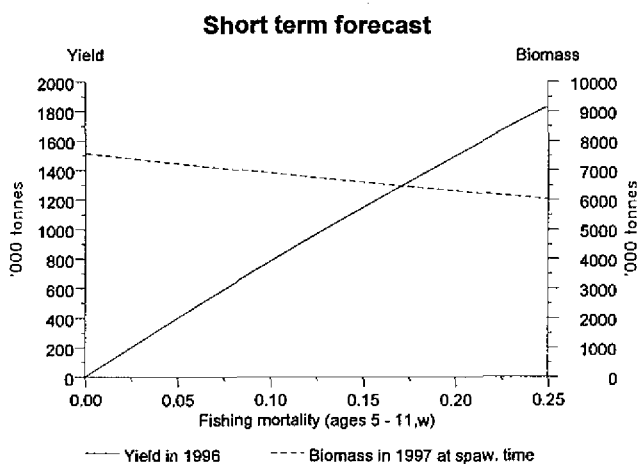
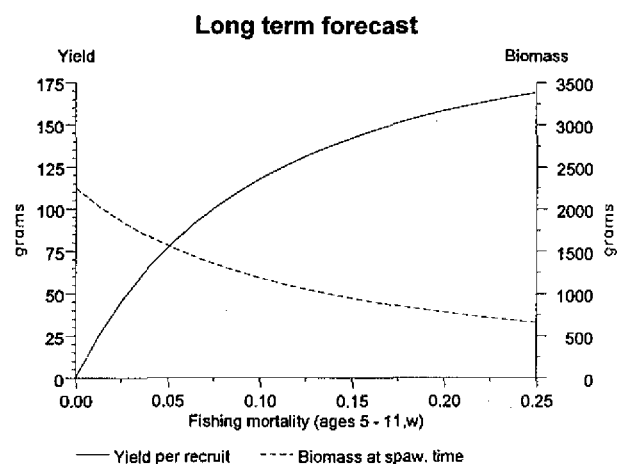
While this analysis is not completely relevant to the request for advice from NEAFC, and since the information given in that report did not allow ACFM to fully evaluate the basic data used, the study helps in describing the 1994 distribution. The analysis provides a description of the distribution of the recent strong 1983 year class throughout its life based on a summary of all available survey and other data. Bearing in mind that point estimates of distribution are difficult to make and may be misleading, the percentage distribution of that year class in 1994 is estimated as follows:

Quarter	1	2	3	4
Zones				
Faroes	0	10	0	0
Iceland	0	3	0	0
Norway	100	32	47	100
Jan Mayen	0	25	6	0
Russia	0	0	0	0
International Zone in Norwegian Sea	0	30	31	0
International Zone in Barents Sea	0	0	0	0
Svalbard	0	0	16	0
EU	0	0	0	0

This is considered to be a useful description of the distribution of the adult component of the stock in 1994, but not of the juveniles which were distributed in the Barents Sea and Norwegian fjords in that year. This stock has been known to change its migration pattern and at present (1995) is distributed differently from 1994.

**Source of information:** Report of the Atlanto-Scandian Herring, Capelin and Blue Whiting Assessment Working Group, October 1995 (C.M.1996/Assess:8); Report of the Scientific Working Group on Zonal Attachment of Norwegian Spring-spawning Herring, Reykjavik, 1995.

### Yield and Spawning Stock Biomass







### 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	Rec. TAC	Agreed TAC	ACFM catch
1987	0	0	0
1988	0	0	0
1989	0	0	0
1990	0	0	0
1991	1000 <sup>1</sup>	900	933
1992	834	1100	1123
1993	600	630	586
1994	0	0	0
1995	0	0	0

<sup>1</sup>Winter-spring fishery. Weights in '000 t.

**Historical development of the fishery:** Since 1979 the fishery has been regulated by a bilateral fishery management agreement between Norway (purse seine) and Russia (formerly USSR) (trawl). 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 400,000 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 stock is considered to be outside safe biological limits. SSB from 1993 to 1995 has shown a declining trend to the level in 1985 to 1987. The present maturing component is estimated to be 120,000 t. Recruitment has been poor since the 1992 year class.

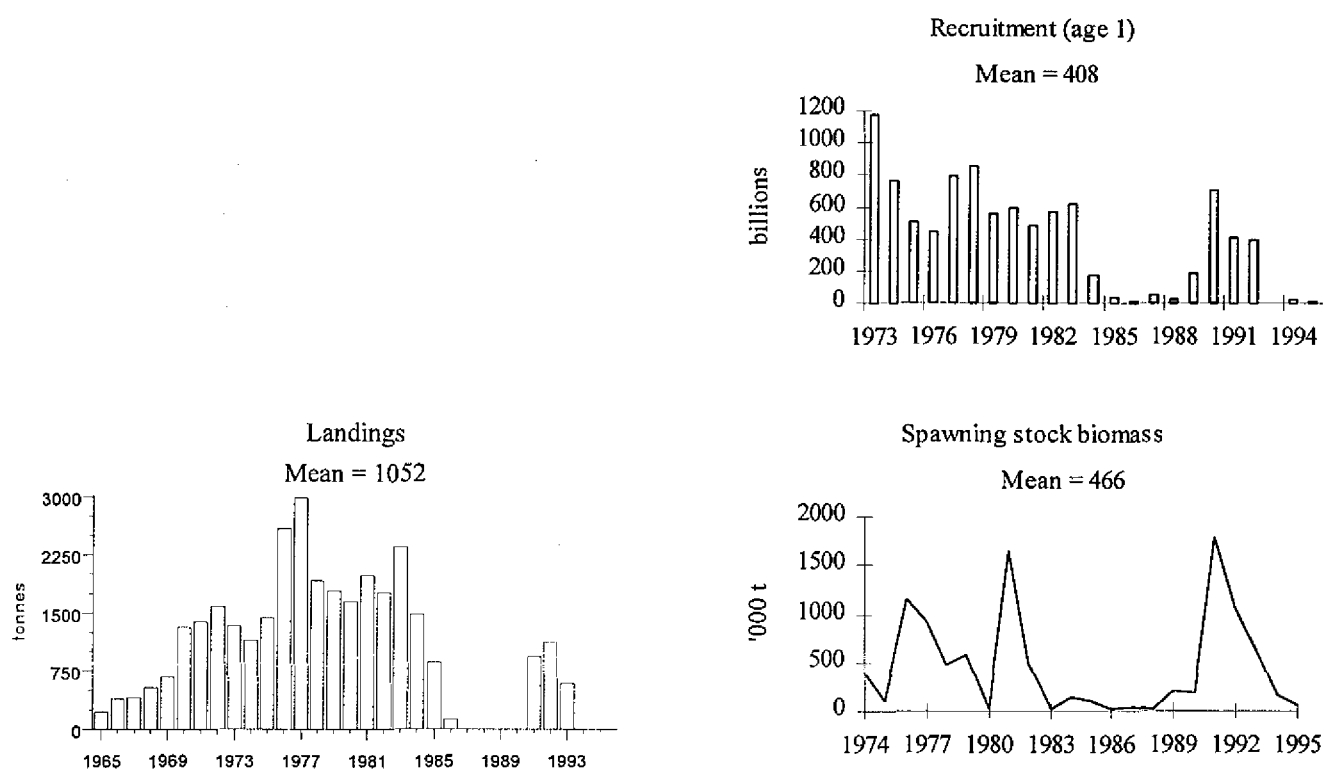
Details in Table 3.1.8.2.

**Medium term considerations:** Capelin is an important food source in the Barents Sea ecosystem. The annual amount eaten by cod, the main predator, is large compared to the catches. The cod stock is currently relatively large and strong year classes have been produced in recent years. The annual predation on capelin is estimated to be 1 to 3.7 million t in recent years. This high predation pressure and low capelin SSB are reflected in the current estimate of recruiting year classes 1993 to 1995 which are very poor. These year classes will dominate the stock in the coming years and the stock is not expected to recover before 1999 at the earliest; consequently any fishery for capelin cannot be expected before that year.

**Management advice:** ACFM recommends that no fishing should take place on this stock in 1996.

**Data and assessment:** Analytical assessment based on acoustic survey.

**Source of information:** Report of the Atlanto-Scandian Herring and Capelin and Blue Whiting Assessment Working Group, October 1995 (C.M.1996/Assess:8).





## **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 last 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 pelagic species, Icelandic herring and capelin, 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 stabilized at medium or high levels (corresponding to  $F_{med}$  or higher) in recent years. A notable exception to this pattern is a marked decrease in cod effort observed since 1994. Furthermore, effort in the herring fishery has been increasing steadily although fishing mortalities have been kept at a low level or somewhat in excess of  $F_{max}$ .

Fisheries in these areas are characterized 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, but also 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 which is virtually a virgin stock 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. These stocks are not regulated by TACs.

The three largest stocks have been subject to unfavourable trends during the last years. The stocks of cod and redfish (traditional stocks) have been declining and are considered to be at a low level 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 rapidly declining during the last years and is considered to be at a low level. For saithe a somewhat increasing trend in spawning stock size has been observed and the stock is considered to be at an intermediate level. The Icelandic summer-spawning herring has been steadily increasing 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 below.

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 a very low level and has only occasionally reached 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 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 may also be considered as a rather challenging task, which requires full scale international cooperation.

Species interaction of 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 are 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 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 **ACFM 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. **ACFM therefore recommends for Icelandic cod, a reduction in fishing mortality by at least 40% from the 1994 level to ensure the SSB does not decrease.**

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. ACFM 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 that stock 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 accordance and indicate that the stock has been declining since the mid 1980's. 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 **ACFM recommends a significant reduction in fishing mortality in 1996 by 40% from the present level in 1994. This corresponds to a TAC of 21,000t in 1996.**

### 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 a.1 - 3.2.2 a.2)

Year	Rec. TAC	Agreed TAC	ACFM catch
<u>East Greenland</u>			
1987	5	11.5	7
1988	5	11.5	9
1989	5	15	15
1990		15	33
1991		25	22
1992		17.25	12
1993		17.25	1
1994		17.25	<1
1995		17.25	
<u>West Greenland</u>			
1987		12.5	12
1988		53	62
1989		90	112
1990		110	68
1991		90	20
1992		66	6
1993		66	2
1994		66	2
1995		66	
<u>Greenland (total)</u>			
1987			19
1988			72
1989			126
1990		125	102
1991		115	42
1992		83.25	17
1993		83.25	3
1994		83.25	3
1995		83.25	

Weights in '000 t.

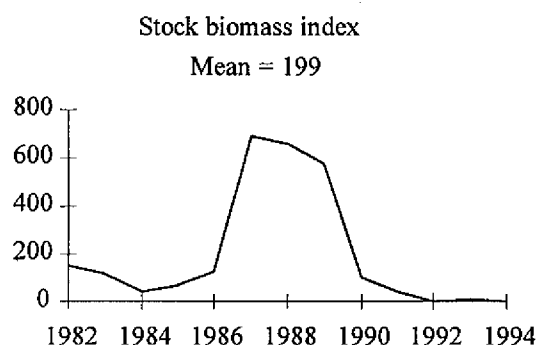
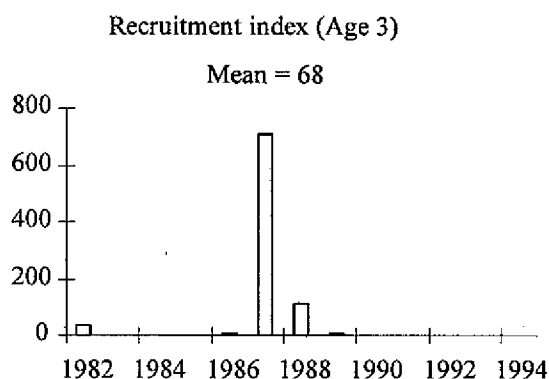
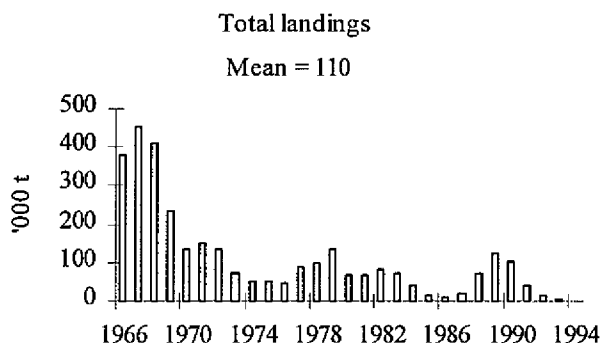
**Historical development of the fishery:** The fishery was mainly targeted at cod with some redfish as a by-catch. The fishery was international until the declaration of EEZs in the 1970s. During the 1980s the offshore fishery was dominated

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. The dramatic decrease in stock abundance was associated with very high fishing mortalities. The inshore component has never been assessed separately, but inshore catches are presently at a low level.

(Details in Table 3.2.2 a.3)

**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 cod 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:** In the past analytical assessments were performed but catch at age data are not available for the most recent year to update the assessment. No analytical assessment was therefore undertaken. All 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 1995 (C.M.1995/Assess:19).

### 3.2.2.b Icelandic cod (Division Va)

Catch data (Table 3.2.2 b.1):

Year	Rec TAC	Agreed TAC	ACFM Catch
1987	300	330	390
1988	300	350	378
1989	300	325	363
1990	250	300	335
1991	240	245	308
1992	250	265	269
1993	154	205	251
1994	150	165	178
1995	130	155	

(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.

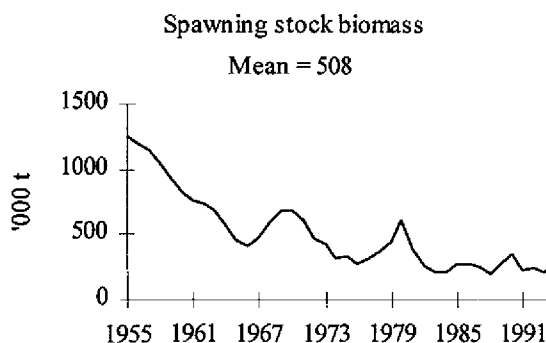
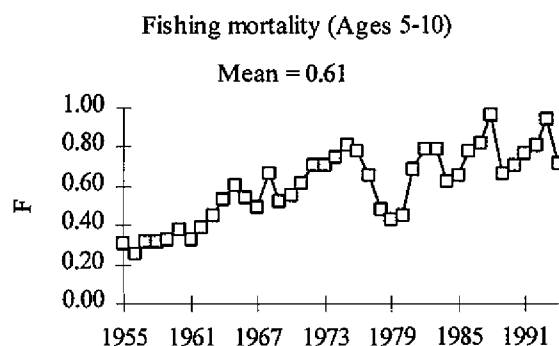
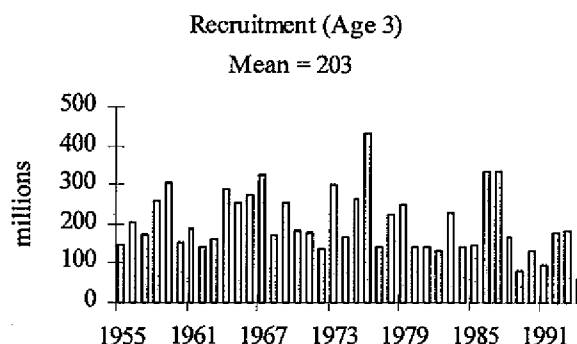
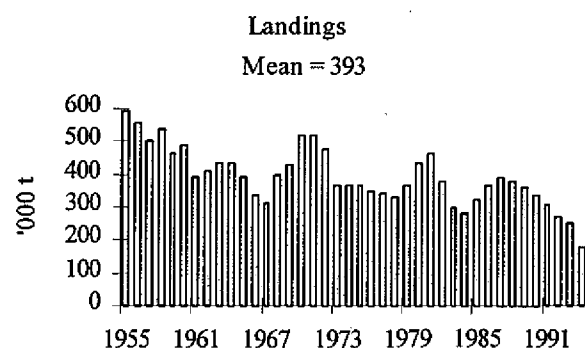
From 1977 to 1983, demersal fishing was limited to a certain number of days each year, but this system, as implemented, failed to meet the objective of limiting fishing mortality and a transferable boat quota system was introduced in 1984.

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 considerably exceeded.

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

SSB has shown a declining trend since 1955 and recent estimates are among the lowest on record. At current (1994) levels of fishing mortality the stock is predicted to decrease further and would fall outside safe biological limits. Recruitment has been poor since the 1985 year class, but the 1993 year class may be around the average level. The stock size may be so low that it is not able to replenish itself at the exploitation rate estimated in 1994.

(Details in Table 3.2.2 b.2.)





**Forecast for 1996:** Assuming a catch in 1995 of 165,000t (TAC-based), corresponding to a 30% reduction in fishing mortality from the 1994 level, the following catch options were derived for 1996:

$F(95) = 0.50$ , Basis:  $Catch(95) = Landings(95)=165$ ,  $SSB(95)=298$

Optn	Basis	F (96)	SSB (96)	Catch (96)	Lnogs (96)	SSB (97)
A	0.4F(94)	0.29	313	120	120	345
B	0.6F(94)	0.43	303	162	162	302
C	0.8F(94)	0.57	289	208	208	259
D	1.0F(94)	0.72	276	249	249	224
E	1.2F(94)	0.86	266	279	279	199

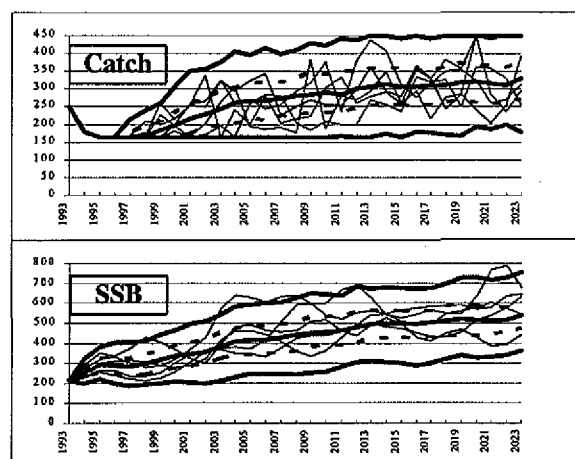
(Weights in '000 t).

- A Fishing mortality would need to be reduced by at least 60% from the 1994 level to obtain an increase in SSB.
- B A 40% reduction in fishing mortality leaves the SSB stable at a low level.
- C-E A reduction in fishing mortality of 20% or less results in a decrease in SSB in 1997.

**Management advice:** ACFM recommends a reduction in fishing mortality by at least 40% from the 1994 level, corresponding to a total catch in 1996 of not more than 162,000 t.

**Medium-term considerations:** In response to a request from the Iceland Government, several medium-term predictions have been considered, taking into account biological interactions between cod, capelin and shrimp. In each simulation the cod TAC in each year is set at a percentage of the biomass of 4 year olds and older (4+). The effect of not following such a strategy, but instead insisting on a minimum catch, was also investigated. Two such simulations are described below:

**A Medium-term simulations based on a minimum catch of 165,000 t (TAC=155,000t).** The resulting upper and lower 5, 25 and 50% lines are given for the SSB and catch.



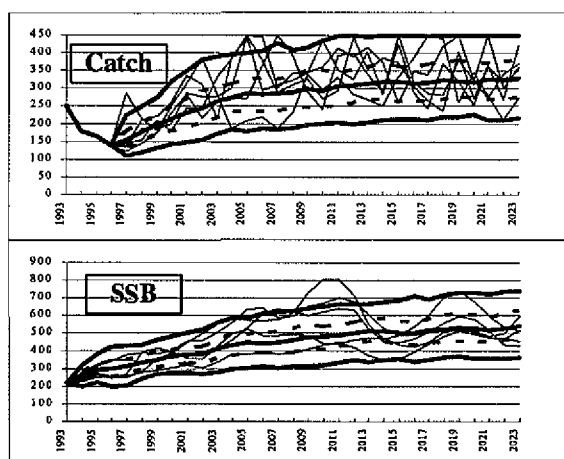
A A fishery from this stock with a strategy which attempts to take as a minimum the same level of catches, 165,000t, as in 1994-1995 (and later increasing catches as the stock increases to 25% of the 4+ biomass) is likely to lead to a rebuilding of the stock but also has a 2% probability of stock collapse.

This simulation corresponds to the current situation in which a TAC of 155,000 t generates a catch of 165,000 t. If the true catch is restricted to 155,000 t the probability of stock collapse will be lower than that given above.

B An alternative strategy, which takes 25% of the 4+ biomass, is likely to rebuild the stock sooner and lead to greater gains in the medium and long run. Application of such a medium-term strategy would lead to a catch of 140,000t in 1996.

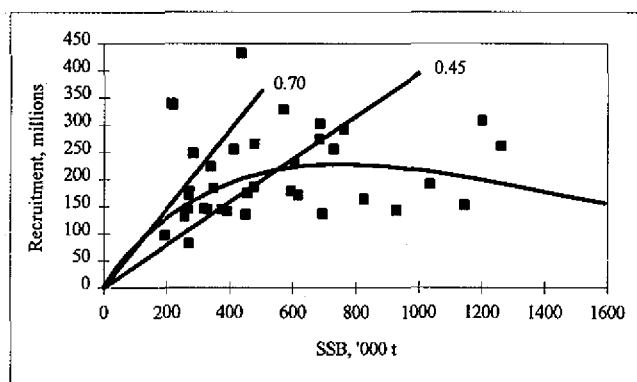
The results of the simulations are shown at the bottom of this page.

**B Medium-term simulations based on a strategy which takes 25% of the 4 + biomass without a minimum catch.** The resulting upper and lower 5, 25 and 50% lines are given for the SSB and catch.

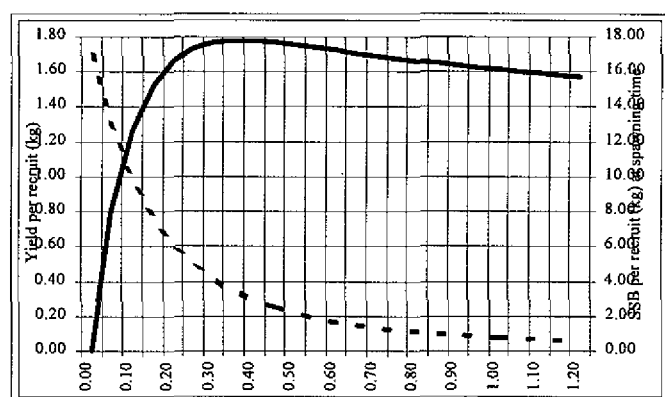


**Special comments:** Fishing mortality has been high since the beginning of the 1980s and was far above  $F_{max}$ . It was above  $F_{high}$  in 1993 and close to  $F_{high}$  in 1994.

Stock-recruitment data together with a fitted stock-recruitment curve are shown below. Also shown are replacement lines corresponding to  $F_{med}(0.45)$  and  $F_{high}(0.70)$ .



Yield per recruit (kg) and SSB (kg) per recruit are shown below.



The TAC was set so as to aim for a catch of 155,000 t in 1995. 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 the fact that long-liners could fish twice their allocated TAC. Taking these exceptions into account leads to an expected catch of 165,000 t in 1995.

All short-term results depend heavily on the assumed development in maturity at age which is difficult to estimate and predict accurately.

The predictions are based on the assumption of a catch of 165,000t in 1995 corresponding to a considerable reduction in fishing mortality from 1994. Should this reduction fail to materialize and higher fishing mortalities continue through 1995, the forecast for 1996 given above will be too optimistic.

Although there are several uncertainties in this assessment, the conclusion about the importance of reducing fishing mortality is quite robust to changes in assumptions.

**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 1995 (C.M.1995/Assess:19).



### 3.2.3 Icelandic saithe (Division Va)

Catch data: (Table 3.2.3.1)

Year	Rec TAC	Agreed TAC	ACFM catch
1987	64	70	81
1988	64	80	77
1989	80	80	82
1990	80	90	98
1991	87	65	103
1992	70	75	80
1993	75	95	72
1994	84 <sup>1</sup>	85	65
1995	61		

<sup>1</sup>Catch at *status quo* F. Weights in '000 t.

**Historical development of the fishery:** Saithe form part of a mixed demersal fishery although they may be targetted 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 fluctuated without trend; the 1984 year class was the highest on record. SSB is at the long-term average. (Details in Table 3.2.3.2).

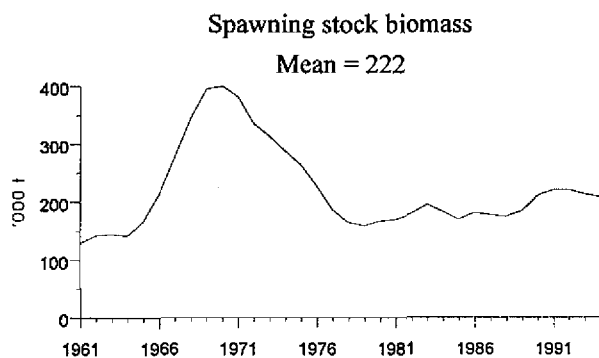
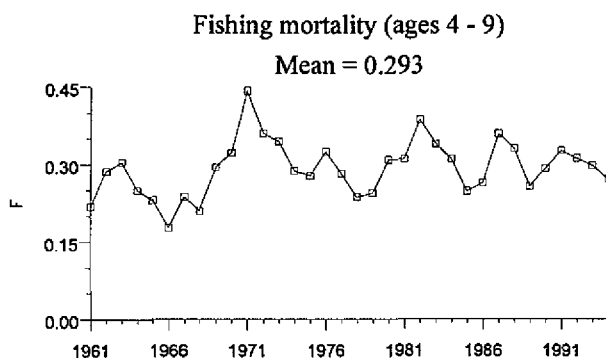
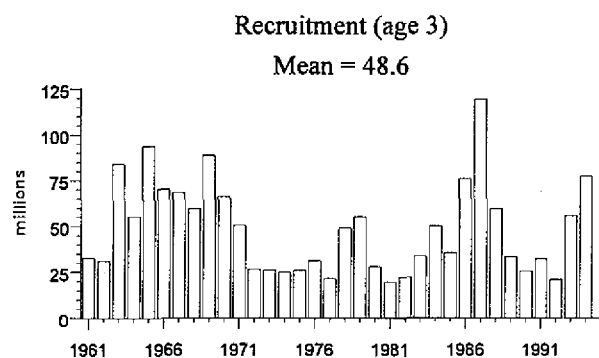
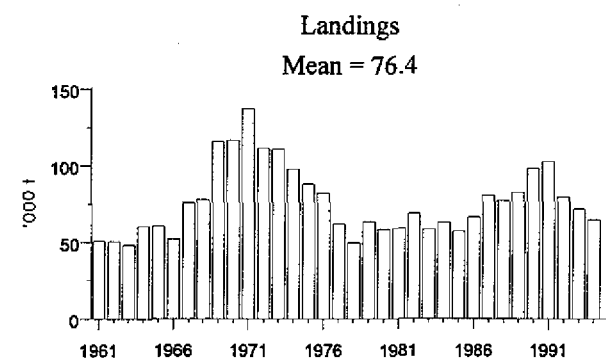
#### Forecast for 1996:

$F(95) = 0.27$ , Basis  $F(95) = F(94)$ , Landings (95) = 61, SSB(95) = 194.

Option	Basis	F(96)	SSB (96)	Catch (96)	Landgs (96)	SSB (97)
A	0.6F(94)	0.16	197	41	41	224
B	0.8 (94)	0.22	197	53	53	213
C	1.0F(94)	0.27	197	65	65	203
D	1.2F(94)	0.33	197	76	76	194

Weights in '000 t.

- catch is reduced by about 30%, SSB shows some increase;
- reduction in catch in 1996 compared to 1994, but SSB will increase by 10%;
- catch remains stable and SSB at about the 1994/1995 level;
- this option results in a 10,000 t increase in catch from the 1994 level and a slight decrease in SSB.



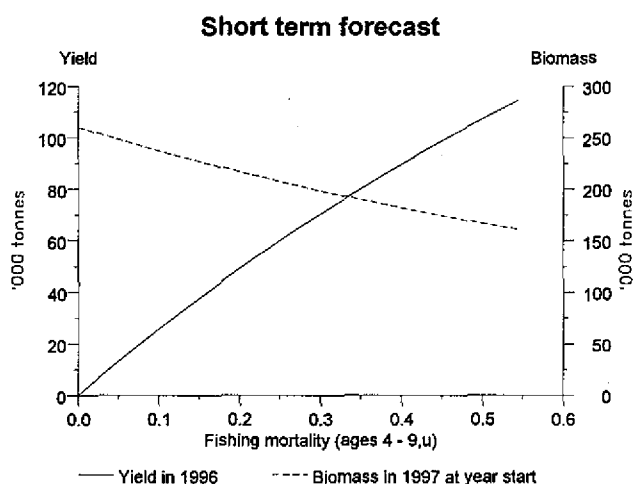
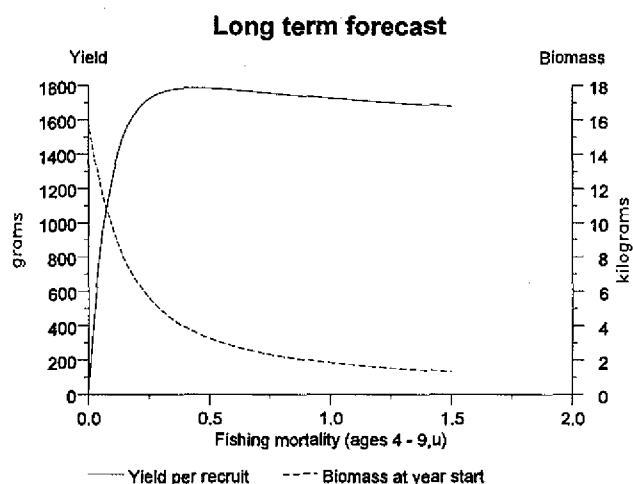
**Management advice:** ACFM notes that there are no measurable long-term benefits in yield from increasing fishing mortality above the present level.

**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.

**Source of information:** Report of the North-Western Working Group, May 1995 (C.M.1995/Assess:19).

### 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	Rec. TAC	Agreed TAC Va	Catch in Va	ACFM catch V,XIV
1987	<28	30	45	47
1988	<28	30	49	51
1989	33	30	59	62
1990		45	37	39
1991	40	30	35	38
1992	30	25	32	35
1993	30	30	34	41
1994	34 <sup>1</sup>	30	29	37
1995	32	30		

<sup>1</sup>Catch at *status quo* F. Weights in '000 t.

**Historical development of the fishery:** Greenland halibut are caught by demersal trawl with most of the fishery taking place in Division Va. As the fishery developed, vessels had to exploit parts of the stock in deeper waters in order to sustain their catch rates. In the past two years a fishery has developed in Division Vb using tangle nets. The fishery in Division Vb is expanding and is not subject to any catch limits. It presently accounts for about 15% 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 1996:

F(95)=0.51, Basis: F(95)=F(94), Catch(95) = 33, Landings (95) = 33, SSB(95) = 57

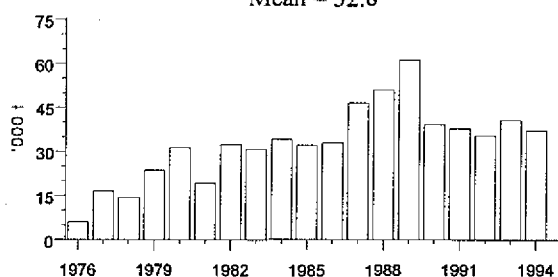
Option	Basis	F(96)	SSB (96)	Catch (96)	Landgs (96)	SSB (97)
A	0.4F(94)	0.20	55	14	14	66
B	0.6F(94)	0.31	55	21	21	62
C	0.8F(94)	0.41	55	26	26	58
D	1.0F(94)	0.51	55	32	32	55
E	1.2F(94)	0.61	55	36	36	52

(Weights in '000 t).

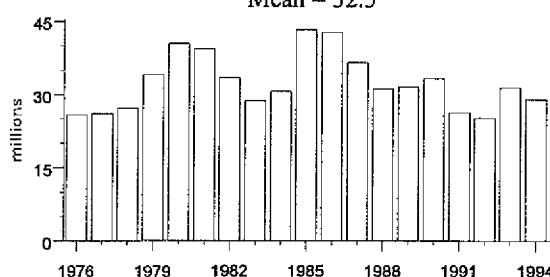
A-C Large reduction in catch, SSB remains at a low level.  
D-E Catch similar to recent levels, SSB continues to decline.

**Management advice:** ACFM recommends a significant reduction in fishing mortality in 1996 by 40% from the present level in 1994. This corresponds to a TAC of 21,000t in 1996. This is the minimum action required to reverse the decline in the SSB.

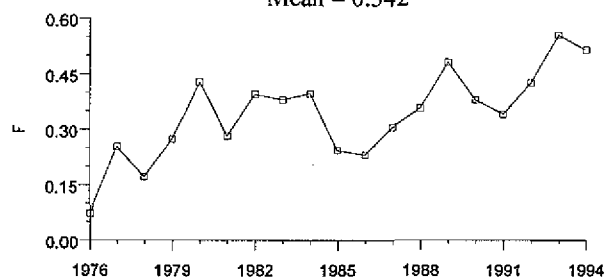
Landings  
Mean = 32.8



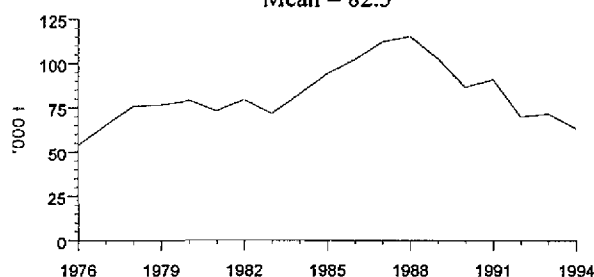
Recruitment (age 5)  
Mean = 32.5



Fishing mortality (ages 8 - 12)  
Mean = 0.342



Spawning stock biomass  
Mean = 82.5



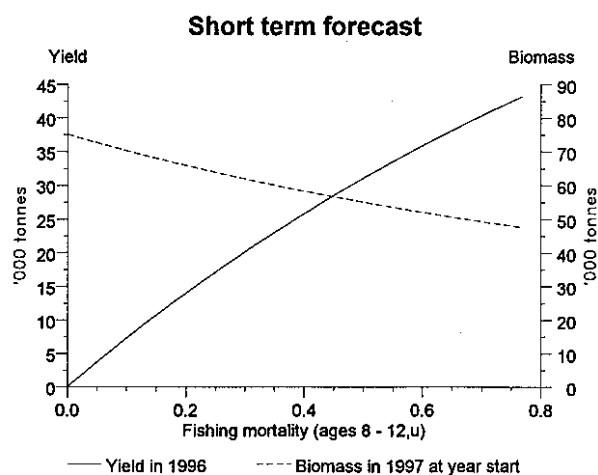
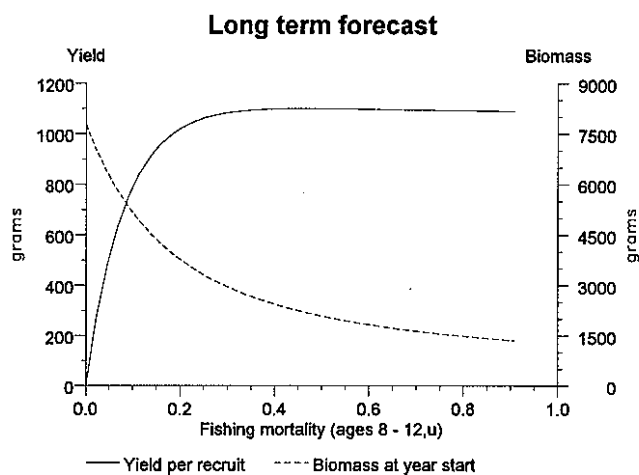
**Special comments:** The redistribution of fishing effort to deeper water as the fishery has developed may lead to underestimates of the present fishing mortality rates. There is a need for better data, particularly survey data on recruitment. The late age of recruitment to the fishery (age 5) means that recruitment failure would only be detected in the fishery some years after it had occurred.

Recent trends in commercial CPUE support the declining stock trend.

**Data and assessment:** Analytical assessment based on catch at age data and one tuning fleet. Data on biological parameters (age, length, weight etc.) are now available for 1994 in Sub-areas V and XIV. This is an improvement from former assessments. Better information on maturity by age is required.

**Source of information:** Report of the North-Western Working Group, May 1995 (C.M.1995/Assess:19).

### Yield and Spawning Stock Biomass



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

#### 3.2.5.a Overview

**Stocks:** The redfish stock complex comprises *Sebastes marinus* and deep-sea *S. mentella* stocks on which the so-called "traditional" redfish fishery along the East Greenland, Iceland and Faroese coasts is based, as well as the oceanic *S. mentella* stock which is fished in the open sea, mainly in international waters outside national economic zones. Although the area separation of the spawning stocks of the oceanic and deep-sea *S. mentella* has not yet been well defined, ACFM considers the oceanic type to be a separate stock.

**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.

Faroese 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 exclusively 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 joined this fishery, mainly outside the EEZs of Iceland and Greenland.

Recently technology for fishing with large pelagic trawl at depths greater than 500m has 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. Since then, landings declined in 1990 but increased again to 224,000 t in 1994 (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. All catches taken in Sub-area XIV are within the national fisheries zone of Greenland. 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 zone of the EU or the Faroe Islands.

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, ACFM has difficulties in quantifying the proportion of the adult stock occurring in the respective national zones.



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

Catch data (Table 3.2.5 b.1):

Year	Rec. TAC	<i>S. marinus</i> ACFM catch.	Combined ACFM catch <sup>1</sup>
1987	< 83 <sup>1</sup>	77	115
1988	< 84 <sup>1</sup>	90	121
1989	117 <sup>1</sup>	57	111
1990	116 <sup>1</sup>	67	111
1991	117 <sup>1</sup>	56	123
1992	116 <sup>1</sup>	56	118
1993	120 <sup>1</sup>	50	124
1994	100 <sup>1</sup>	42	125
1995	90 <sup>1</sup>		

<sup>1</sup> Deep-sea *S. mentella* and *S. marinus* combined. <sup>2</sup> *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 been a reduction of effort in Sub-area XIV but an increase in Division Va.

**State of stock:** The stock is presently at a very low level and may be outside safe biological limits. CPUE indices from the Icelandic survey and fishery in Division Va show a considerable decline (65% and 42%, respectively) in fishable biomass (>31 cm) since 1986. 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 and 15% of the 1977 level. Fishing mortality was estimated to be about 0.28 on fully recruited age groups in Division Va.

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

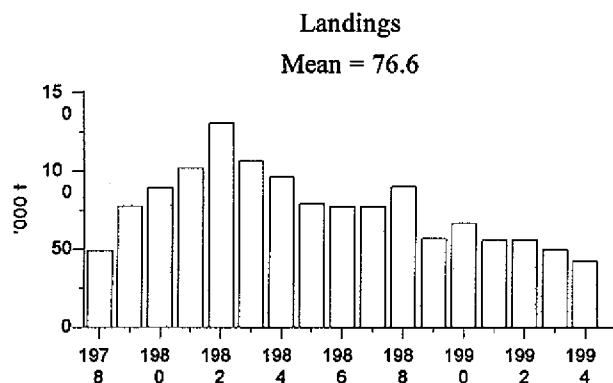
Little is known about the state of that part of the stock in Division Vb.

**Management advice:** ACFM recommends a reduction in fishing mortality in Division Va to at least the 1986-1990 level. Such a reduction corresponds to a TAC in Division Va in 1996 of about 28,000 t and would stabilise the stock at present levels. For Division Vb and Sub-area XIV ACFM advises a precautionary TAC set at an average of the catches in the period 1989-1994 (4,300 t).

**Data and assessment:** Age-based production model for Division Va. CPUE data from Icelandic survey and fishery in Division Va. CPUE from German groundfish survey in Sub-area XIV, and a combined redfish CPUE from the Faroes fishery in Division Vb.

**Source of information:** Report of the North-Western Working Group, May 1995 (C.M.1995/Assess:19).

(Details in table 3.2.5 b.1)



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

Catch data (Table 3.2.5 c.1):

Year	Rec. TAC	Deep-sea <i>S. mentella</i> ACFM catch	Combined ACFM catch <sup>1</sup>
1987	<83 <sup>1</sup>	38	115
1988	<84 <sup>1</sup>	31	121
1989	117 <sup>1</sup>	54	111
1990	116 <sup>1</sup>	44	111
1991	117 <sup>1</sup>	67	123
1992	116 <sup>1</sup>	62	118
1993	120 <sup>1</sup>	75	124
1994	100 <sup>1</sup>	82	125
1995	90 <sup>1</sup>		

<sup>1</sup> Deep-sea *S. mentella* and *S. marinus* combined.

<sup>2</sup> Deep-sea *S. mentella* only. Weights in '000 t.

**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 1980's. This is 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 are substantial catches of small redfish in Sub-area XIV.

(Details in Table 3.2.5 c.1)

**State of stock:** It is not possible to evaluate the state of the stock in terms of an historical perspective. CPUE for the Icelandic trawlers fishing in Division Va, however, has shown a 47% decline from a stable level before 1990. In Sub-area XIV the German groundfish survey shows that adult deep-sea *S. mentella* above 30 cm have almost disappeared.

**Forecast:** A *status quo* forecast assuming a further decline in CPUE gives a predicted catch in 1996 of 45,000 t in Division Va.

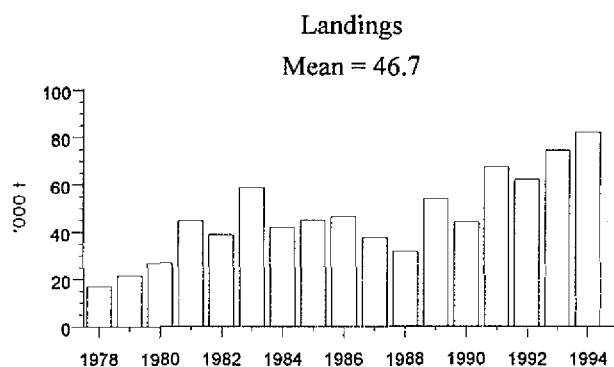
**Management advice:** If a precautionary TAC is set for this stock ACFM advises that it should not exceed 45,000 t for Division Va. In addition, catches in Division Vb, and Sub-areas VI and XIV should be no higher than the average catches in the years 1992-1994 (23,000 t).

**Special comments :** The catch forecast for Division Va is based on commercial CPUE. It assumes that the decline in CPUE will be maintained but that effort in 1996 will remain at the same level.

See also Special Comment on stock identification in Section 3.2.5 d.

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

**Source of information:** Report of the North-Western Working Group, May 1995 (C.M.1995/Assess:19).



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

Catch data (Tables 3.2.5 d.1-3.2.5 d.2):

Year	Rec TAC	ACFM catch
1987		91
1988		91
1989		38
1990		32
1991	66	25
1992	1	66
1993	~50	115
1994	100	99
1995	100	

(Weights in '000 t)

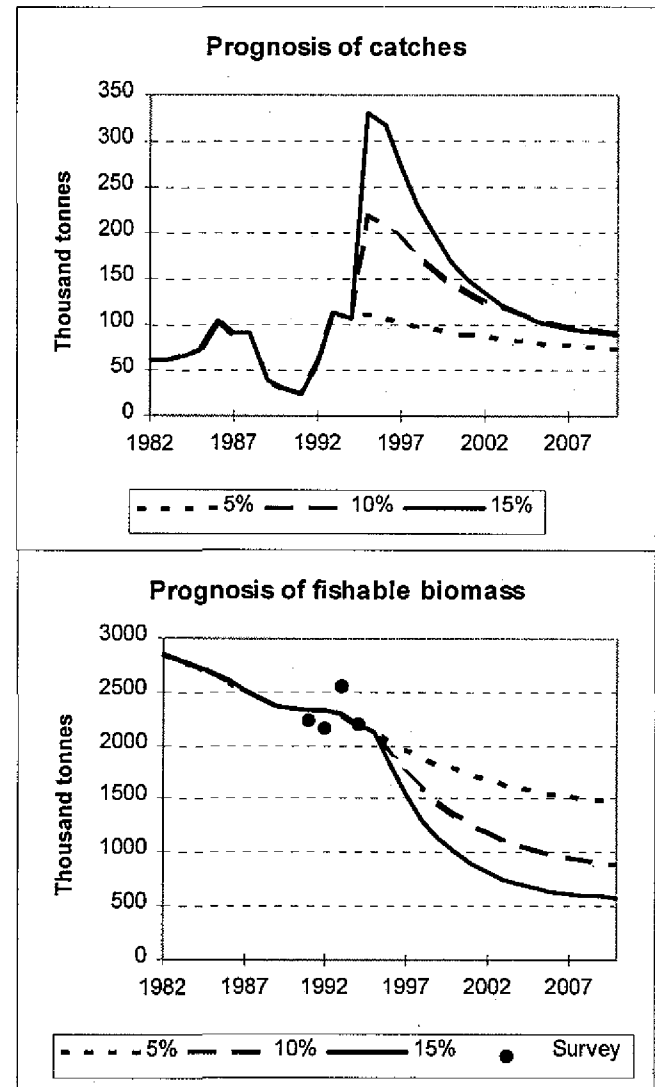
<sup>1</sup>Preference for no major expansion of the fishery

**Historical development of the fishery:** The fishery started in 1982. After decreasing from 1988 to 1991 landings increased again. This decrease was mostly due to a reduction in Russian effort. The catches from Sub-area XII have since 1993 been greater than those in Sub-area XIV. The increase in the catches since 1991 is a direct consequence of increased fishing effort due to new fleets entering the fishery.

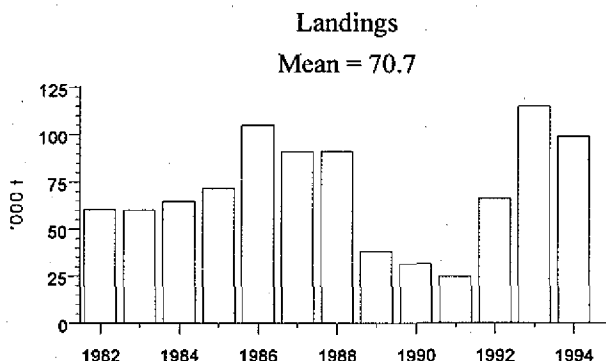
**State of stock:** The stock is considered to be within safe biological limits. Acoustic surveys from 1991-1994 indicate the stock biomass to be in the range 1.9 to 2.6 million tonnes in the area surveyed to date, but the productivity of the stock is uncertain. The present fishing mortality on fully-recruited ages is estimated to be about 0.06. No information is available on recruitment.

**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:

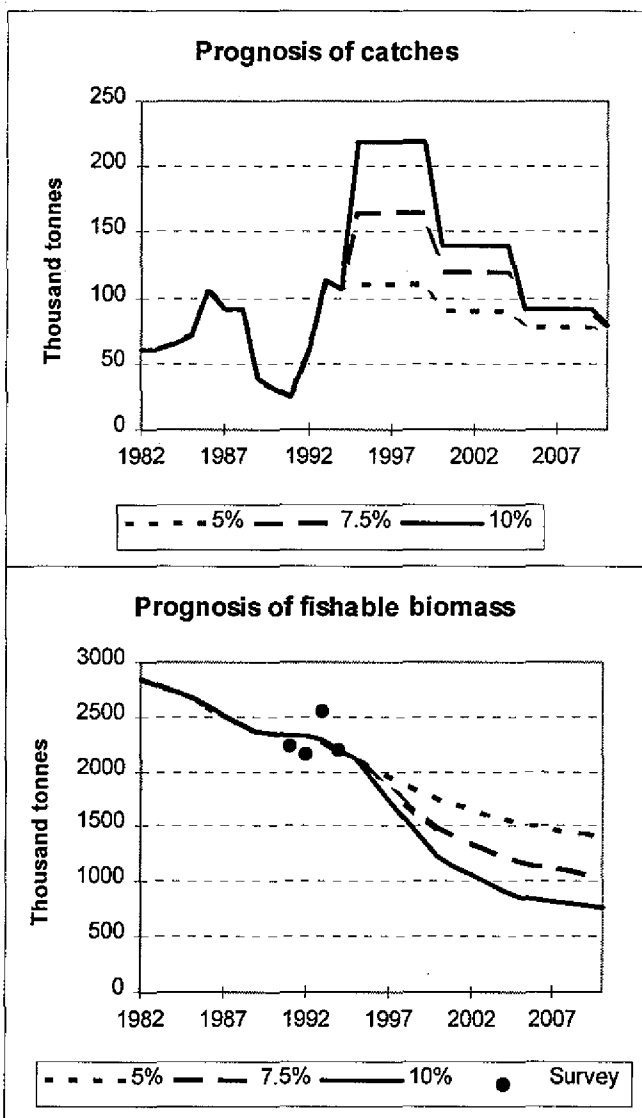
**Scenario 1, Proportional harvesting** The quota each year is set at a certain percentage (5-15%) of the spawning stock biomass.



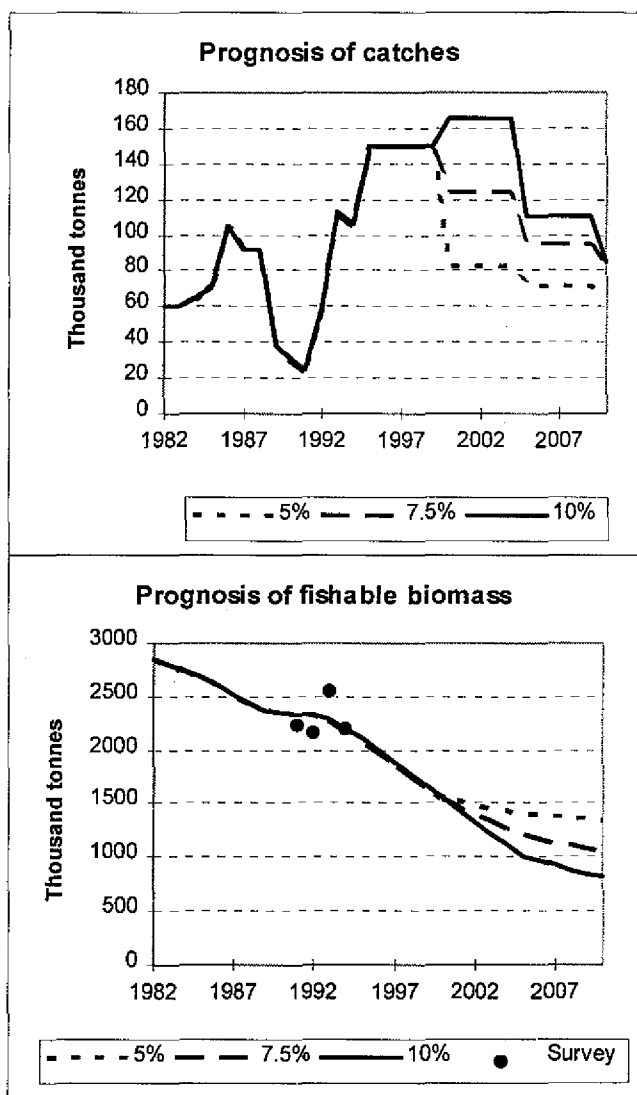
(Details in Table 3.2.5 d.3)



**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 in the beginning of each 5-year period.



**Scenario 3. Fixed TAC to 1999 of 150,000t.** A scenario is also presented with a constant catch of 150,000 tonnes each year prior to 1999, and a catch in later years set at a certain percentage (5-10%) of the fishable biomass in the beginning of each 5-year period



All the above scenarios show a gradual decline in the spawning stock over the simulation period to approximately 50% of the virgin stock biomass. Thus, the harvesting strategy does not reach an equilibrium SSB over this period. However, the SSB at half virgin biomass can probably be considered to be within safe levels.

**Special comments:** The medium-term predictions evaluate management strategies which are sometimes considered in more general settings. Such approaches need to be considered in more detail in the future, with an emphasis on quantifying uncertainty in such a fashion as to allow tabulation of e.g. medium-term catches vs 'risk of depletion'. This is particularly the case for Oceanic *S. mentella*. In order to complete such a task, ACFM ideally needs some guidance on appropriate target levels and criteria for

evaluating strategies, e.g. on possible aversion to catch reduction and on interannual variation of catch.

The scenarios considered above are not sufficient to define a sustainable harvesting strategy, partly because the simulations do not reach an equilibrium SSB and partly because the model parameters are not well defined. A strategy which explicitly attempted to maintain the SSB above or close to 50% of virgin biomass, however, is very likely to be sustainable.

Information on recruitment is lacking. The stock may 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 localize nursery areas to achieve knowledge about recruitment.

Since this is an expanding fishery, ACFM 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 1982-1994 was reviewed by ACFM. In general, there appears to be a southwestward 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. 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.

**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 this stock component. 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 ACFM 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. Acoustic estimates are available for a given area in 1991, 1992, 1993 and 1994.

**Source of information:** Report of the North-Western Working Group, May 1995 (C.M.1995/Assess:19) and Report of the Joint Icelandic/Norwegian Survey on Oceanic Redfish in the Irminger Sea and Adjacent Waters, in June/July 1994 (C.M. 1994/G:44).

### 3.2.6 Icelandic summer-spawning herring (Division Va)

Catch data (Table 3.2.6.1):

Year	Rec. TAC	Agreed TAC	ACFM catch
1987	70	72.9	75
1988	100	90	92
1989	90	90	101
1990/91	90	100	106
1991/92	79	110	109
1992/93	86	110	107
1993/94	110	110	103
1994/95	83 <sup>1</sup>	130	134
1995/96	120 <sup>1</sup>	110	

<sup>1</sup> Catch at  $F_{0.1}$ . 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 BRT, operating purse seine and drift net.

In later years the vessels have increased in size (up to 1500 BRT) and are highly specialised purse seiners operating both in the herring and capelin fisheries. Some vessels have converted to demersal fisheries in the most recent years.

**State of stock:** The stock is considered to be within safe biological limits. The spawning stock biomass is currently at a historically high level. 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 (0.21).

Details in Table 3.2.6.2.

**Forecast for the 1996/97 season:**

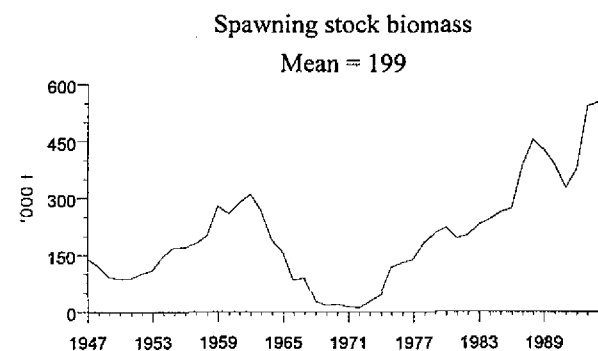
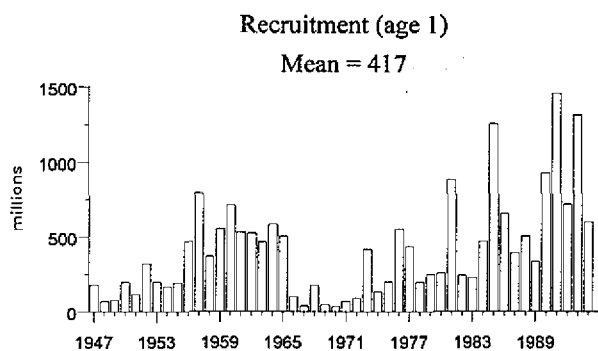
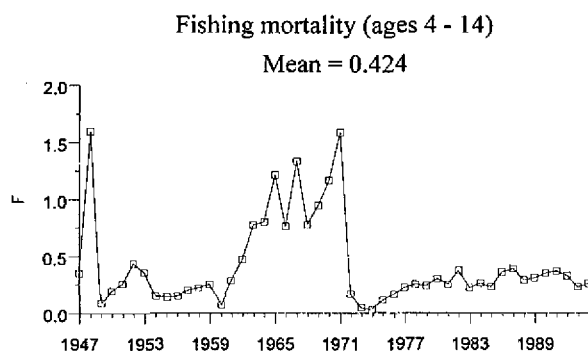
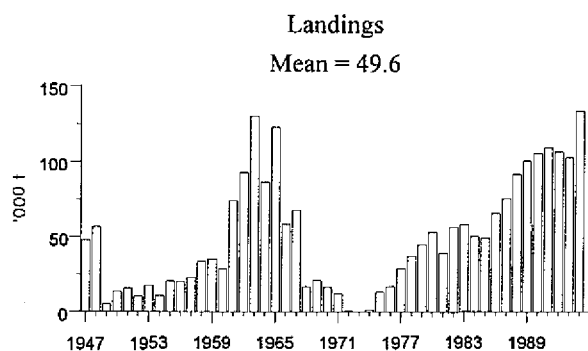
$SSB_{(95)} = 587$ ,  $F_{(95)} = 0.22$ , Basis: TAC, Catch<sub>(95/96)</sub> = 107

Option	Basis	F (96)	SSB (96)	Catch (96)	Lndgs (96)	SSB (97)
A	0.4 $F_{94}$	0.11	587	58	58	625
B	0.6 $F_{94}$	0.16		84	84	599
C	0.8 $F_{94} = F_{(0.1)}$	0.21		110	110	573
D	1.0 $F_{94}$	0.26		134	134	549
E	1.2 $F_{94}$	0.32		157	157	529

Weights in '000 t. F values are weighted and do not correspond exactly with those in Table 3.2.6.2.

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



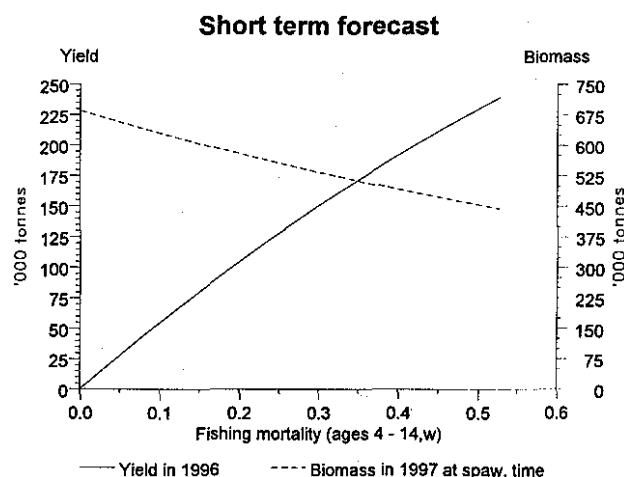
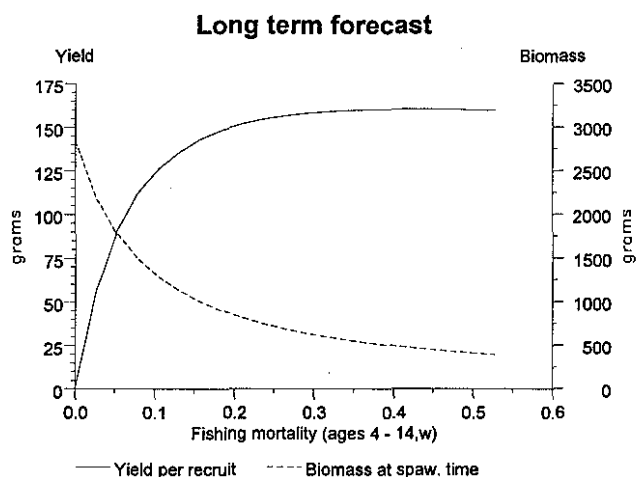
show that there is little probability that the current harvest strategy will reduce the stock to low levels. These simulations are sensitive to the assumed relationship between recruitment and SSB. Moreover, the simulations assume a low and constant natural mortality for all age groups. The role of herring in the ecosystem at Iceland is currently not well known and the results of ongoing studies may influence the medium-term perspective for this stock.

**Management advice:** ACFM notes that 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:** Analytical assessment based on catch, acoustic survey and catch-at-age data is considered reliable.

**Source of information:** Report of the Atlanto-Scandian Herring, Capelin and Blue Whiting Assessment Working Group, October 1995 (C.M. 1996/Assess:8).

### Yield and Spawning Stock Biomass



### 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	Precautionary TAC <sup>1</sup>	Rec TAC <sup>2,3</sup>	ACFM catch <sup>3</sup>
1987	500	1,115	1,116
1988	900	1,065	1,037
1989	900		808
1990	600	250	370
1991	0	740	677
1992	500	900	787
1993	900	1,250	1,179
1994	950	950	864
1995	800		

(Weights in '000 t) <sup>1</sup>TAC set for July-December part of the season. <sup>2</sup>July-March of following year. <sup>3</sup>Final TAC recommended by national scientists for whole season.

**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.

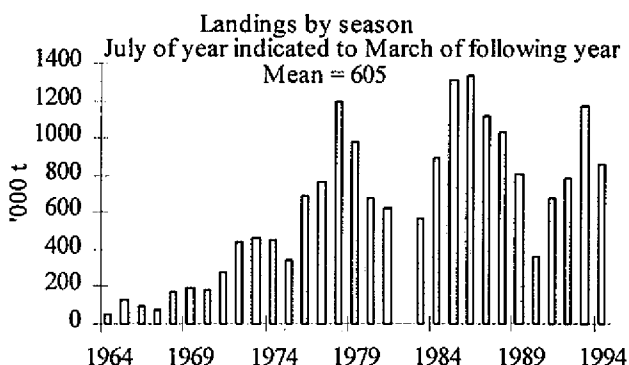
After being low in the 1989/90 and 1990/91 seasons, catches have been increasing. Because of difficult fishing conditions for considerable periods, the TAC was not taken in the last seasons.

The fishery is managed by aiming at maintaining a residual spawning stock biomass of 400,000 t.

**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)

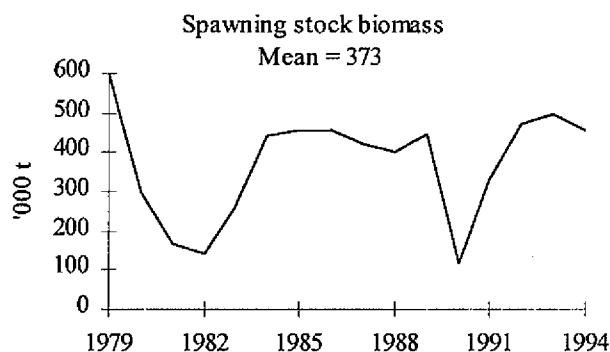
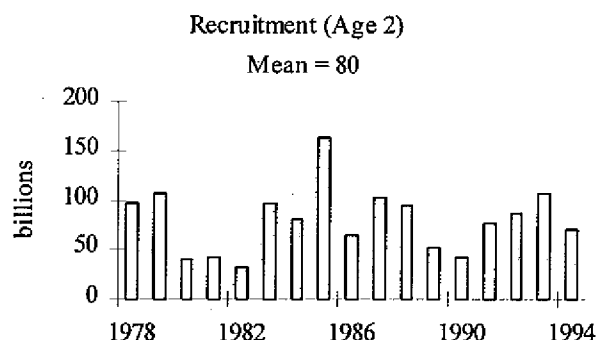


**Forecast:** Acoustic surveys and a regression-based prediction model give a prediction of stock numbers at 1 October 1995 as 92.5 and 14.9 billion 2- and 3- group capelin respectively. This corresponds to a fishable (mature) biomass of 1.9 million t at the beginning of the season. A catch of 1.2 million t is then expected to leave 400,000 t for spawning.

**Management advice:** In order to ensure a spawning stock biomass of 400,000t in March 1996 ACFM recommends that the precautionary TAC for the first half of the 1995/96 season should not exceed 800,000 t.

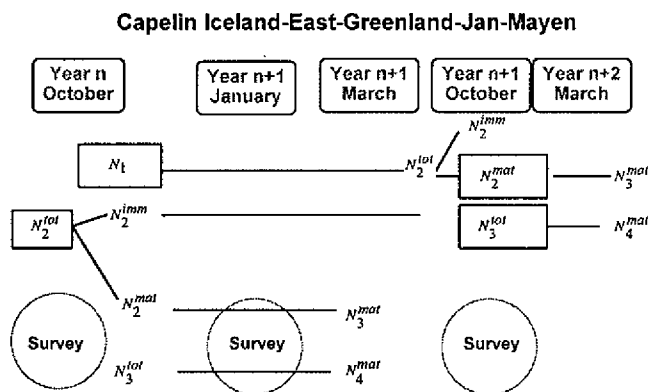
ACFM recommends that the data from the surveys in October-November 1995 and January-February 1996 be used when the final TAC is set for the 1995/96 season.

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 precautionary TAC computations are based on the method which was first used in 1992. 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 ( $N_3^{mat}$ ). The relevant relationships are indicated below:



In the 1989/90 season the TAC was overestimated by one third. Therefore to reduce the risk of overexploitation the precautionary TAC for the summer-autumn part of the season is 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 Atlanto-Scandian Herring and Capelin Working Group, October 1994 (C.M. 1995/Assess:6) and Working Paper presented to ACFM, April 1995.



### 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 the cod catches have increased considerably compared to 1994; catch rates have also increased.

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 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. Given the restrictive TAC's for cod and haddock and allocation of cod and haddock quotas to most fleet categories, it is not likely that the high TAC for saithe will be taken. Species under the quota system are Faroe Plateau cod, haddock, saithe, redfish and Faroe Bank cod.

Generally the catch and effort data for Faroese stocks have been of high quality. However, the introduction of the quota system has resulted in discarding and misreporting and therefore in a deterioration of the data used in the assessment. Reorganisation of enforcement and control have so far not solved the problems.

**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 poor since the middle of the 1980s. This applies also for 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 like sandeel and Norway pout has been good and the growth of fishes like cod, haddock and saithe has improved considerably.

**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 biologically acceptable levels and consequently advised no fishing. In 1994 the SSB of Faroe saithe was assessed to be a little above the lowest on record. Although the stocks are gradually recovering, they still are at a low level.

The cod stock on Faroe Plateau has shown an increase, but is still considered to be well below the minimum biologically acceptable level. The haddock stock is also considered to be outside safe biological limits although it is expected to increase by 1997. The saithe stock is within or at safe biological limits. The state of the cod stock on Faroe Bank is not known.

For saithe and haddock, ACFM recommends that fishing mortality in 1996 should not be allowed to increase. For Faroe Plateau cod, on the other hand, ACFM recommends that fishing mortality should be kept at the lowest possible level in 1996.

### 3.3.2 Faroe saithe

Catch data (Tables 3.3.2.1-3.3.2.2):

Year	Rec TAC	Agreed TAC	ACFM landings
1987	<32		40
1988	<32		45
1989	40		44
1990			62
1991	30		55
1992	27		38
1993	<37		33
1994	26	42 <sup>1</sup>	33
1995	22	39 <sup>1</sup>	

(Weights in '000 t)

<sup>1</sup>In 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 since the declaration of EEZs it is now largely a Faroese fishery.

It appears unlikely that the TAC will be taken in 1995.

**State of stock:** The stock is considered to be within or at safe biological limits. Despite a high level of recruitment during the 1980s, the SSB has decreased significantly due to high fishing mortalities and reduced growth. Presently, the stock is estimated to be increasing. Recent growth rates have increased from the low level observed in 1990–1991. Fishing

mortality peaked in 1991, but appears to have decreased somewhat since then.

(Details in Table 3.3.2.3).

**Forecast for 1996:**

SSB(95) = 90, F(95) = 0.41, Basis: F(95) = F(94), Catch(95) = 35, Landings(95) = 35.

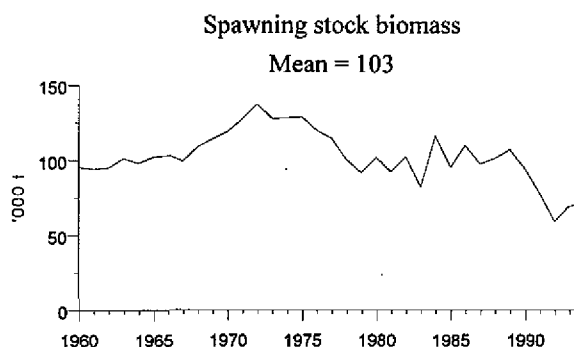
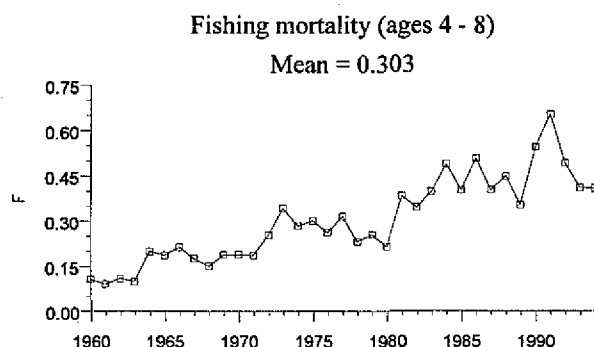
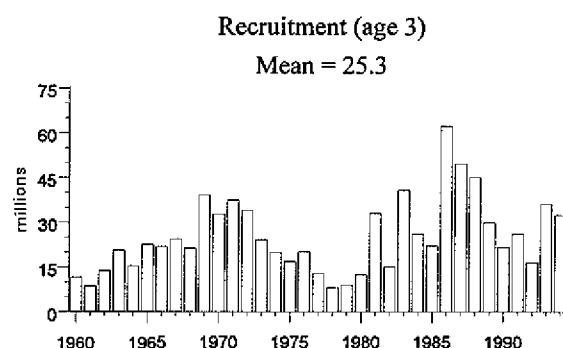
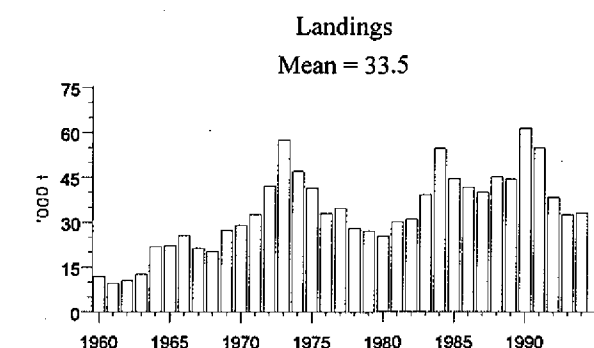
Option	Basis	F (96)	SSB (96)	Catch (96)	Lndgs (96)	SSB (97)
A	0.4 F(94)	0.16	85	18	18	111
B	0.6 F(94)	0.25		25	25	103
C	0.8 F(94)	0.33		33	33	97
D	1.0 F(94)	0.41		39	39	90
E	1.2 F(94)	0.49		45	45	84

(Weights in '000 t)

A-C The SSB is expected to increase from current low levels but with substantially reduced catches for the lowest F values.

D-E The SSB stabilises at levels somewhat above the recent lowest recorded levels. Catches increase above the lowest value seen in 1993.

**Management advice:** ACFM recommends that fishing mortality should not be allowed to increase corresponding to a catch of not more than 39,000 t in 1996.



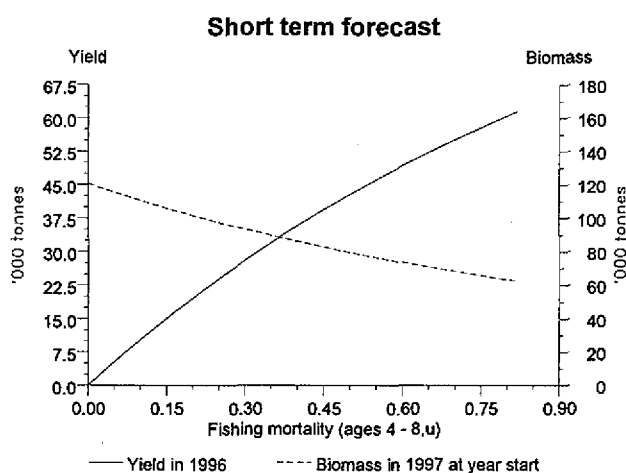
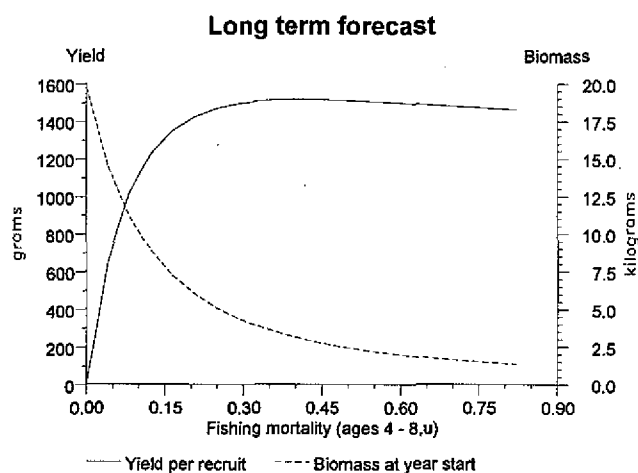
**Special comments:** It should be noted that saithe and haddock are caught in a mixed fishery with cod. Given the state of the cod stock, management measures for saithe and haddock should ensure the greatest protection for the cod stock.

There are indications of the 1992 year class being small.

**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 1995 (C.M.1995/Assess:19); J.-J. Maguire *et al.* 1995. ACFM Working Paper on Groundfishes in the Faroes.

### Yield and Spawning Stock Biomass



### 3.3.3 Cod

#### 3.3.3.a Faroe Plateau cod (Sub-division Vb<sub>1</sub>)

Catch data (Tables 3.3.3.a.1–3.3.3.a.2):

Year	Rec. TAC	Agreed TAC	ACFM catch
1987	<31		21.4
1988	<29		23.2
1989	<19		22.1
1990			13.5
1991	16		8.7
1992	20		6.5
1993	0		5.8
1994	0	8.5/12.5 <sup>1,3</sup>	9.0
1995	0	10 <sup>1</sup>	

Weights in '000 t.

<sup>1</sup> In the quota year 1 September–31 August the following year.

<sup>2</sup> F at lowest possible level.

<sup>3</sup> The TAC was increased during the quota year

**Historical development of the fishery:** Cod are part of a mixed demersal fishery which initially was international. Following the declaration of EEZs in the 1970s, the fishery became largely Faroese and fishing mortality declined in this period. Since then fishing mortality has increased to high

levels. Most of the vessels involved are trawlers and longliners.

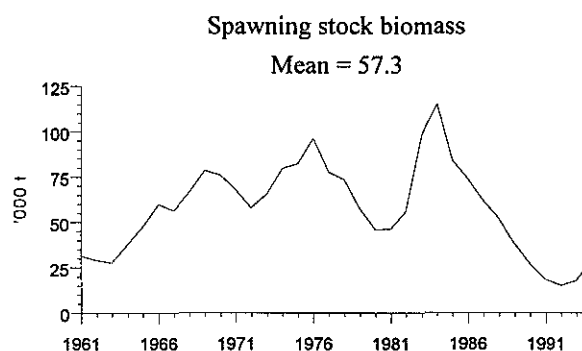
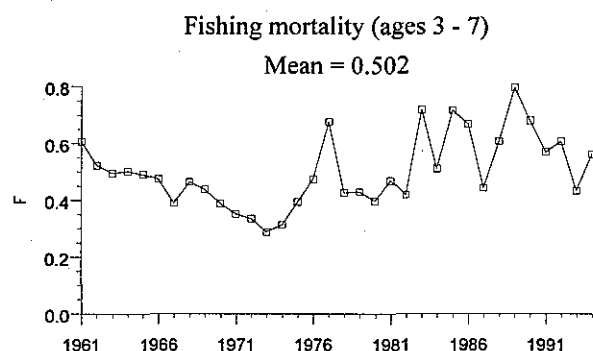
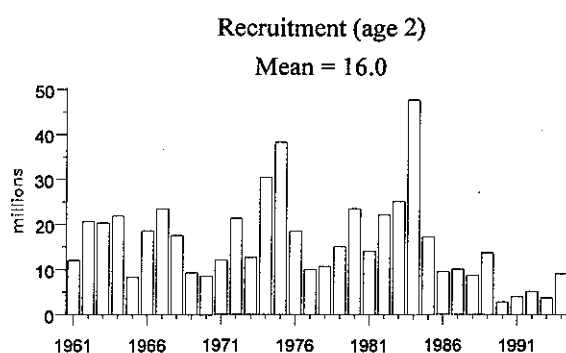
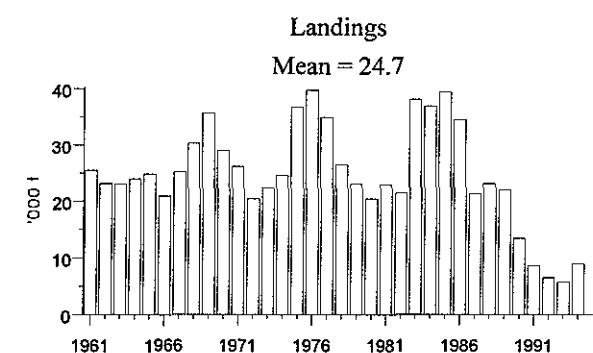
**State of stock:** The stock is considered to be outside safe biological limits and well below the Minimum Biologically Acceptable Level (MBAL) of 52,000 t. Due to the combined effect of high fishing mortality and poor recruitment since 1984 the SSB is at a very low level. In the most recent years it has increased, however. (Details in Table 3.3.3.a.3). The decrease in the SSB between 1994 and 1995 is primarily due to a change in the rate of maturation of incoming year classes. The growth rate of the stock has fluctuated around a long-term declining trend over the last three decades. At present, however, there is evidence of a short-term increase in growth rate.

#### Forecast for 1996:

Basis: catch prognosis for 1995 (12,000 t taken by 1 October extrapolated to 18,000 t for the whole year including estimated misreporting), Catch(95) = 18, Landings(95) = 18, F(95)=1.47, SSB(95) = 20.

Option	Basis	F(96)	SSB (96)	Catch (96)	Landgs (96)	SSB (97)
A	No fishing	0.0	25	0	0	47
B	0.4F(94)	0.22		3.9	3.9	42
C	0.6F(94)	0.34		5.7	5.7	40
D	0.8F(94)	0.45		7.3	7.3	39
E	1.0F(94)	0.56		8.8	8.8	37
F	1.2F(94)	0.68		10.3	10.3	35

Weights in '000 t.



- A SSB increases to close to MBAL
- B-E The TAC will not be taken; SSB approximately doubles by 1997 compared to the 1995 level.
- E TAC would be overshoot. SSB by 1997 nearly double the SSB in 1995.

**Medium-term considerations:** Evaluation of the medium-term effect of implementing a catch limit of 10,000 t for 1996 and onwards suggests that the probability of stock recovery to MBAL in 1998 for these fixed TAC regimes is very low (see Figure on next page). These results are dependent on the estimate of incoming year classes which cannot be estimated with adequate precision at present.

**Management advice:** ACFM recommends that fishing mortality be kept at the lowest possible level in 1996.

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

All data sources available indicate that the spawning stock biomass in recent years has been increasing but is still below MBAL. The sources are, however, not consistent in the indications of the strength of this recovery.

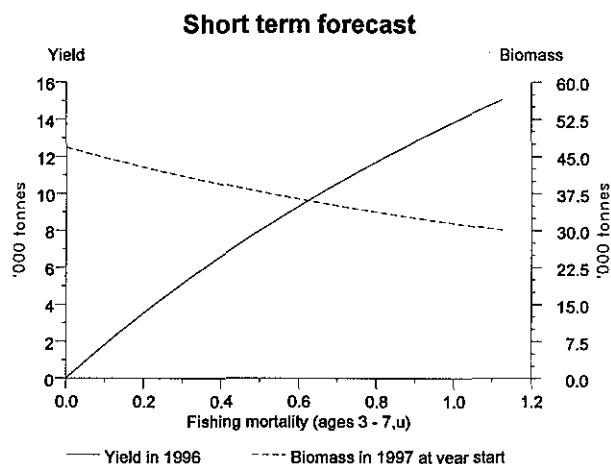
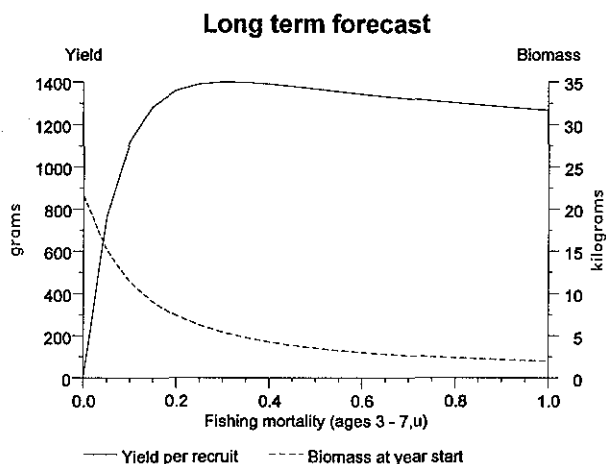
In 1995 catch per unit effort has increased considerably, both in the survey and in the fishery. The increase in CPUE applies to all age groups and can therefore not be explained by an increased recruitment alone. It seems that the availability of the stock to both the fishery and the survey has increased in 1995. This indicates that the behaviour or the distribution of the stock has changed.

The high catches in 1995 result in fishing mortalities being set at very large values in 1995 in the prediction to produce expected catches in the intermediate year.

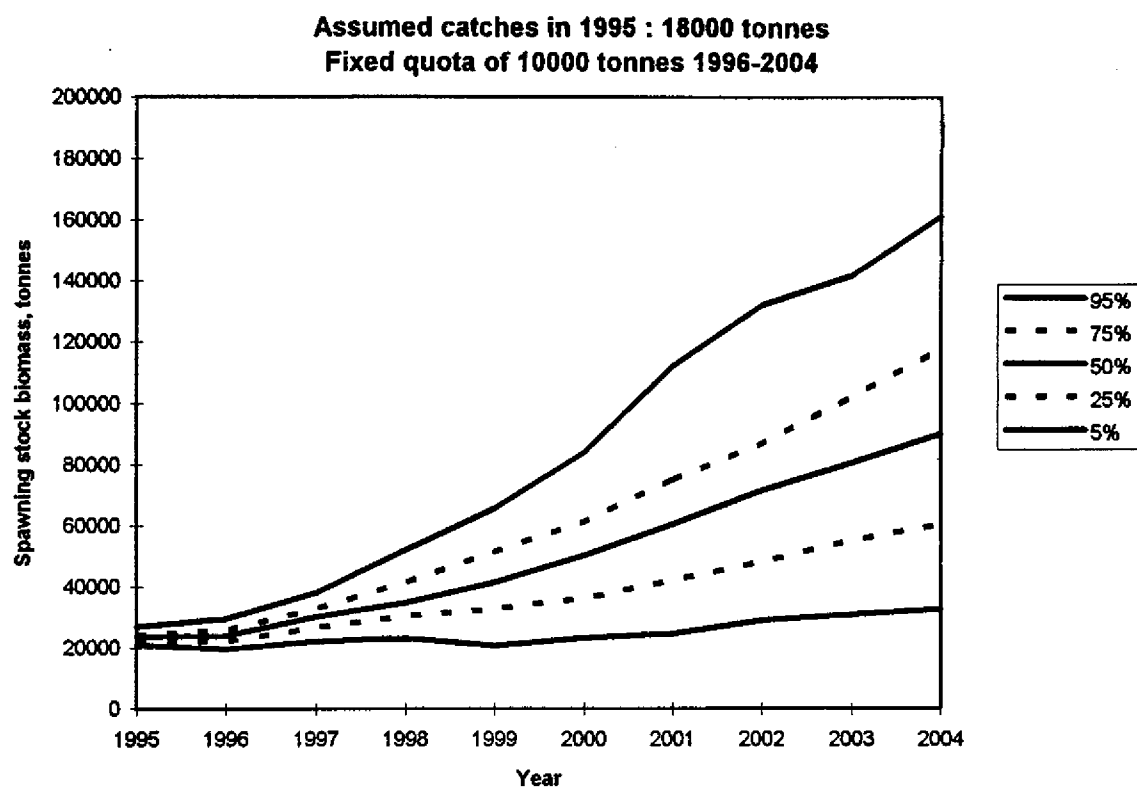
**Data and assessment:** Analytical assessment using catch at age data tuned with groundfish survey series and 3 commercial CPUE series. Survey data from 1995 are not included in the assessment.

**Source of information:** Report of the North-Western Working Group, May 1995 (C.M.1995/Assess:19); J.-J. Maguire *et al.* 1995. ACFM Working Paper on Groundfishes in the Faroes.

## Yield and Spawning Stock Biomass



$q = 10001$



Faroe Plateau cod. Risk analysis with Ricker stock-recruitment relationship



### 3.3.3.b Faroe Bank cod (Sub-division Vb<sub>2</sub>)

Catch data (Table 3.3.3 b.1):

Year	Rec. TAC	Off. Indgs.
1987		3.5
1988		3.1
1989		1.4
1990		0.6
1991		0.4
1992	0.3	0.3
1993	0.5	0.4
1994	0.5	0.7 <sup>1</sup>
1995	0.5	

Weights in '000 t. <sup>1</sup> Provisional

**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 mainly consists of longliners.

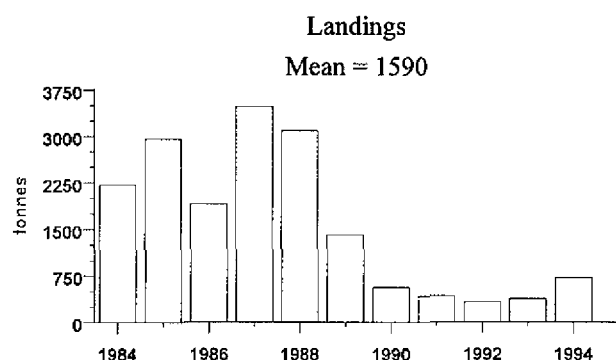
**State of stock:** Not known. The Faroese groundfish surveys of the Bank indicate a steady significant decline in the stock from 1984 to 1990 after which a slight increase has been observed. Catch and effort data for long liners fishing at the Faroe Bank indicate a similar trend in the CPUE observed in the groundfish surveys.

**Management advice:** In view of the uncertainties about the state of this stock, ACFM advises that a precautionary TAC of not more than 500 t be set for the whole Bank area (<350 m depth) in 1996.

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

**Source of information:** Report of the North-Western Working Group, May 1995 (C.M.1995/Assess:19).

(Details in Table 3.3.3 b.2).



### 3.3.4 Faroe haddock

Catch data (Tables 3.3.4.1–3.3.4.2):

Year	Rec. TAC	Agreed TAC	ACFM catch
1987	<17		14.9
1988	<18		12.2
1989	<11		14.3
1990			11.7
1991	11		8.4
1992	13-15		5.5
1993	<8		3.8
1994	0	6.2	4.3
1995	0	6.2	

Weights in '000 t.

**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. Since then fishing mortality has increased but remains below the highest levels observed. Most of the vessels involved are trawlers and longliners.

**State of stock:** The stock is considered to be outside safe biological limits at present. However, this situation is expected to improve significantly by 1997 if recruiting year classes are as abundant as predicted. The 1993 and 1994 year

classes appear to be above average. Fishing mortality is currently about half the highest values observed in the 1960s. (Details in Table 3.3.4.3).

Forecast for 1996:

$F(95) = 0.24$ , Basis:  $F(95)=F(94)$ ,  $Catch(95) = 5.4$ , Landings  $(95) = 5.4$ ,  $SSB(95) = 19$ .

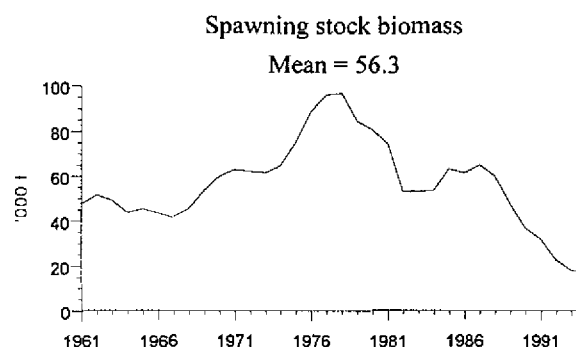
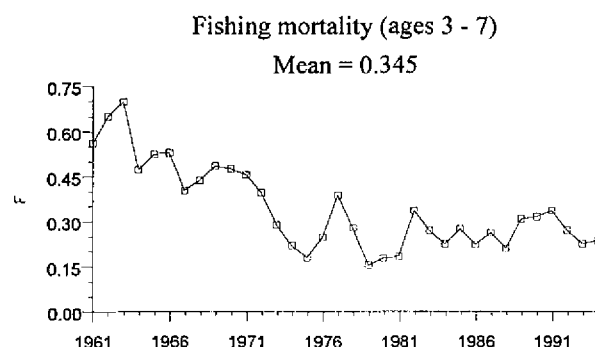
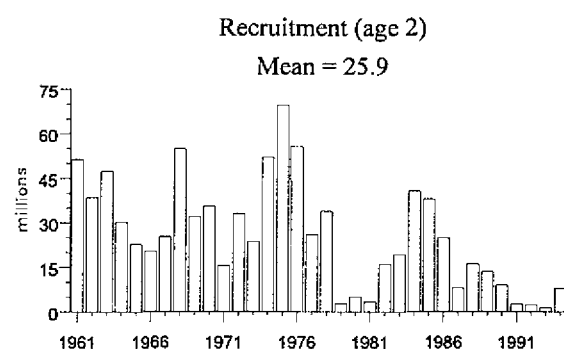
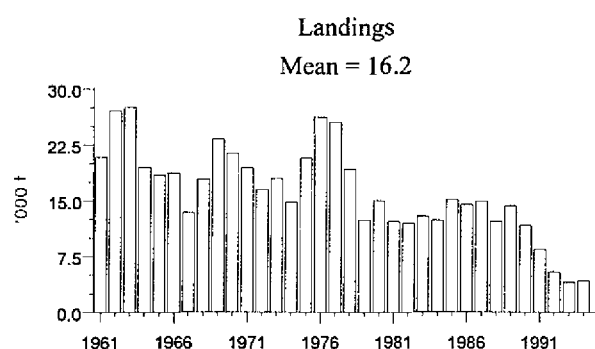
Option	Basis	F(96)	SSB(96)	Catch (96)	Landgs (96)	SSB(97)
A	No catch	0	27	0	0	50
B	0.4F(94)	0.09	27	3.6	3.6	46
C	0.6F(94)	0.14	27	5.2	5.2	44
D	0.8F(94)	0.19	27	6.8	6.8	42
E	1.0F(94)	0.24	27	8.3	8.3	41
F	1.2F(94)	0.28	27	9.7	9.7	39

Weights in '000 t.

A)–C) TAC of 6,200 t is undershot and SSB increases substantially.

D)–F) TAC is overshoot and SSB increases substantially.

**Medium-term considerations:** Medium-term projections are very uncertain due to the imprecision in the estimates of large recruiting year classes. However, the probability of a sustained recovery in the SSB during the period 1995–1998 is likely to be high given a fixed TAC of 6,200 t or a TAC set at one third of the SSB.



**Management advice:** ACFM recommends that fishing mortality should not be allowed to increase above the present level observed in 1994, corresponding to a catch of not more than 8,300 t in 1996.

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

Analysis of spawning stock and recruitment estimates indicate 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. However, the survey indices for the 1993 and 1994 year classes are the largest in the time series started in 1983, and hence these year

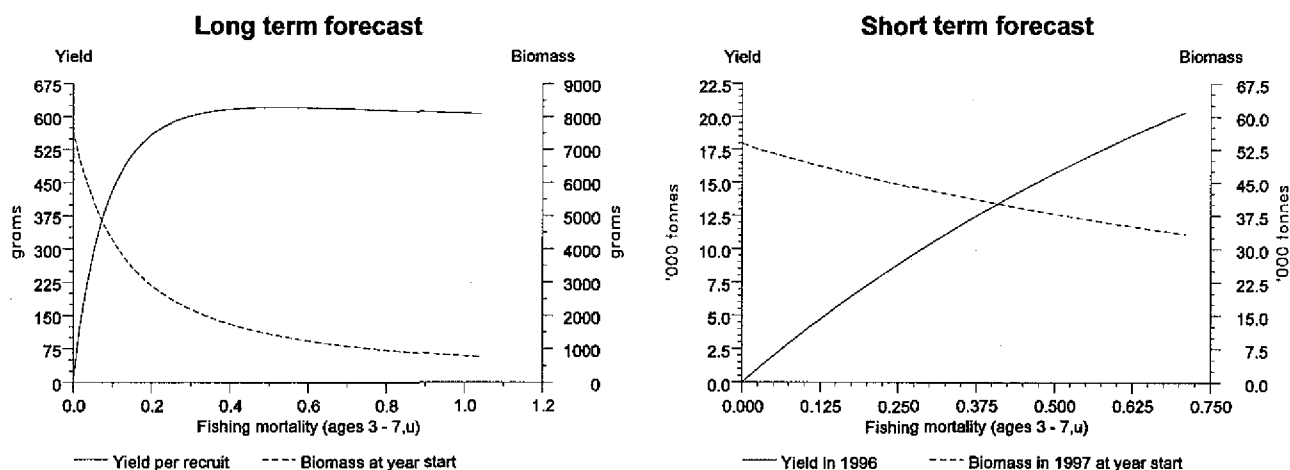
classes cannot be estimated with any precision. The stock forecast assumes that these large year classes are equal to the long-term arithmetic mean.

The mean weights at age have been increasing since 1992 and the available information from the 1st quarter of 1995 indicates that the increase continues at least in 1995 for ages two 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 1995 (C.M.1995/Assess:19).

## 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) are very diverse including gillnetters and Danish seiners exploiting flatfish and cod, demersal trawlers involved in various human consumption fisheries (roundfish, flatfish, *Pandalus* and *Nephrops*) and fisheries for reduction purposes (Norway pout and sandeel) and pelagic trawlers and purse seiners exploiting 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.

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, topology 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, both in terms of 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 cod (except for coastal populations in fjords), haddock, whiting and Norway pout.

For sandeel, the population structure in the North Sea and Skagerrak is probably a complex of several local populations rather than separate populations in the two areas, and there is therefore no biological reason to split these stocks along the North Sea/Skagerrak border.

There is no separate mackerel stock spawning in Division IIIa.

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. Both stocks have important components migrating into Division IIIa at some time during their life cycle. The juvenile herring in Division IIIa mainly originate from the North Sea stock 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 are found in the Skagerrak in summer.

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

There are difficulties in assessing several of these stocks separately. This is to a large extent because these stocks may not be separate from stocks in neighbouring areas, but problems with basic data are also important in some cases.

For most stocks the state of the stock is uncertain due to these difficulties. This applies to the herring spring spawners, sprat, sole, plaice, cod in the Skagerrak, haddock, whiting, Norway pout, sandeel and *Nephrops*. For sole, indications are that the stock has been at a high level recently but that recruitment has returned to average levels. For *Nephrops* there are indications of overexploitation.

For cod in the Kattegat indications are that the stock has been decreasing for two decades.

##### Environmental and ecosystem considerations

Parts of the area are strongly influenced by the dynamics of water exchange between the North Sea and the Baltic. The Kattegat has been exposed to high nutrient loadings and there have been problems with anoxic conditions in some recent years. The strong reduction in plaice abundance in the Kattegat has been associated with these problems but the relationship is not entirely clear.

### 3.4.2 Cod in Division IIIa

#### 3.4.2.a Cod in the Skagerrak

Catch data (Table 3.4.2.a.1):

Year	Rec. TAC <sup>1</sup>	Agreed TAC <sup>1</sup>	ACFM catch <sup>1</sup>
1987	<21	22.5	20.9
1988	- <sup>2</sup>	21.5	16.9
1989	<23	20.5	19.6
1990	21.0	21.0	18.6
1991	15.0	15.0	12.4
1992	- <sup>3</sup>	15.0	14.8
1993	- <sup>2</sup>	15.0	15.3
1994	- <sup>2</sup>	15.5	13.9
1995	- <sup>2</sup>	20.0	

<sup>1</sup> Norwegian fjords not included. <sup>2</sup>Precautionary TAC (based on recent catch levels). <sup>3</sup>Effort should be reduced, preferably by 30%. Weights in '000 t.

**Historical development of the fishery:** Catches are taken by trawl, seine and gillnet in directed and mixed fisheries. Landings have remained fairly stable in the last decade. The industrial by-catch was a large component of the catch but has decreased in recent years.

**State of stock:** The state of the stock is uncertain. This stock is part of or closely related to the North Sea stock. As in the

North Sea, spawning stock biomass has shown a decline over the period 1982 to 1993. There has been evidence from surveys of strong juvenile abundance in this area.

Details given in Table 3.4.2.a.2. In the figures at the foot of the page, the size of recent year classes is uncertain.

**Forecast for 1996:** Not available. A *status quo* prediction for 1996 is a catch of 26,000 t.

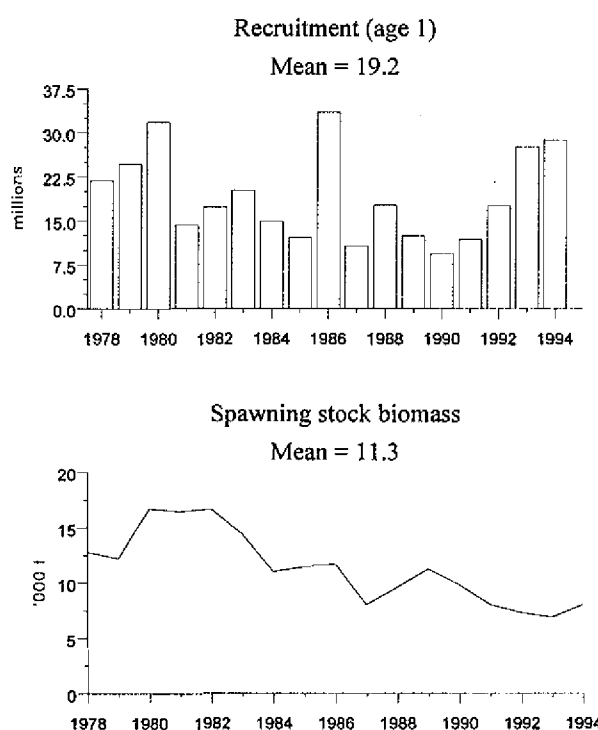
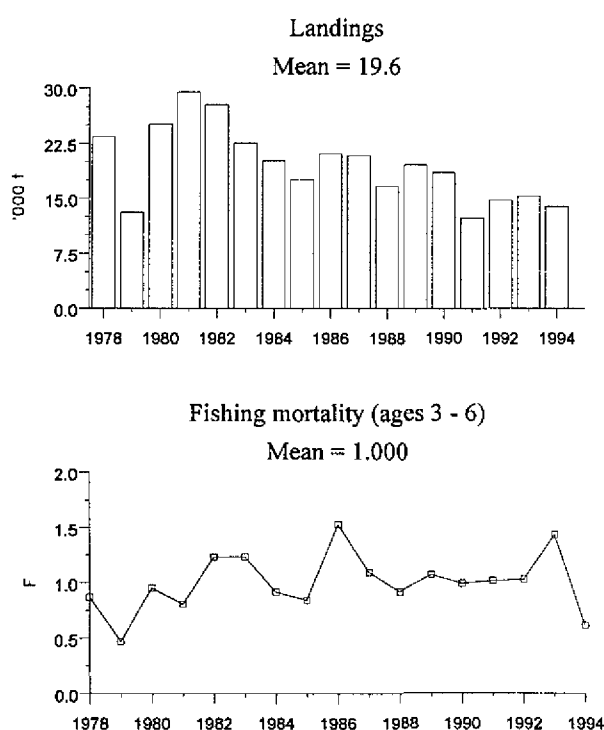
**Management advice:** ACFM recommends that if a TAC for cod in the Skagerrak is set for 1996, it should be set on a precautionary basis, taking into account the link with the cod in the North Sea.

**Special comments:** Recent research shows that cod in the Skagerrak are recruited from an influx of larvae and 0-group spawned in the North Sea. The Skagerrak cod could therefore, together with the North Sea cod, be considered as a single stock.

**Data and assessment:** Analytical assessment based on commercial CPUE and survey data. Industrial by-catches and discards not included. The assessment is assumed to be an indicator of long-term trends in the stock, but is not thought to be reliable for projection.

Analytical problems are due to nonreporting as well as misallocation of catches, and mixing between adjacent areas.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).



### 3.4.2 b Cod in the Kattegat

Catch data (Table 3.4.2 b.1):

Year	Rec. TAC	Agreed TAC	ACFM catch
1987	<13.0	15.5	11.5
1988	<15.0	15.0	5.5
1989	10.0	12.5	8.6
1990	7.0	8.5	5.9
1991	6.3	6.65	6.8
1992	<sup>1</sup>	6.65	6.3
1993	<sup>1</sup>	6.8	7.2
1994	<6.3	6.7	7.8
1995	<sup>2</sup>	6.7	

<sup>1</sup>Effort reduction. <sup>2</sup>Precautionary. 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.

**State of the stock:** The state of the stock cannot be estimated precisely. The spawning stock has declined steadily for two decades and reached a historically low level in 1991. The fishing mortality has more than

doubled over the same period. Due to recent improved recruitment the stock size is increasing. It is, however, evident that fishing mortality is high and that a continuation of this level will hamper stock recovery.

**Forecast:** Not available. Uncertainties in the data make the estimates of stock size and fishing mortality for recent years very variable and not useful for catch predictions.

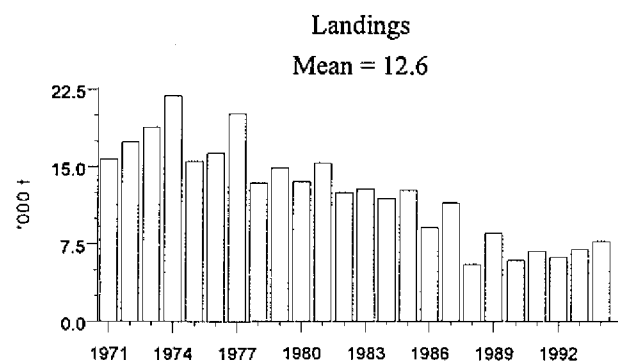
**Management advice:** ACFM recommends that fishing effort be reduced by at least 30% from the 1994 level.

**Special comments:** Although recent recruitment appears to have resulted in stock increases, the exploitation level is very high and will hamper stock recovery or lead to a rapid stock reduction if recruitment is again reduced in the future. It is not possible to advise on the basis of a forecast. In order to enable the stock to recover on a 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. An analytical assessment indicates stock trends but is too uncertain to provide a basis for forecasts.

**Source of information :** Report of the Working Group on the Assessment of Demersal and Pelagic Stocks in the Baltic, April 1995 (C.M. 1995/Assess:18).

(Details in Table 3.4.2 b.1)



### 3.4.3 Haddock in Division IIIa

Catch data (Table 3.4.3.1):

Year	Rec. TAC	Agreed TAC	ACFM catch <sup>3</sup>
1987	- <sup>1</sup>	11.5	5.3
1988	- <sup>1</sup>	10.0	4.4
1989	- <sup>1</sup>	10.0	4.5
1990	- <sup>1</sup>	10.0	6.1
1991	4.6 <sup>2</sup>	4.6	6.7
1992	4.6 <sup>2</sup>	4.6	9.0
1993	- <sup>1</sup>	4.6	4.4
1994	- <sup>1</sup>	10.0	4.0
1995	- <sup>1</sup>	10.0	

<sup>1</sup>Precautionary TAC based on recent catch levels.

<sup>2</sup>Precautionary TAC. <sup>3</sup>Including by-catches in small-mesh industrial fishery. Weights in '000 t.

**Historical development of the fishery:** 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 declined from the early 1980s and has remained fairly low.

**State of stock:** Unknown.

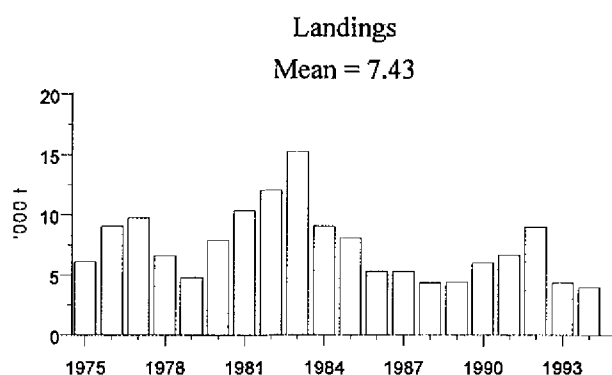
**Forecast for 1996:** Not available.

**Management advice:** ACFM recommends that if a TAC for haddock in Division IIIa is set for 1996, it should be set on a precautionary basis, taking into account a possible link with haddock in the North Sea.

**Special comments:** The stock identity is not clear but the Skagerrak stock is possibly related to the North Sea stock.

**Data and assessment:** Data for 1987-1990 for the industrial fishery are not available. An analytical assessment is not available at present.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess: 6).



### 3.4.4 Whiting in Division IIIa

Catch data (Table 3.4.4.1):

Year	Rec. TAC	Agreed TAC	ACFM catch <sup>2</sup>
1987	- <sup>1</sup>	17.0	16.7
1988	- <sup>1</sup>	17.0	11.8
1989	- <sup>1</sup>	17.0	13.2
1990	- <sup>1</sup>	17.0	19.3
1991	- <sup>1</sup>	17.0	14.1
1992	-	17.0	12.2
1993	- <sup>1</sup>	17.0	4.6
1994	- <sup>1</sup>	17.0	5.9
1995	- <sup>1</sup>	15.2	

<sup>1</sup>Precautionary TAC based on recent catch levels. <sup>2</sup>Includes 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.

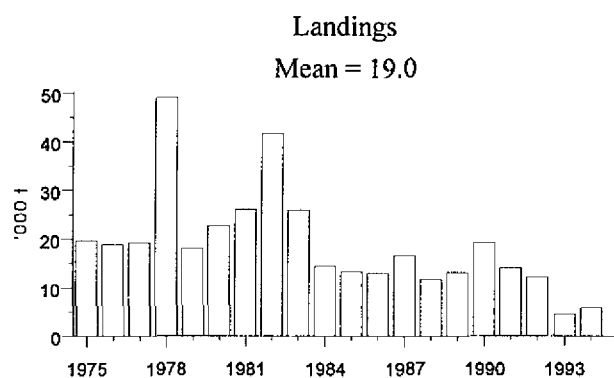
**State of stock:** Unknown.

**Forecast for 1996:** No projection is available.

**Management advice:** ACFM recommends that if a TAC for whiting in Division IIIa is set for 1996, it should be on a precautionary basis.

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

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess: 6).





### 3.4.5 Plaice in Division IIIa

Catch data (Table 3.4.5.1):

Year	Rec. TAC: <sup>1</sup>		Agreed TAC:		ACFM catch
	Kattegat	Skagerrak	Kattegat	Skagerrak	
1987	- <sup>2</sup>	- <sup>2</sup>	4.75	14.5	16.8
1988	3.7	- <sup>2</sup>	4.75	15.0	13.2
1989	2.9	- <sup>2</sup>	4.0	15.0	8.0
1990	1.3	10.0	2.0	11.0	12.4
1991	1.1 <sup>3</sup>	10.3 <sup>3</sup>	1.3	10.0	8.7
1992	14.0		2.8	11.2	12.4
1993	- <sup>2</sup>		2.8	11.2	11.6
1994	- <sup>2</sup>		2.8	11.2	11.9
1995	- <sup>2</sup>		2.8	11.2	

<sup>1</sup>From 1992 onwards recommended TACs are combined.

<sup>2</sup>Precautionary TAC. <sup>3</sup>In May 1991 ACFM revised its advice to 12.0 for both areas combined. Weights in '000 t.

**Historical development of the fishery:** Catches are taken by seine, trawl and gill net typically in mixed fisheries. The fishery has declined since the late 1970s especially in the Kattegat.

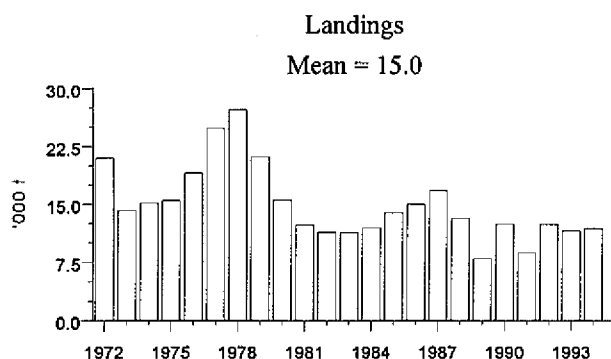
**State of stock:** The stock assessment is regarded as uncertain but suggests that fisheries mortality and yield have remained stable over the last decade.

**Forecast for 1996:** No projection is available.

**Management advice:** ACFM recommends that if a TAC for plaice in Division IIIa is set for 1996, it should be set on a precautionary basis.

**Data and assessment:** There are catch-at-age data available, but these are not considered to be reliable for the most recent year, and CPUE series from commercial fisheries. The assessment is not considered reliable for the current situation, and projection was impossible.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess: 6).



### 3.4.6 Sole in Division IIIa

Catch data (Table 3.4.6.1):

Year	Rec. TAC	Agreed TAC	ACFM catch
1987		0.85	0.72
1988		0.95	0.71
1989	<0.8	0.80	0.82
1990	0.6	0.50	1.05
1991	0.6	1.00	<sup>1</sup>
1992	1.0	1.40	<sup>1</sup>
1993	1.0	1.60	<sup>1</sup>
1994	-	2.10	1.20
1995	-	2.25	

<sup>1</sup>Uncertain data. Weights in '000 t.

**Historical development of the fishery:** Sole is mainly taken together with *Nephrops* and cod in trawls and in gill-nets directed at sole. Since 1987 the sole catches have been at a considerably higher level than previously, and 3-6 times the long-term average.

**State of the stock:** The stock size is not known precisely but both the fishery and surveys indicate that it has been

exceptionally high in the period 1988-1994. Surveys in 1995 indicate that recruitment is back to the level before 1988.

**Forecast:** Not available.

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

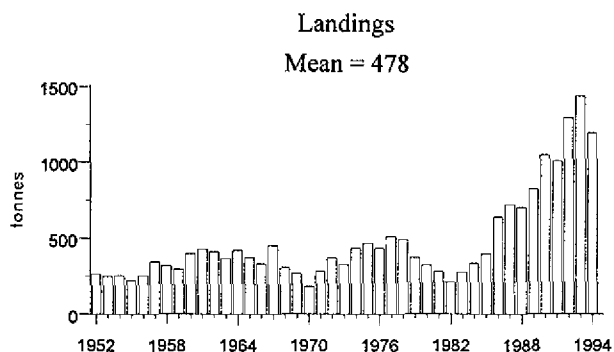
**Special comments:** Sole have also occurred in Sub-division 22 of the Baltic during the period of high recruitment.

Regulation of the mixed sole-*Nephrops*-cod 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 for 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 Working Group on the Assessment of Demersal and Pelagic stocks in the Baltic, April 1995 (C.M. 1995/Assess:18).

(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	Rec. TAC	Agreed TAC Skager-rak	Agreed TAC IIIa+ IVaE	Disc. slip.	ACFM Indgs	ACFM catch
1987				0.8	14.3	15.1
1988				0.8	12.0	12.9
1989		3.1 <sup>1</sup>		1.5	11.0	12.5
1990	10.0	2.75 <sup>1</sup>		1.7	10.2	11.9
1991	12.0	8.55		0.8	11.6	12.3
1992		10.5	15.0	0.7	13.0	13.7
1993		10.5	15.0	1.2	12.7	13.9
1994		12.6	18.0	0.4	11.7	12.1
1995		11.2	16.0			

<sup>1</sup>EU zone only. Weights in '000 t

**Historical development of the fishery:** Swedish and Norwegian catches increased in the last decade, while Danish catches decreased. Total landings are fairly stable fluctuating from 10 to 14 thousand t. All countries reduced fishing effort in 1993-1994.

**State of stock:** The stock is within safe biological limits. The spawning stock biomass increased in 1994 to a high level, due to the very rich 1992 year class. Both 1993 and 1994 year-classes are close to the average level.

Details given in Table 3.4.7.3.

**Forecast for 1996:** Recruitment of the 1995 year class set equal to the long-term average.

SSB(95)=15.7; F(95) = 0.64; Basis:F(95)=F(94); Catch(95) = 12.1; Landings(95) = 11.9

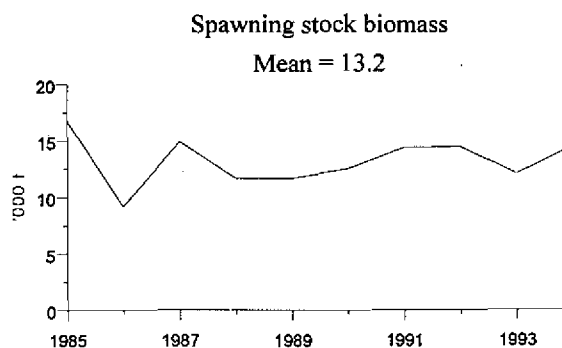
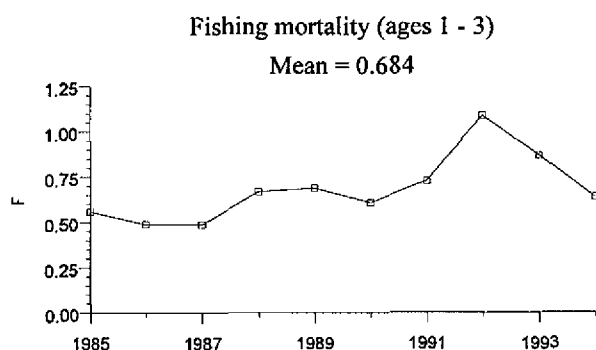
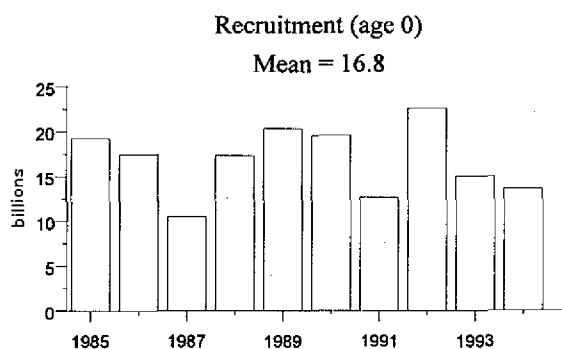
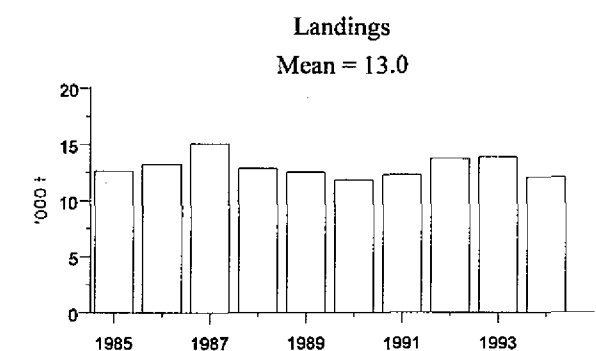
Option	Basis	F(96)	SSB (96)	Catch (96)	Landgs (96)	SSB (97)
A	0.4 F(94)	0.26	15.5	5.2	5.1	21.0
B	0.6 F(94)	0.39	15.1	7.4	7.2	19.0
C	0.8 F(94)	0.52	14.6	9.3	9.1	17.3
D	1.0 F(94)	0.64	14.2	11.0	10.7	15.8
E	1.2 F(94)	0.77	13.7	12.6	12.3	14.5

Weight in '000 t.

The SSB is predicted to decrease in 1996 but will increase again in 1997.

**Medium-term considerations:** *Pandalus* stocks in the North Sea are short lived and are very dependent on the recruiting year class.

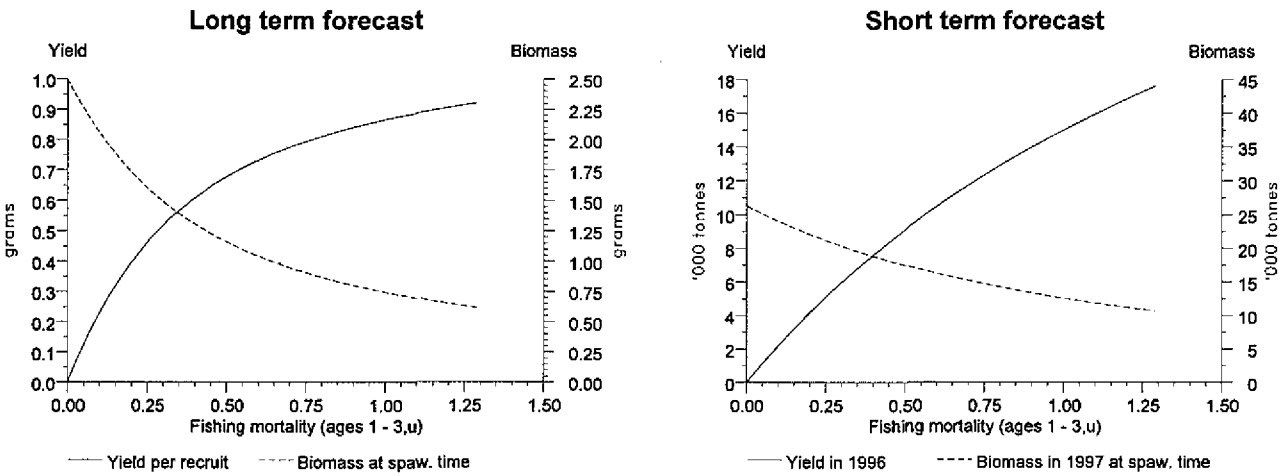
**Special comments:** The preliminary survey observations indicate that the 1995 year class may be below the average, but this can only slightly affect the 1996 forecast.



**Data and assessment:** Age-based assessment tuned using effort data and survey indices.

**Source of information:** Report of the Study Group on Life Histories and Assessment of *Pandalus* stocks in the North Atlantic. ICES CM 1995/K:5.

**Yield and Spawning Stock Biomass**



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

Catch data for Division IIIa and Sub-divisions 22-24 (Table 3.4.8.1):

Year	Rec. TAC <sup>2</sup>	ACFM catch of stock <sup>1</sup>
1987	-	175
1988	196	251
1989	174	186
1990	131	204
1991	178	192
1992	170	168
1993	150-181	171
1994	130-180	164
1995	- <sup>3</sup>	

<sup>1</sup>Including North Sea. <sup>2</sup>Spring-spawners in IIIa and 22-24.

<sup>3</sup>Not exceeding recent catch levels. Weights in '000 t.

**Historical development of the fishery:** 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. Landings have decreased in spite of increasing abundance indices and apparently large stock size. Uncertainties in data sources preclude an analytical assessment.

(Details in Table 3.4.8.2).

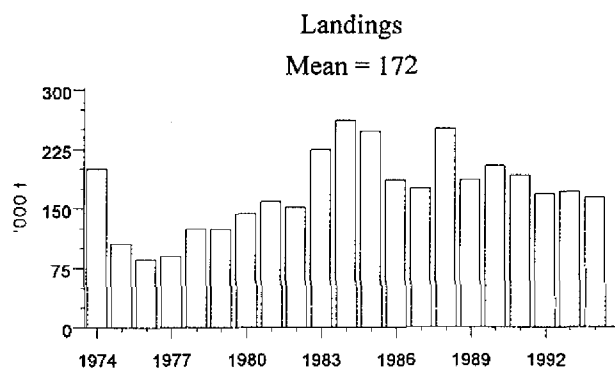
Forecast for 1996: Not available.

**Management advice:** If a precautionary TAC is required, ACFM advises that it should be established such that the catch does not exceed recent levels.

**Special comments:** Some of the fisheries which exploit this stock in Division IIIa also exploit the North Sea stock. Any increase in these fisheries may hamper recovery of the North Sea stock.

**Data and assessment:** Catch-at-age data are uncertain due to undersampling of landings, particularly in Division IIIa. 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, March/April 1995 (C.M.1995/Assess:13).



### 3.4.9 Sprat in Division IIIa

Catch data (Table 3.4.9.1):

Year	Agreed TAC	Official landings	Other species <sup>1</sup>	ACFM catch
1987	80	68	-53	14
1988	80	63	-53	9
1989	80	62	-52	10
1990	65	43	-33	10
1991	50	44	-32	14
1992	50	40	-30	10
1993	45	31	-22	9
1994	43	42	n.a.	96
1995	43			

<sup>1</sup>Species reported as "sprat" taken in "mixed clupeoid fishery". Weights in '000 t.

**Historical development of the fishery:** Sprat in Division IIIa are caught primarily by various types of trawl in both the "mixed clupeoid" fishery and in the 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 in 1994 increased greatly to 96,000 t.

**State of stock:** The data available do not allow an evaluation of stock size.

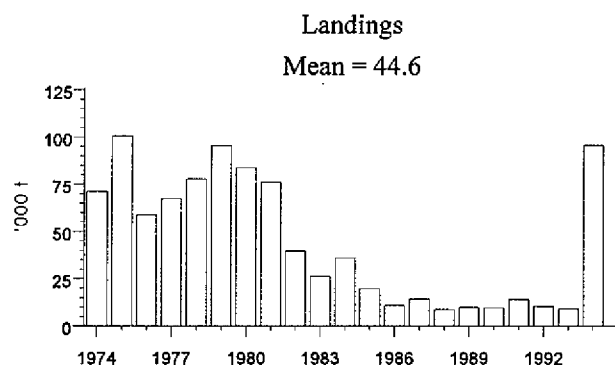
**Forecast for 1996:** No forecast is available.

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

**Data and assessment:** In 1994 the sampling was extended to cover the Swedish landings for industrial purposes. The number of samples for age determination is far below the recommended level. 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, March/April 1995 (C.M.1995/Assess:13).

(Details in Table 3.4.9.1).



### 3.4.10 Norway pout in Division IIIa

Catch data (Tables 3.4.1.1 and 3.4.10.1):

Year	ACFM catch
1987	3
1988	8
1989	6
1990	27
1991	32
1992	42
1993	8
1994	7
1995	

Weights in '000 t.

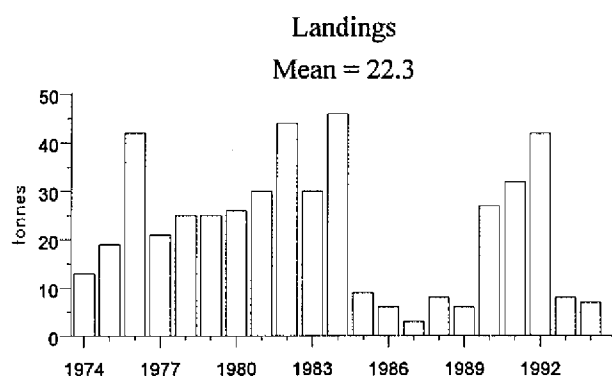
**Historical development of the fishery:** Small mesh trawl fishery directed at Norway pout which takes place near the edge of the Norwegian Deep. The fishery is effectively a continuation of the North Sea fishery. Fishing takes place mostly in quarters one and four. A variable fraction of the catch is Norway pout.

**State of stock:** Unknown.

**Special comments:** It is likely that the Norway pout in Division IIIa are part of the North Sea stock since the fishery takes place in a continuous area which overlaps both Division IIIa and Sub-area IV.

**Data and assessment:** Catch-at-age and weight-at-age data available since 1986 but of variable quality. Because of the link with the North Sea stock it is considered inappropriate to assess this stock separately.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).





### 3.4.11 Sandeel in Division IIIa

Catch data (Tables 3.4.1.1 and 3.4.11.1):

Year	ACFM landings
1987	5
1988	23
1989	18
1990	16
1991	23
1992	39
1993	45
1994	55
1995	

Weights in '000 t.

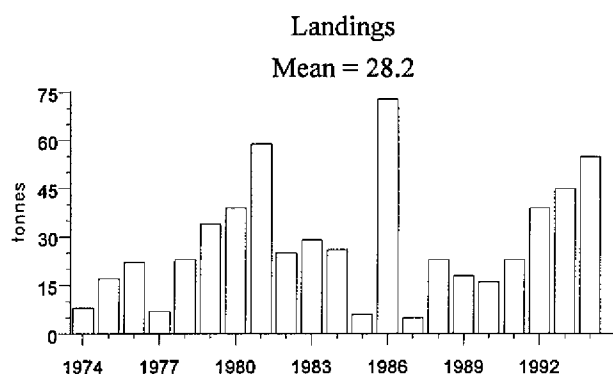
**Historical development of the fishery:** An extension of the North Sea fishery into Division IIIa but with smaller vessels working closer inshore, mostly along the coast of Jutland.

**State of stock:** Uncertain.

**Special comments:** Biological samples taken since 1992 indicate a mixture of several sandeel species. This mixture is greater than in other sandeel fisheries.

**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 1995 (C.M.1996/Assess:6).



### 3.4.12 *Nephrops* in Division IIIa

Units included in recommended Management Area: a) Skagerrak (Unit 3) and b) Kattegat (Unit 4) (see Figure 2.4.1).

Catch data (Tables 3.4.12.1-3.4.12.2) :

Year	Rec TAC	Agreed TAC	ACFM Indgs
1987			4.0
1988			3.7
1989			3.9
1990			4.3
1991			4.2
1992	~4.0	3.5	2.9
1993	~4.3	3.5	3.2
1994	2.9	3.5	2.8
1995	2.9	4.8	

(Weights in '000 t)

**Historical Development of the Fishery:** Landings in the Skagerrak varied between 500 and 1,500t from the 1960s to the 1980s and thereafter showed a marked increase, fluctuating between 2,000 and 2,500 t (graph a). In the Kattegat, landings have decreased by 52% since 1985 and are currently the lowest in the recent ten year period (graph a). Total landings for the Management Area are shown at the foot of the page.

**State of stock:** The state of the stock cannot be precisely assessed but LPUE in recent years is considerably lower than in the mid-1980s (graphs c and d), and there are indications of overexploitation. The fishing effort in the Skagerrak is now stabilizing but effort in the Kattegat continues to decline (graph b). Preliminary assessments suggest that current  $F$  is above  $F_{max}$  in males and close to  $F_{max}$  in females (graph e).

Landings from recommended Management Area (Details in Table 3.4.12.3)

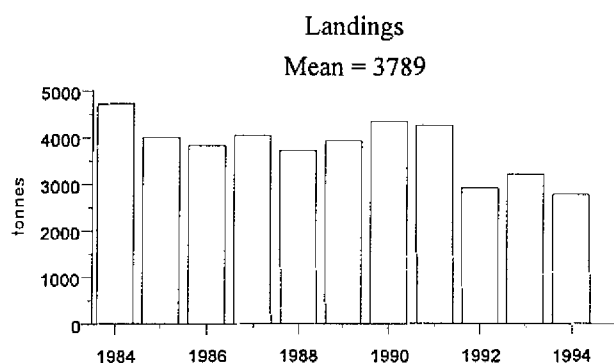
**Management advice:** ACFM recommends that a precautionary TAC for 1996 and 1997 should not exceed 2,900 t. Similar or higher yields could be obtained in the long term at lower cost and with higher catch rates if the effort is reduced and the selection pattern in the fishery is improved.

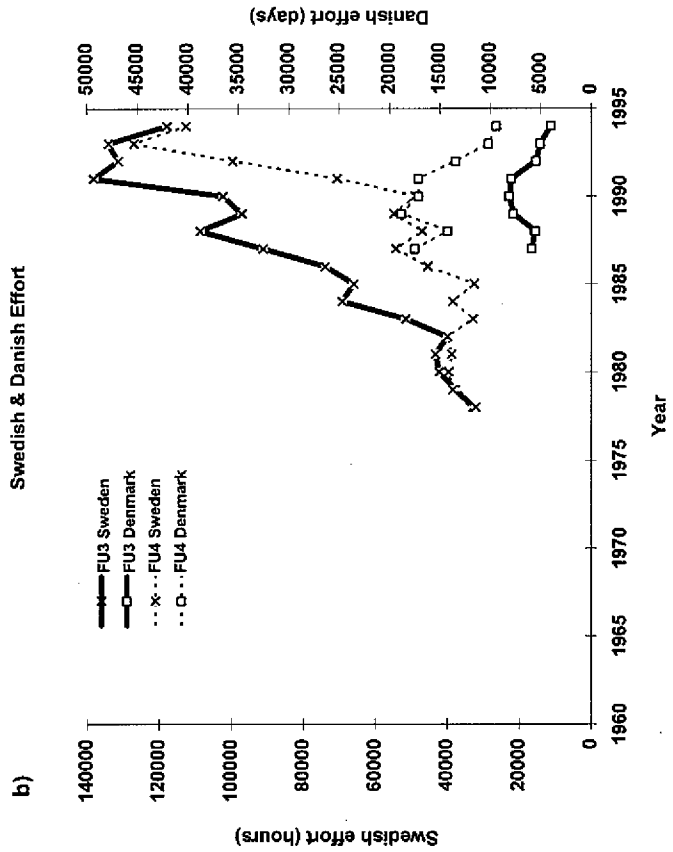
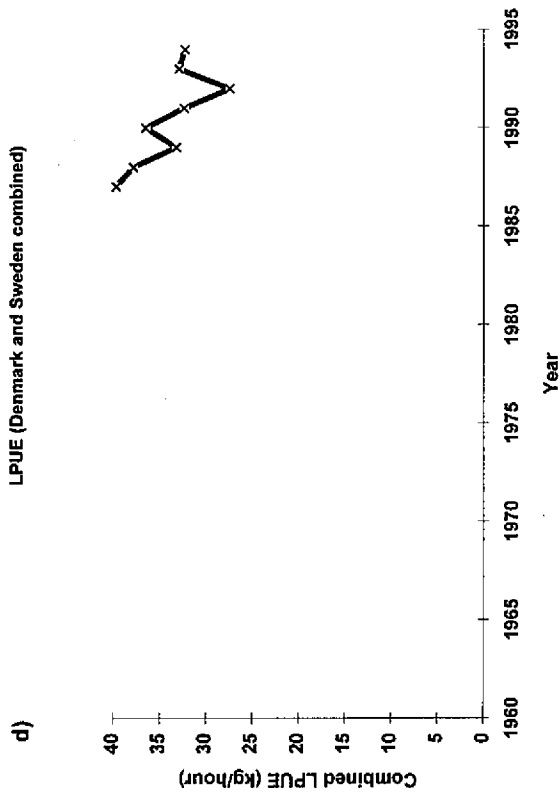
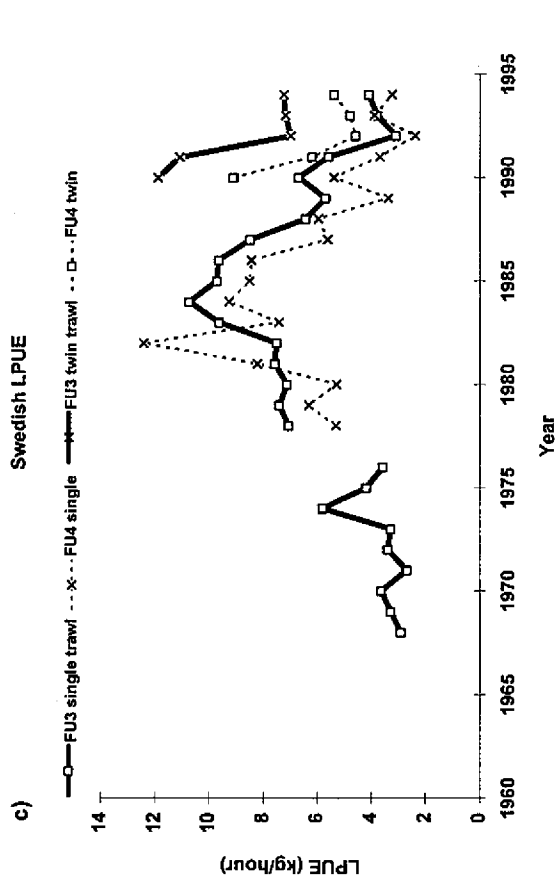
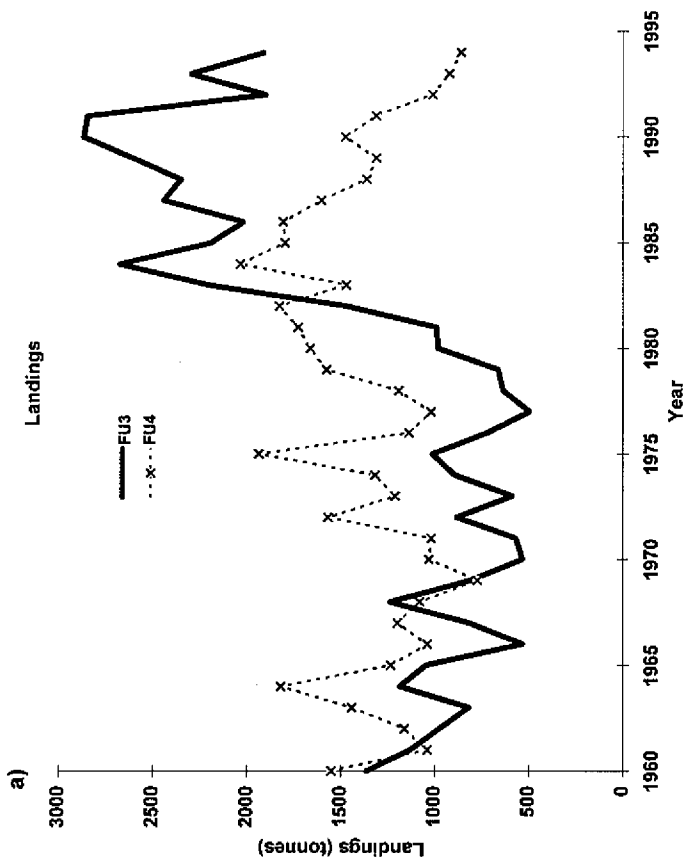
**Special comments:** In 1994, ACFM advised that the precautionary TAC to be set for 1995 should not exceed the 1992 catch, viz 2,900t. There is no new information to revise this figure for 1996 and 1997.

The large quantity of undersized *Nephrops* that are discarded in this area (in 1994 estimated to be 84% of the catch in number) reflects the fact that the minimum landing size does not correspond to the current legal mesh size of 70 mm diamond mesh. The results of a mesh assessment based on new selectivity experiments indicate that the gain in long-term landings from introducing more selective gears could be significant.

**Data and assessment:** Landings per unit effort and some CPUE data are available. Length compositions are available from 1990 onwards. A new length cohort analysis was not carried out for the combined area as biological data are still inadequate to support a reliable analytical assessment. Assessment of the stock is based mainly on CPUE and effort data.

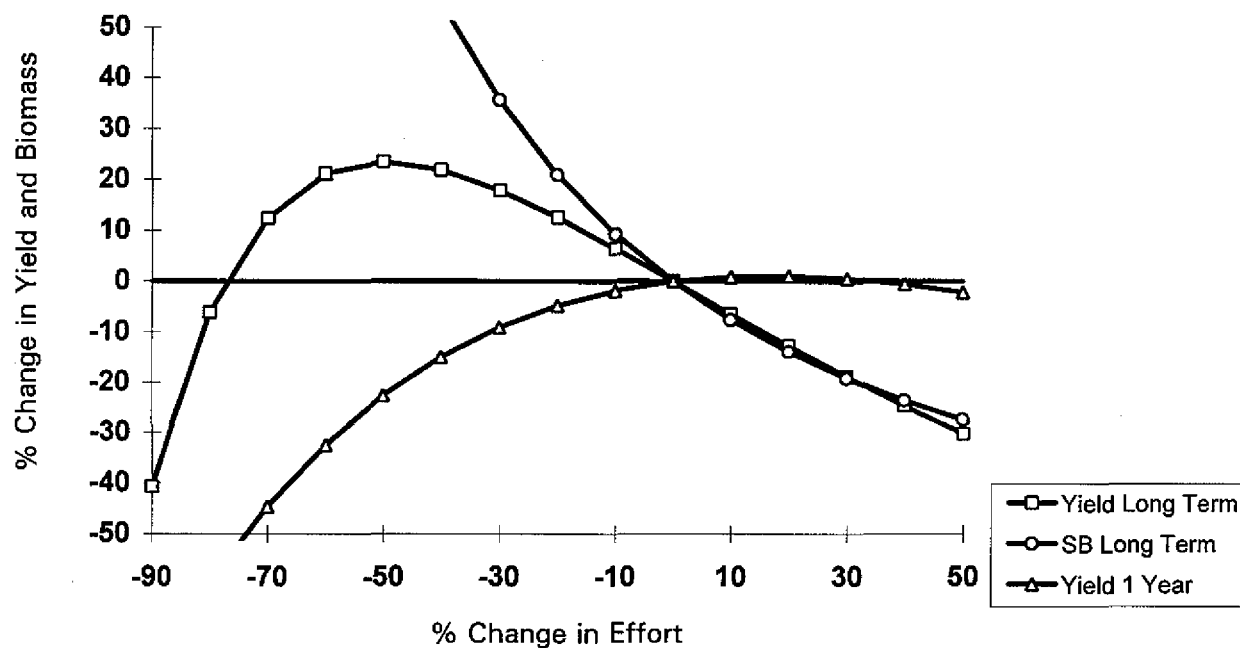
**Source of information:** Report of the Working Group on *Nephrops* Stocks, March 1995 (C.M.1995/Assess:12); Report of the Fishing Technology and Fish Behaviour Working Group, April 1995 (C.M. 1995/B:2).



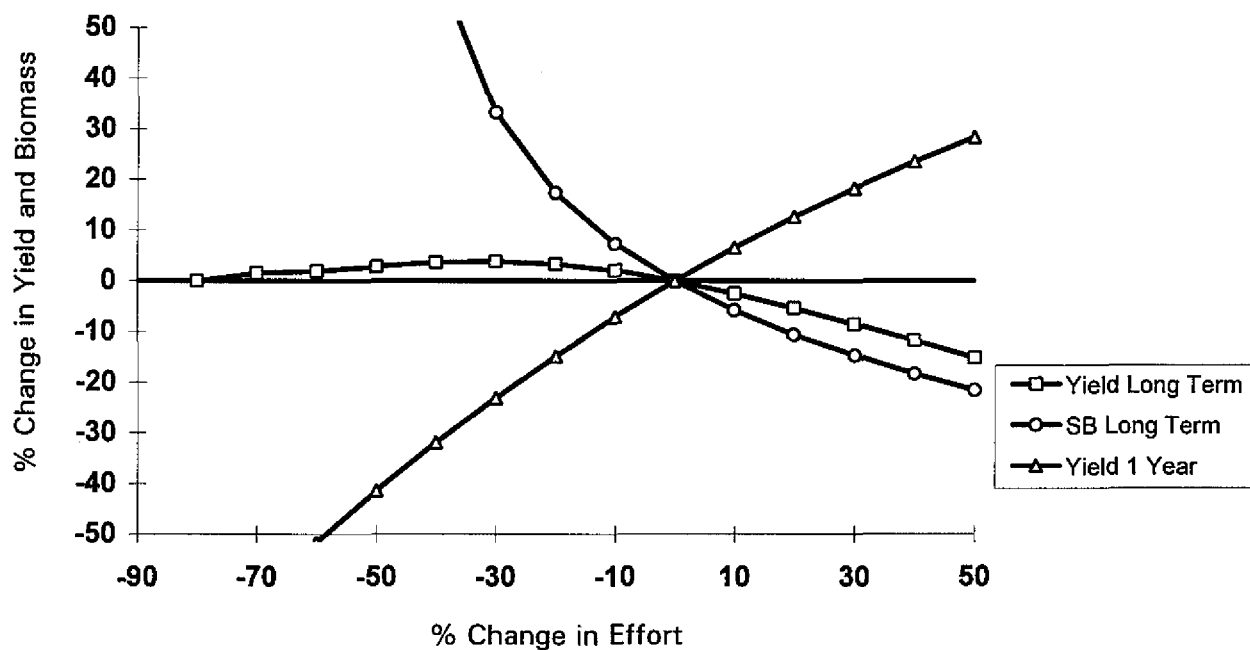


e)

## Males



## Females



Skagerrak (FU3) and Kattegat (FU4): Percentage changes in long-term landings and stock biomass, and short term landings following various changes in fishing effort. Males and females shown separately



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

#### 3.5.1 Overview

##### Description of the fisheries

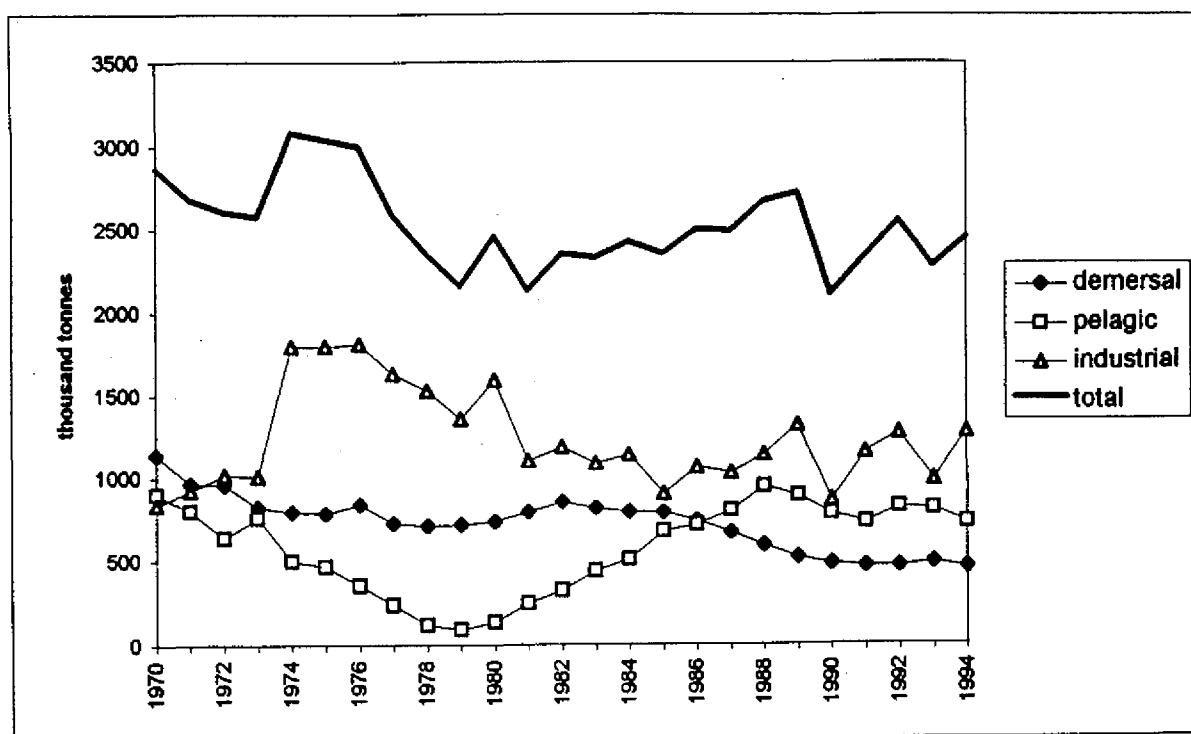
The fisheries in the North Sea can be grouped according to their main landings, in demersal and pelagic fisheries, and industrial fisheries which land their catch for reduction purposes. Demersal fisheries usually either target a mixture of roundfish species (cod, haddock, whiting), or a mixture of flatfish 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 3.5.1.2). In addition to the demersal, pelagic and industrial fisheries for fish, smaller fleets exist which fish for crustaceans like *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.

The trends in landings of the most important species landed by these three fleets during the last 25 years, together with the total international landings, are shown in Table 3.5.1.1 and in the figure below. 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 1970's, when the fishery for herring was closed, to increase again up to 1988. Since then a slight decrease can be observed. The landings of the industrial fisheries increased to approximately 1.8 million t in the early 1970's, but has fluctuated around 1 million t in recent years. These landings show the greatest annual variations, probably due to the short life span of the species they consist of. The total landings reached 3 million t in 1974, and have been around 2.5 million t since the 1980's.

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. Whether or not this is caused by poor economic results of the fishery is not clear. The effort in the Danish and Norwegian fishery for Norway pout and sandeel has been gradually decreasing since 1989.

Some major technological developments changed the fisheries in the North Sea in the 1960s. These were the change in the herring fishery, where over a few years time the driftnets were replaced by pelagic trawls, the introduction of the power block, which enormously increased the possibilities for the purse seiners, and the development of the beam trawl fishery for flatfish.



Landings in the North Sea, 1970-1994.

Demersal: human consumption landings of cod, haddock, whiting, saithe, sole and plaice

Pelagic: herring, mackerel, horse mackerel

Industrial fisheries: Norway pout, sandeel, sprat, and the by-catch of haddock, whiting and saithe

Most species are managed by means of TAC/quota regulations that apply for Sub-area IV. For saithe the TAC is set for Sub-area IV and Division IIIa. The industrial fisheries are subject to regulations in by-catches of protected species.

The data available from scientific sources for the assessment of roundfish, flatfish, herring and mackerel stocks 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.

In recent years there was misreporting of roundfish landings due to restrictive TAC's.

Several series of research vessel survey indices are available for most species. For herring and mackerel the spawning stock sizes are estimated through annual acoustic (herring) or intermittent egg (mackerel) surveys.

Data on landings, fishing effort and species composition are available from all industrial fisheries.

There are important technical interactions in several fisheries. The demersal fisheries for both roundfish and flatfish are largely mixed fisheries for roundfish or flatfish. In the flatfish fishery in addition a by-catch of cod may occur. For this reason the management of cod, haddock, whiting, sole and plaice cannot be considered on an individual stock basis. The industrial fisheries sometimes have a by-catch of juvenile roundfish species, predominantly whiting, although this by-catch has decreased over the last years. In the sprat fishery there is a by-catch of juvenile herring.

#### Overview of the resources

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. ACFM considers that the stock of cod is at present outside safe biological limits. The stock of saithe is considered to be close to safe biological limits. 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 as the present stock size is the result of a series of good recruitment which is exceptional historically. 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. Sole is considered to be within safe biological limits.

The herring stock, which collapsed in the late 1970s but recovered through the 1980s, has been decreasing in recent years and is now considered to be outside safe biological

limits. The state of the sprat stock is not precisely known, but the stock does not show signs of overexploitation.

The spawning stock of mackerel in the North Sea is at a severely depleted 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 which spawns outside the North Sea and which is present in the northern North Sea in the second half of the year.

The present state of the North Sea horse mackerel stock is not known. The last estimate from 1990 indicates a 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 stocks of Norway pout and sandeel are variable due to the short life span and variable recruitment. The stocks are considered to be within safe biological limits.

The state of the stocks of *Pandalus borealis* in Division IVa (Fladen Ground) and Division IVb (Farn Deep) is unknown as no data for assessment were available. The fishery is an opportunistic fishery, strongly influenced by stock abundance and market prices.

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

#### Management advice

The management advice is given for individual stocks.

All stocks of roundfish and flatfish species in the North Sea, which are targeted by human consumption fisheries, are characterized by very high levels of fishing mortality. Most of these stocks have been outside or close to safe biological limits in recent years and several stocks are at this level presently.

ACFM 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. ACFM has therefore since 1991 indicated that reductions in fishing effort are required to achieve fishing mortality reductions.

Fishing mortality levels are generally high and are for most stocks on a high historical level resulting from an increase in recent decades. This is in itself a clear indication of an excessive effort level. This and the poor performance of TACs, as implemented, in reducing fishing mortality leads ACFM to reiterate that the required reductions in fishing mortalities can only be achieved if reductions in effort are included in management.

### 3.5.2 Cod in Sub-area IV (North Sea)

Catch data (Table 3.5.2.1):

Year	Rec. TAC	Agreed TAC	Off. Lndgs.	ACFM catch
1987	<125	175	167	175
1988	≤148	160	142	150
1989	<124	124	110	116
1990	113	105	99	105
1991	<sup>1</sup>	100	86	89
1992	<sup>1</sup>	100	98	97
1993	<sup>1</sup>	101	95	105
1994	<sup>2</sup>	102	88	88
1995	<sup>2</sup>	120	-	-

<sup>1</sup>30% reduction in fishing effort relative to 1989. <sup>2</sup>Significant reduction in fishing effort. <sup>3</sup>20% reduction in F from 1994 value. Weights in '000 t.

**Historical development of the fishery:** Cod are mainly taken together with haddock and whiting in mixed roundfish fisheries using towed gears, in directed fisheries using fixed gears, and also as a by-catch in flatfish fisheries.

**State of stock:** The stock is considered to be outside safe biological limits. Spawning stock biomass is close to an historical low level and is well below MBAL (150,000 t). Only two year classes (1985 and 1993) in the past 10 years have been above average. The stock is considered to be at a level where there is evidence that the low spawning stock

biomass has an impact on recruitment. *Status quo* fishing mortality is somewhat above  $F_{med}$  (0.81). Details given in Table 3.5.2.2.

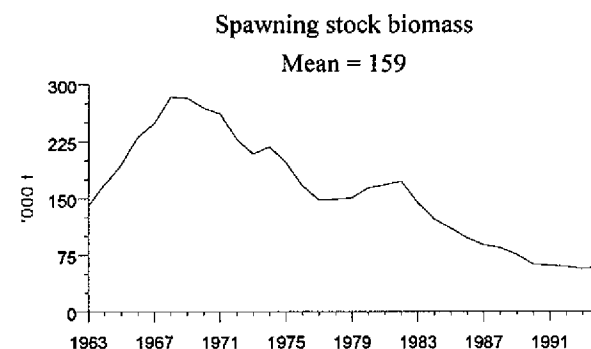
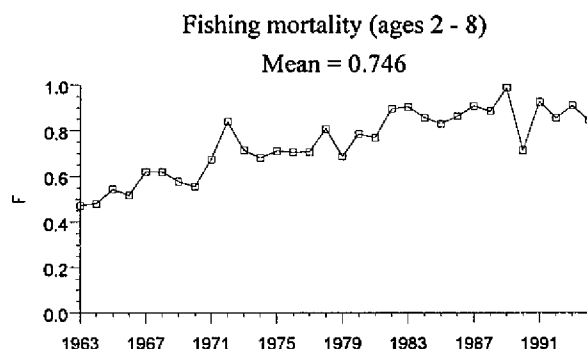
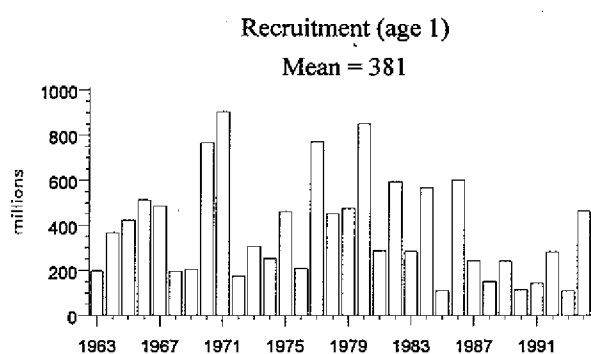
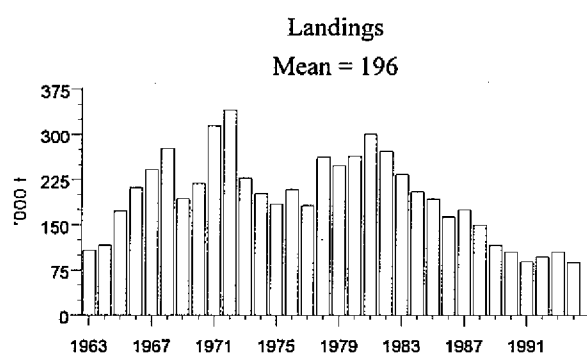
**Forecast for 1996:** Effort having not been reduced, ACFM assumed that fishing mortality in 1995 would be the same as in 1994 in making projections:

SSB(95)=78,  $F(95) = 0.85$ , Basis:  $F(95)=F(94)$ , Catch(95)=169, Landings (95)=169

Option	Basis	F (96)	SSB (96)	Catch (96)	Lndgs (96)	SSB (97)
A	0.4 $F_{94}$	0.34	89	81	81	169
B	0.6 $F_{94}$	0.51		113	113	144
C	0.8 $F_{94}$	0.68		141	141	122
D	1.0 $F_{94}$	0.85		165	165	103
E	1.2 $F_{94}$	1.02		185	185	88

Weights in '000 t.

Continuation of the fishery at a *status quo* level leads to an increase in SSB due to the recruitment of the 1993 year class. An increase in the SSB to the level of MBAL at the start of 1997, would require a reduction in F in 1996 of about 50%.

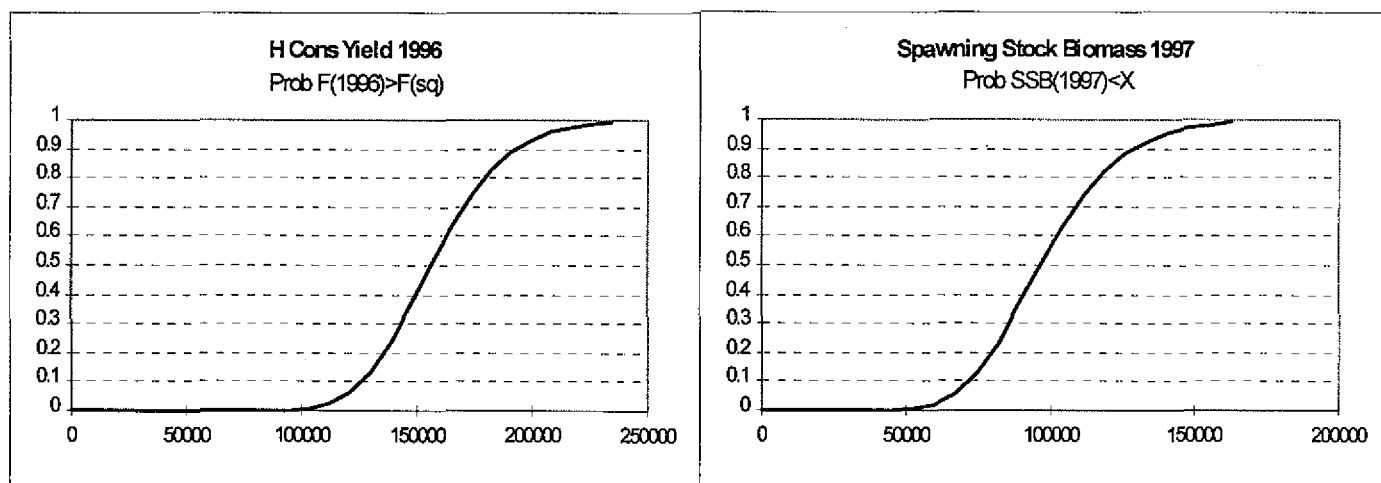




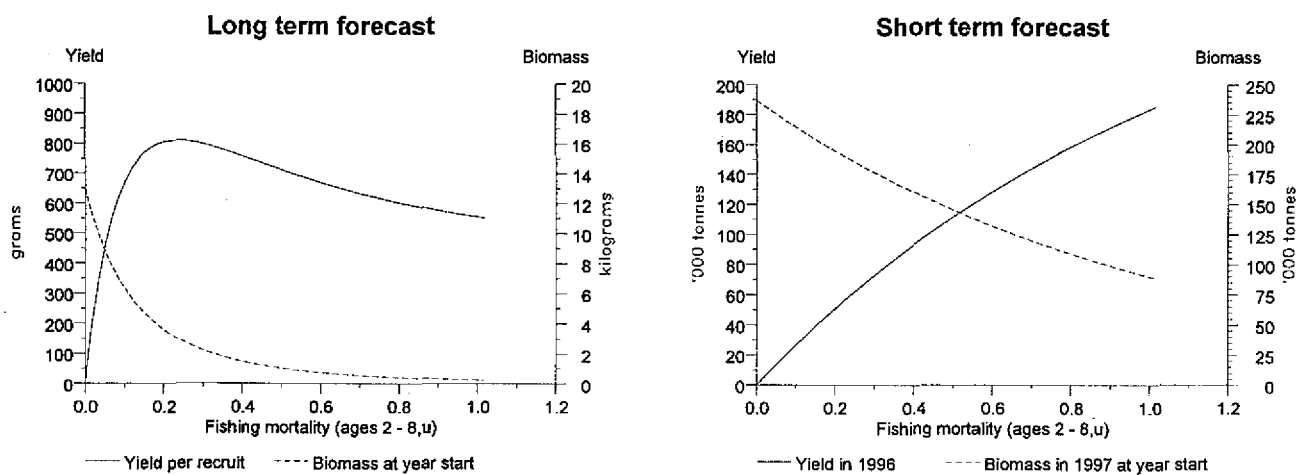
If the catch in 1996 is limited to 140,000t there is a high probability that  $F$  will be reduced in 1996 (see figure on next page). On the other hand, a catch of 175,000t is likely to lead

to an increase in the fishing mortality in 1996. At *status quo*  $F$  there is a high probability that the spawning stock size will increase, but remain below MBAL.

### Cumulative probability distributions

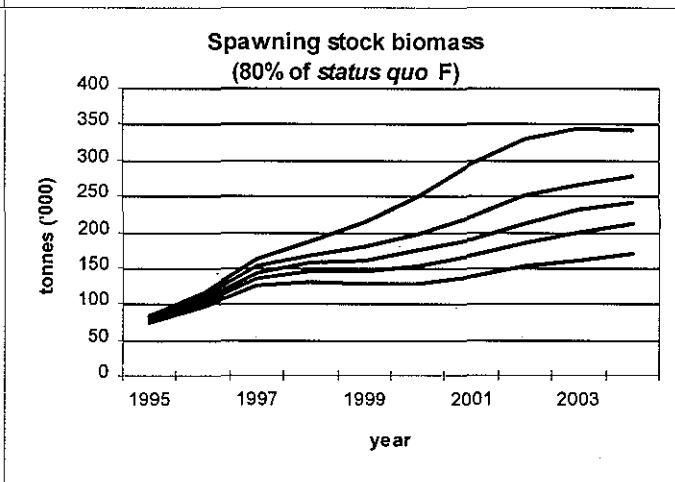
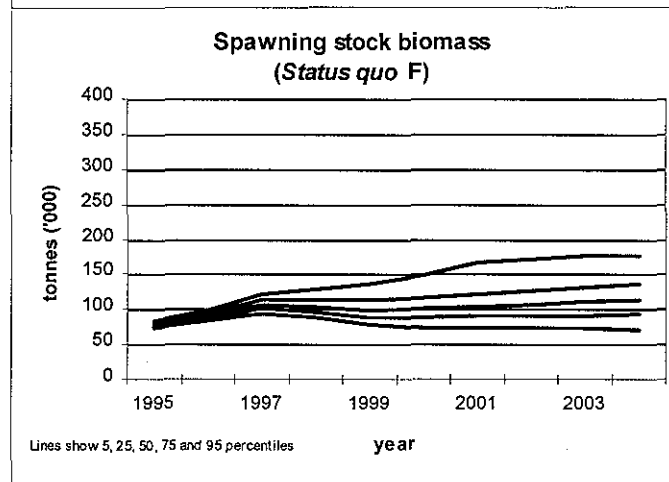
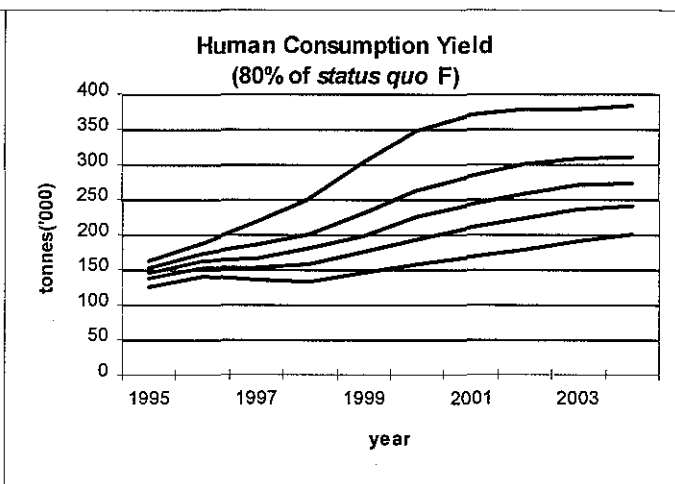
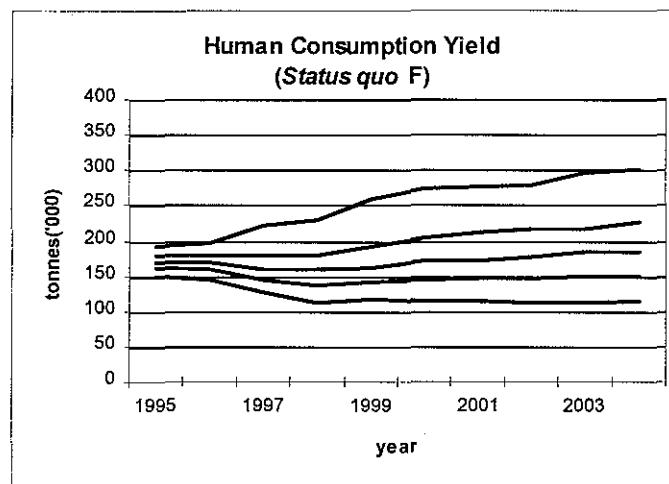


### Yield and Spawning Stock Biomass



**Medium-term considerations:** Medium-term simulations (see figures below) indicate that there is less than a 25%

probability that SSB will increase to MBAL at current levels of fishing mortality, whereas, if fishing mortality is reduced by 30%, an increase to MBAL is highly probable.



**Management advice:** In order to bring the stock within safe biological limits in the medium term, **ACFM recommends that fishing mortality be reduced by at least 20% of the 1994 value. This corresponds to an F in 1996 of not more than 0.7.**

The 1993 year class appears to be strong and has a profound impact on short- and medium-term predictions. This year class has been estimated from surveys and its exact size is still uncertain. An increase in spawning stock biomass in the short term depends on this year class. The abundance of the 1993 year class is consistent with reports by fishermen of large catches of this year class as 2-year-olds.

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

**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 1995 (C.M.1996/Assess:6 ).



### 3.5.3 Haddock in Sub-area IV (North Sea)

Catch data (Table 3.5.3.1):

Year	Rec. TAC	Agreed TAC	Off. Indg	Hum. Co. lds.	Disc slip.	Indust Bycatch	ACFM catch
1987	<120	140	109	108	59	4	172
1988	<185	185	105	105	62	4	171
1989	<68	68	64	76	27	2	104
1990	50	50	43	51	32	3	87
1991	- <sup>1</sup>	50	44	45	40	5	90
1992	- <sup>1</sup>	60	51	70	48	11	129
1993	- <sup>1</sup>	133	80	80	80	11	170
1994	- <sup>2</sup>	160	87	80	65	4	149
1995	- <sup>2</sup>	120					

<sup>1</sup>30% reduction in fishing effort relative to 1989. <sup>2</sup>Significant reduction in fishing effort. Weights in '000 t.

**Historical development of the fishery:** Haddock is taken as part of a mixed demersal fishery along with cod and whiting. The large majority of the catch is taken by Scottish trawlers, seiners and pair trawlers. Smaller quantities of haddock are taken by other Scottish vessels, including *Nephrops* trawlers which use 70 mm mesh. The stock is also exploited by vessels from England, Denmark and Norway.

**State of stock:** The stock is considered to be within safe biological limits. Apart from 1993, all year classes since 1990 have been 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  $F_{med}$  (0.57). At current levels of  $F$ , the stock will continue to be dependent on the strength of incoming year classes. The 0-group and 1-group survey indices suggest that the 1994 year class is strong.

Further details in Table 3.5.3.2.

#### Forecast for 1996:

SSB(95) = 177,  $F(95) = 0.85^1$ , Basis:  $F(95) = F(94)$ , Catch(95) = 198, Landings <sup>2</sup>(95) = 111

Option	Basis	F	SSB	Catch	Ldgs	Disc	By-catch	SSB
		(96) <sup>1</sup>	(96)	(96)	(96) <sup>2</sup>	(96)	(96) <sup>3</sup>	(97)
A	$0.4F_{94}$	0.34	207	118	60	41	17	313
B	$0.6F_{94}$	0.51		159	84	59	16	276
C	$0.8F_{94}$	0.68		195	105	75	15	244
D	$1.0F_{94}$	0.85		227	123	90	15	217
E	$1.2F_{94}$	1.02		256	139	103	14	193

Weights in '000 t.

<sup>1</sup>Human consumption landings + discards

<sup>2</sup>Human consumption only

<sup>3</sup>All assume  $F(ind)96 = F(ind)94 = 0.04$ .

For all options, SSB is expected to increase in the short term. However, the forecast is not of high precision. The forecast for 1996 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. The forecast depends heavily on recruiting year classes, whose abundance cannot be determined precisely.

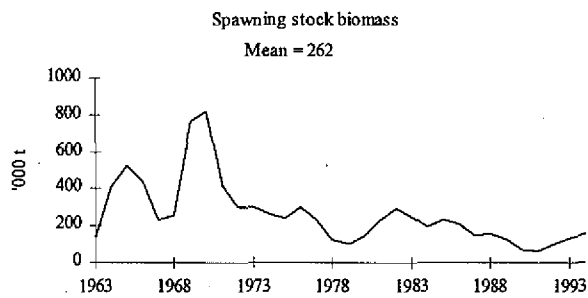
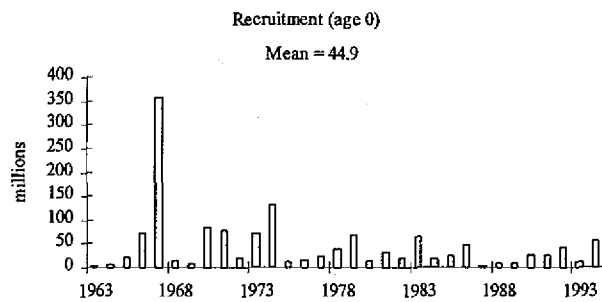
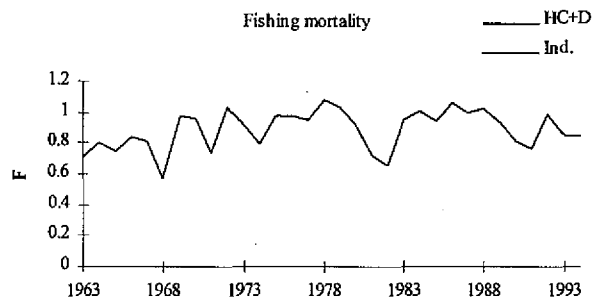
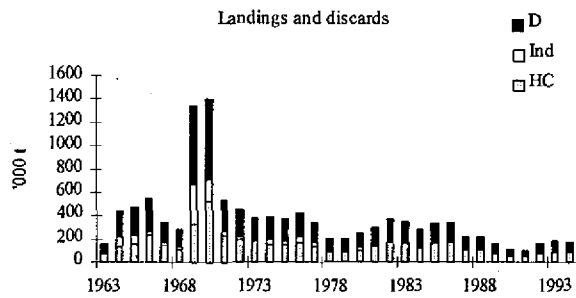
**Medium-term considerations:** The combination of highly variable recruitment and the high level of  $F$  results in yield and SSB changing rapidly in the short term. This variability would be reduced at lower levels of  $F$ .

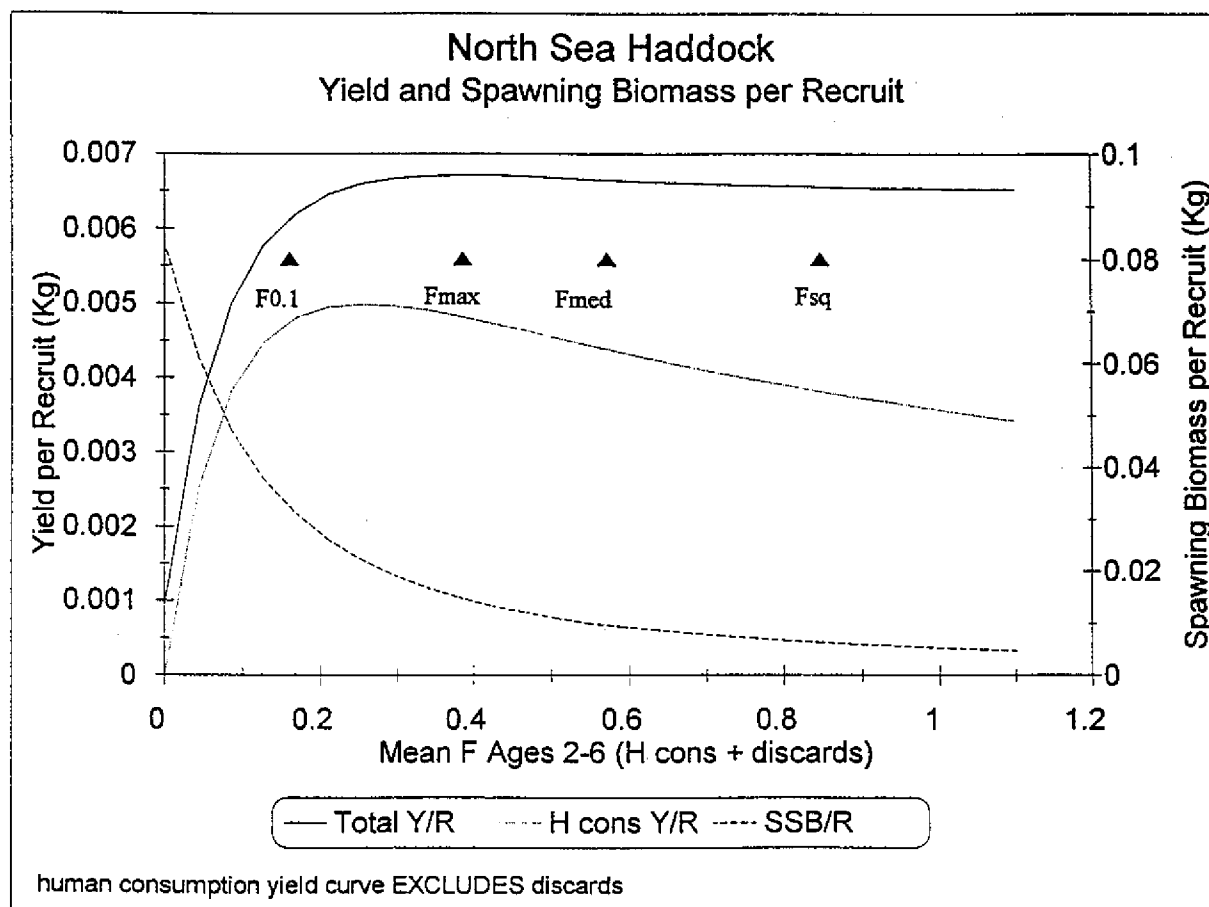
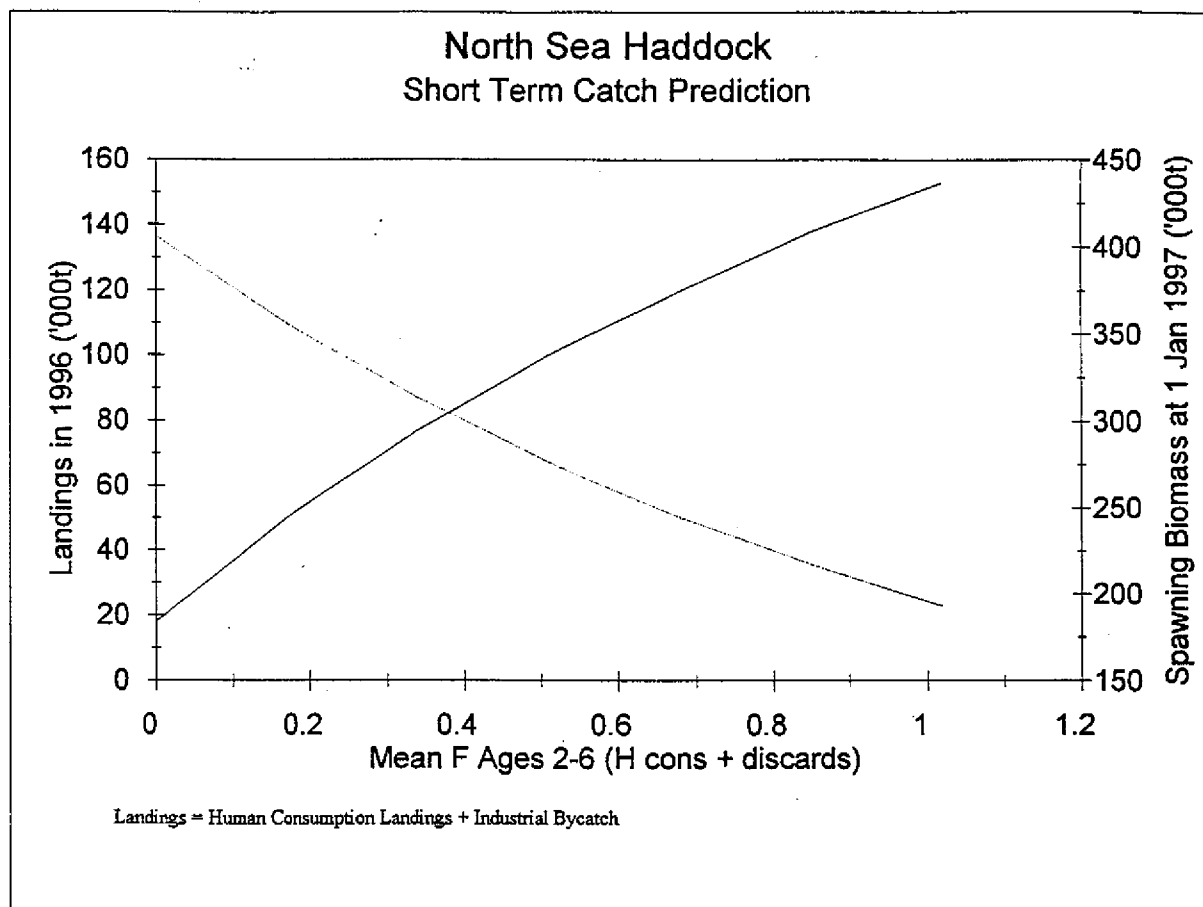
**Management advice:** Haddock is taken in mixed fisheries with cod, and management measures should take into account the recommended reduction in fishing mortality on cod.

**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 fluctuations in stock size.

**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 1995 (C.M.1996/Assess:6).







### 3.5.4 Whiting in Sub-area IV (North Sea)

Catch data (Table 3.5.4.1):

Year	Rec. TAC	Agreed TAC	Off. Indgs.	Hum.Con Indgs.	Indust. bycatch	Disc. slip.	ACFM catch
1987	127	135	65	64	16	54	132
1988	134	120	66	52	49	28	127
1989	115	115	40	41	43	36	118
1990	130	125	41	43	51	55	147
1991	<sup>1</sup>	141	47	47	38	34	117
1992	<sup>1</sup>	135	47	46	27	31	102
1993	<sup>1</sup>	120	47	48	20	43	111
1994	<sup>2</sup>	100	42	42	10	33	86
1995	<sup>2</sup>	81					

<sup>1</sup>30% reduction in fishing effort relative to 1989. <sup>2</sup>Significant reduction in fishing effort. Weights in '000 t.

**Historical development of the fishery:** The fishery for whiting is part of a mixed fishery also for 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.

**State of stock:** The state of the stock is uncertain. VPA estimates indicate that SSB has been stable since 1984, whereas an analysis using survey data indicates that it has increased during 1986-1992, followed by a decrease. However, the stock is probably within safe biological limits. Fishing mortality is at a high level.

Further details in Table 3.5.4.2.

**Forecast for 1996:** The *status quo* catch prediction for 1996 is a catch of 105,000t (48,000t human consumption landings, 38,000t discards and 19,000t industrial bycatch).

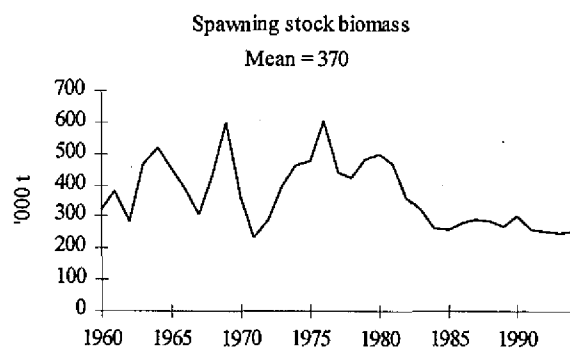
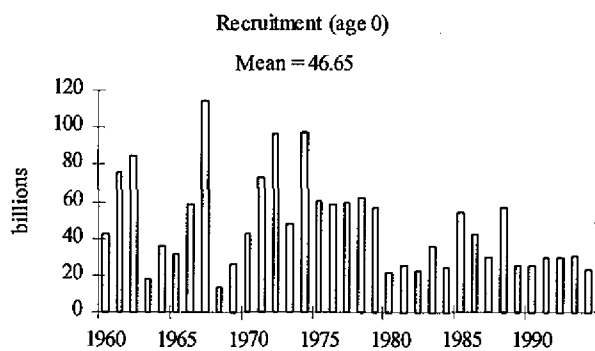
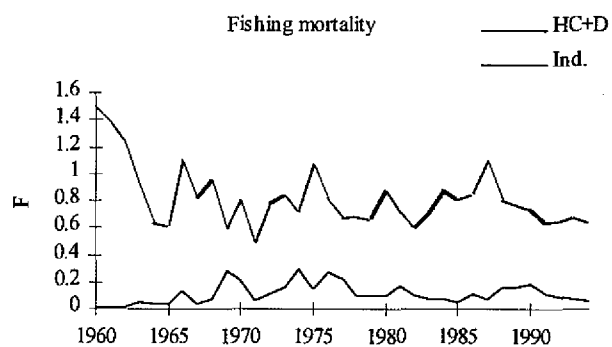
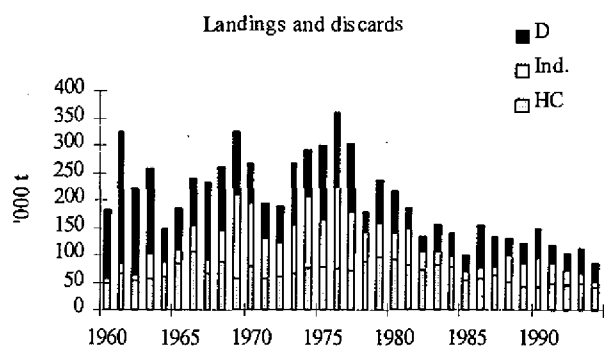
**Management advice:** Most of the fisheries exploiting whiting are mixed fisheries exploiting cod as well. Management measures should take into account the recommended reduction in fishing mortality on cod.

**Special comments:** An effort reduction in the fisheries which take cod will have a beneficial effect on the mortality rate on whiting.

**Data and assessment:** Analytical assessment based on landings, survey and CPUE-data. Discards extrapolated from Scottish data. Uncertainties and conflicting trends in the assessment.

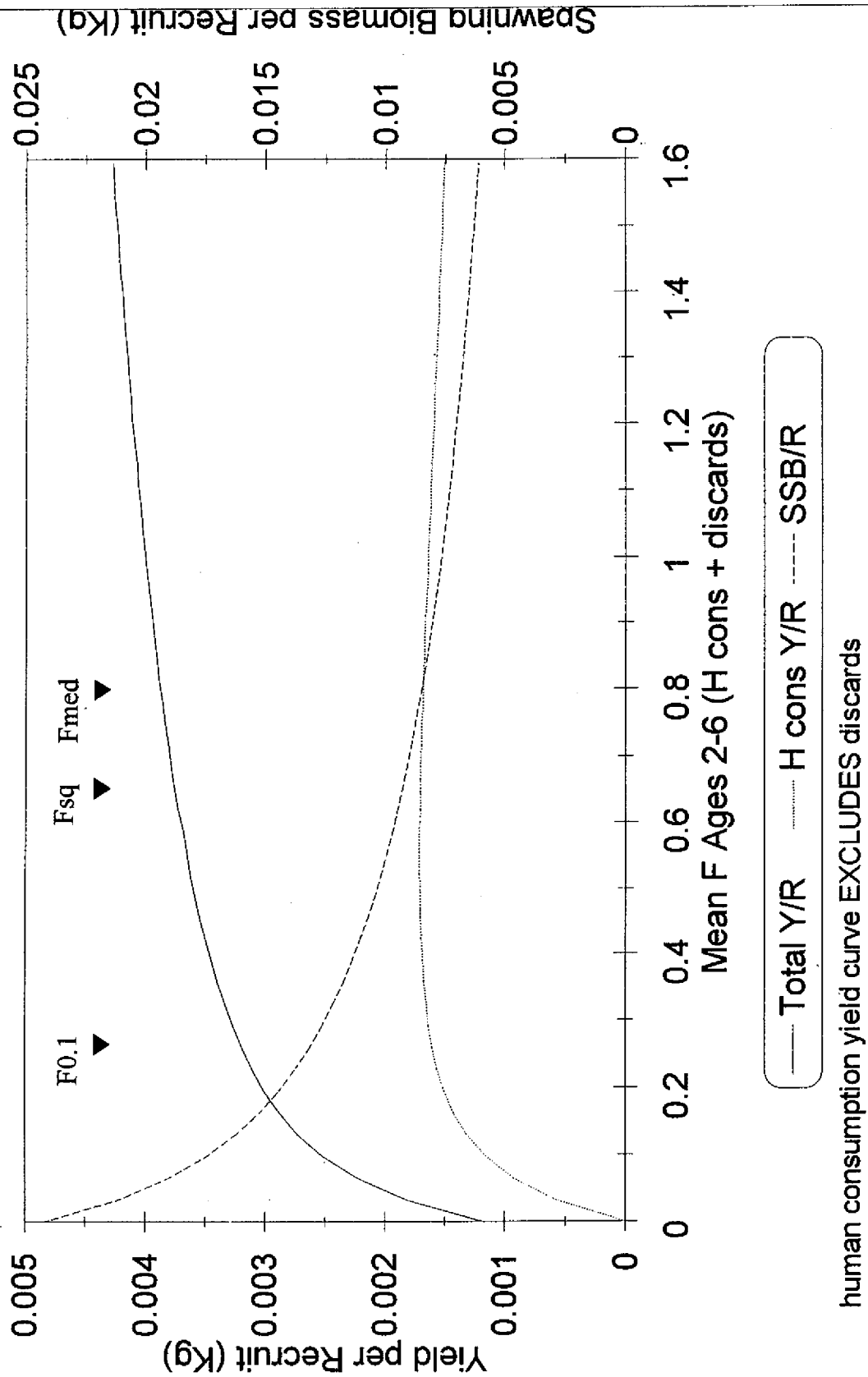
**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).





# North Sea Whiting

## Yield and Spawning Biomass per Recruit





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

Catch data (Table 3.5.5.1):

Year	Rec. TAC	Agreed TAC	Off. Indgs.	ACFM catch
1987	<198	173	154	149
1988	156	165	113	105
1989	170	170	92	92
1990	120	120	85	88
1991	125	125	93	99
1992	102	110	92	93
1993	93	93	108	105
1994	72	97	98	97
1995	107	107		

Weights in '000 t.

**Historical development of the fishery:** Saithe is mainly taken in a directed trawl fishery which started in the beginning of the 1970s. The French, Norwegian and German catches make up about 80% of the total international catch.

**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. Fishing mortality has shown a decreasing trend since 1986 and is now close to  $F_{med}$  (0.47).

Further details in Table 3.5.5.2.

#### Forecast for 1996:

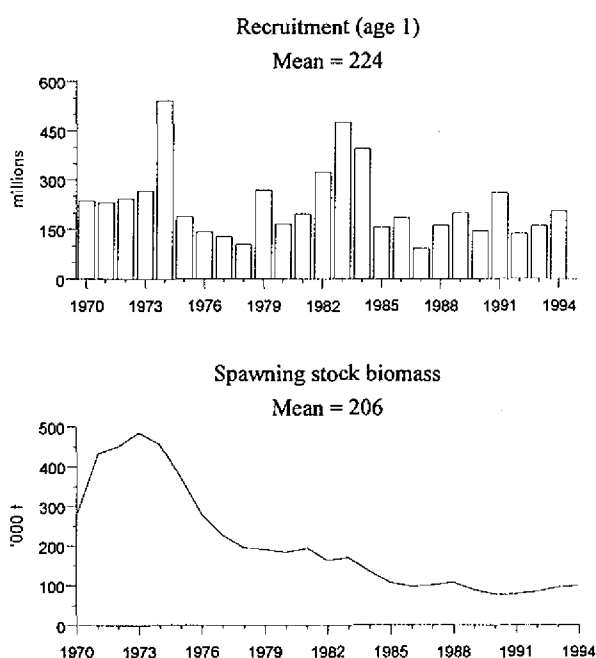
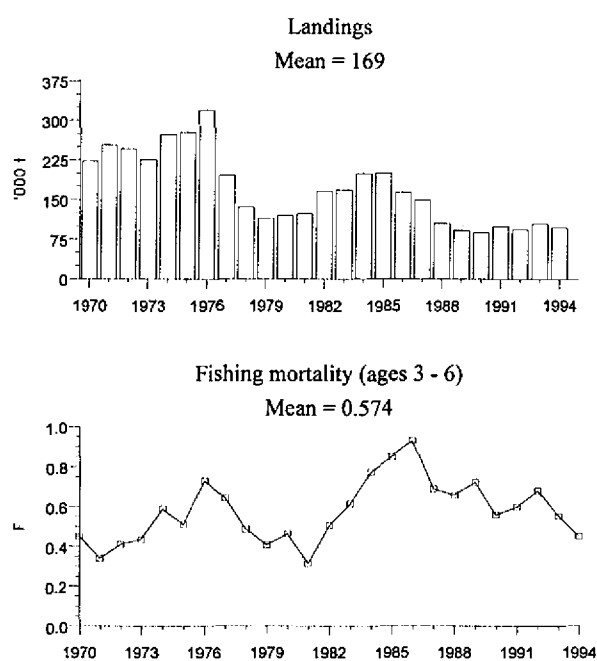
SSB(95) = 134,  $F(95) = 0.45$ , Basis:  $F(95) = F(94)$ , Catch(95) = 105, Landings(95) = 105.

Option	Basis	F (96)	SSB (96)	Catch (96)	Landgs <sup>1</sup> (96)	SSB (97)
A	0.4 $F_{94}$	0.18	141	50	50	201
B	0.6 $F_{94}$	0.27		72	72	183
C	0.7 $F_{94}$	0.32		82	82	174
D	0.8 $F_{94}$	0.36		92	92	166
E	1.0 $F_{94}$	0.45		111	111	150
F	1.2 $F_{94}$	0.54		128	128	136

Weights in '000 t.

<sup>1</sup> Human consumption + Industrial by-catch

Under all options, SSB is expected to increase in the short term (see probability profiles on next page). However, this forecast is based on estimates of population numbers in 1995 and recruitment, both of which are not well determined.



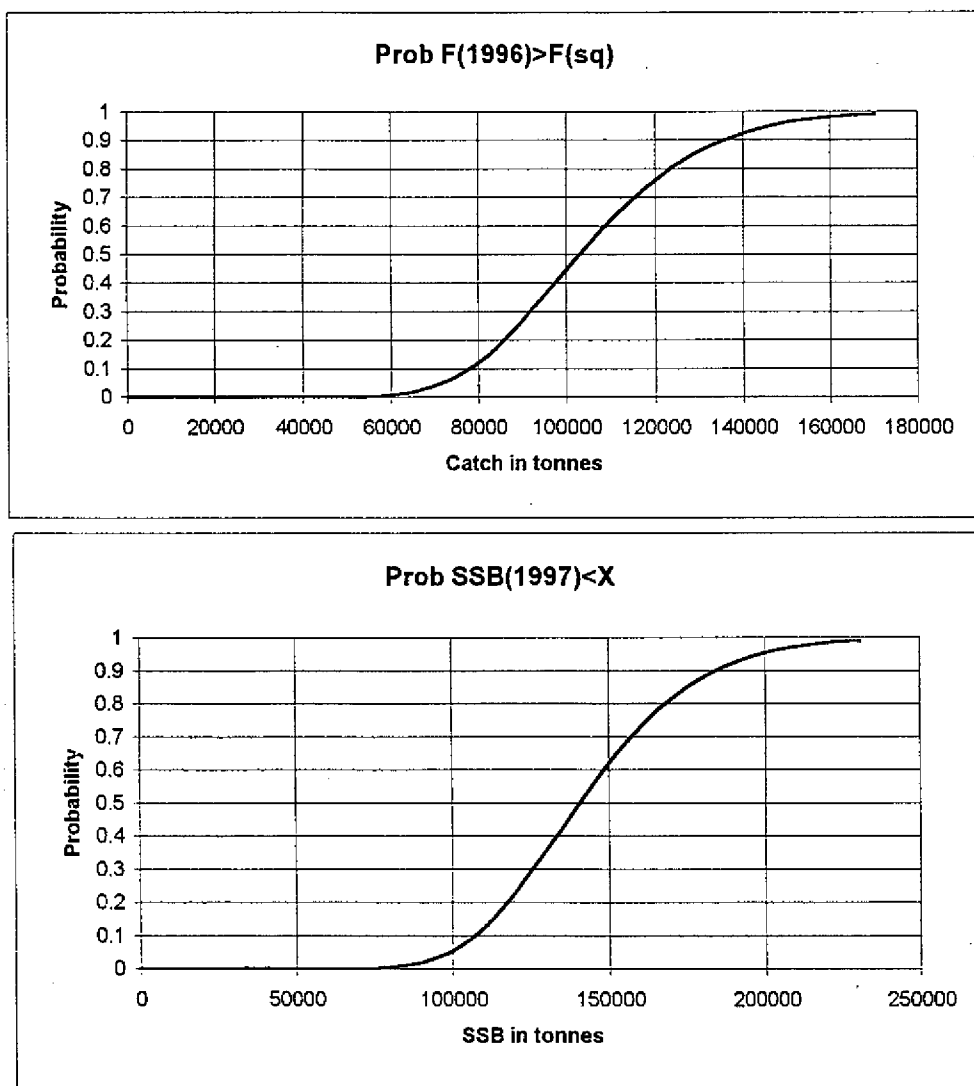
**Management advice:** ACFM recommends that the fishing mortality in 1996 should not be increased above the 1994 level. An increase of the fishing mortality above *status quo* would have a high probability of reducing the stock below safe biological limits.

**Special comments:** This assessment is consistent with the previous ones, but the lack of good recruitment indices for recent and incoming year classes makes catch predictions uncertain.

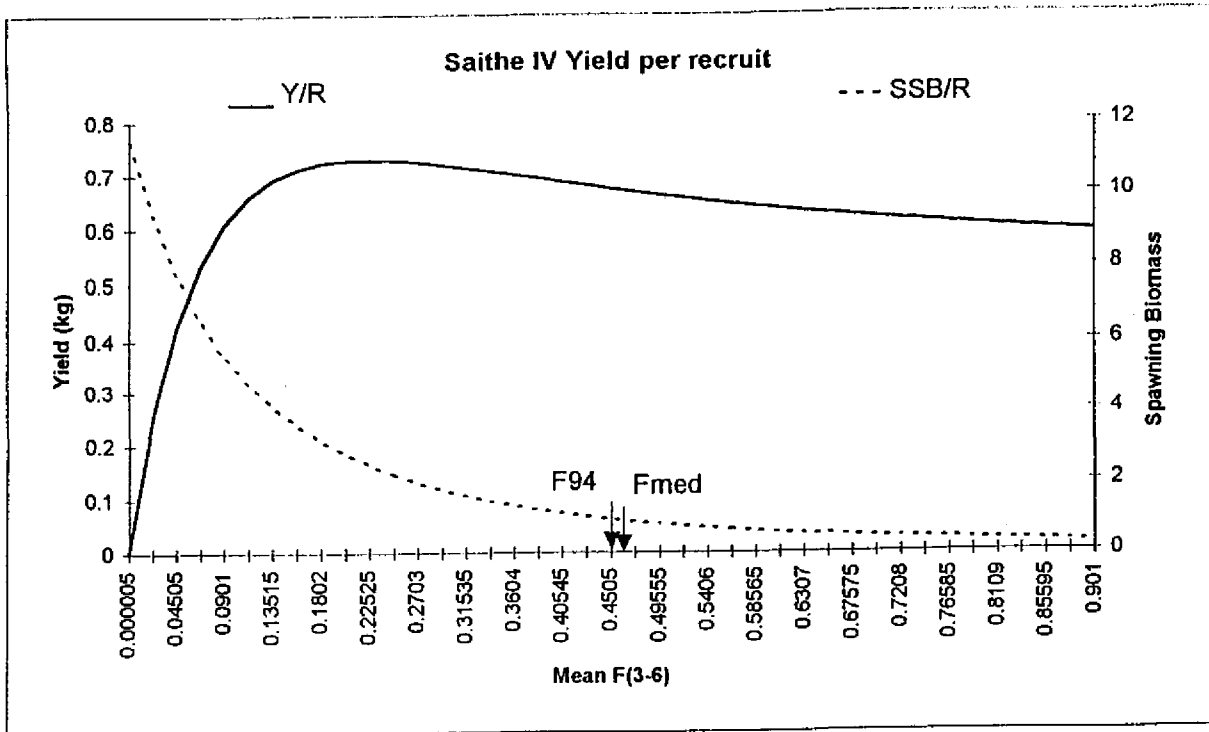
**Data and assessment:** Analytical assessment of catch-at-age data using CPUE.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995(C.M.1996/Assess:6).

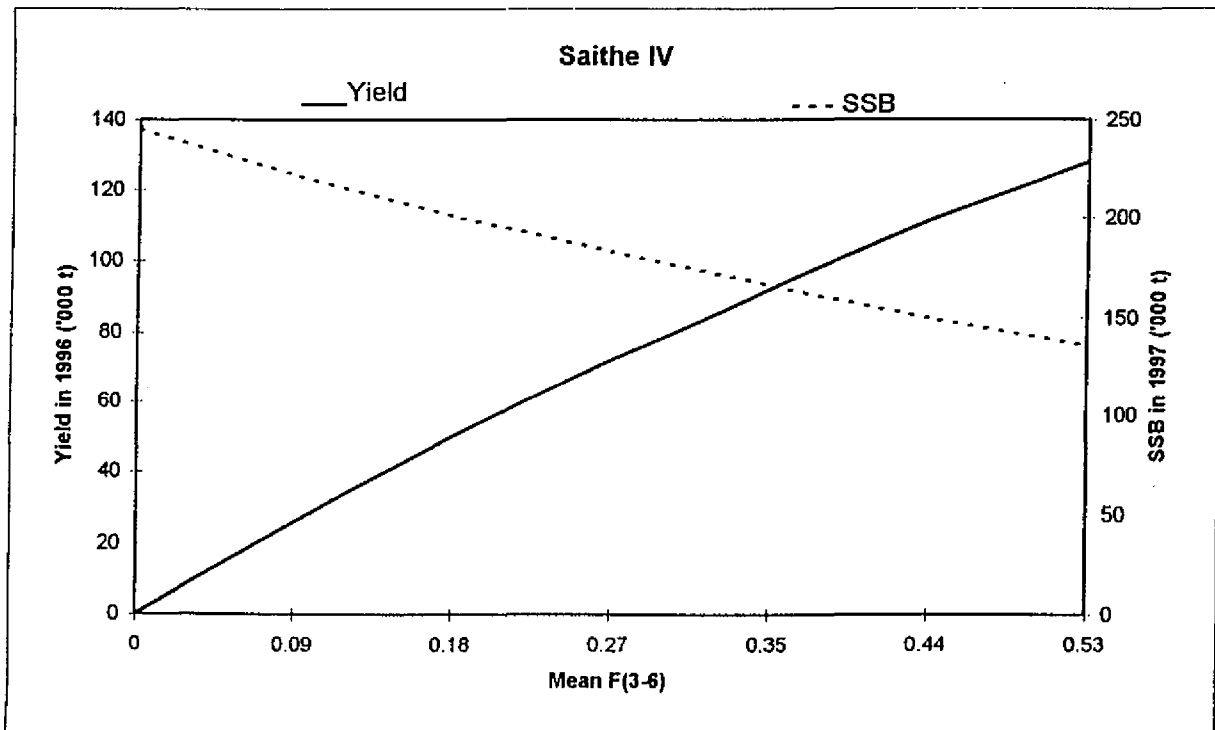
**Saithe North Sea. Sensitivity analysis of short term forecast. Cumulative probability distributions.**



### Saithe North Sea. Yield per recruit



### Saithe North Sea. Yield and SSB in the short term prediction





### 3.5.6 North Sea plaice

Catch data (Table 3.5.6.1)

Year	Rec. TAC	Agreed TAC	Off. Lndgs.	ACFM catch
1987	120	150	131	154
1988	150	175	138	154
1989	<175	185	152	170
1990	171	180	155	156
1991	169	175	143	147
1992	<sup>1</sup>	175	123	125
1993	<sup>1</sup>	175	115	115
1994	<sup>1</sup>	165	111	111
1995	87 <sup>2</sup>	115		

<sup>1</sup>No long-term gain in increasing F. <sup>2</sup>Catch at 20% reduction in F. <sup>3</sup>Catch at 40% 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 undersized 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" is closed for the whole year. Exemption fleets of beam trawlers < 300 hp were

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 fluctuating around a record high level. Spawning stock biomass has varied in relation to recruitment, but has declined rapidly since 1990 to a historical low in 1995. The Minimum biologically acceptable level (MBAL) for this stock is considered to be 300,000t. Since the mid 1980s a decrease has been observed in mean weight at age which has contributed to the recent reduction in yield and SSB.

Further details in Table 3.5.6.2.

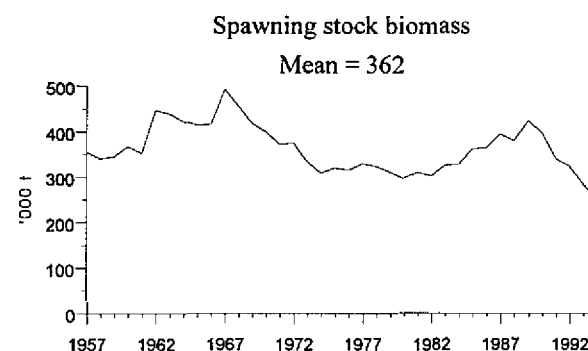
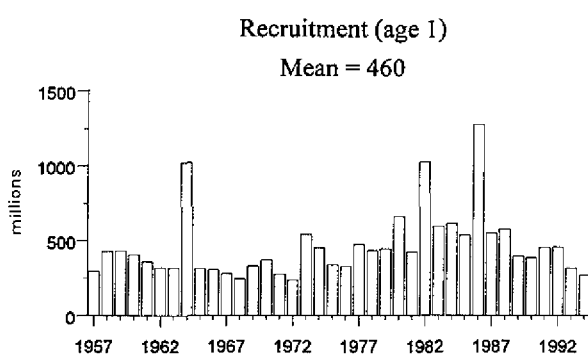
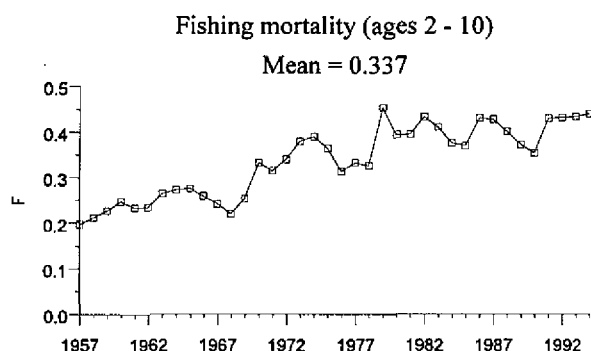
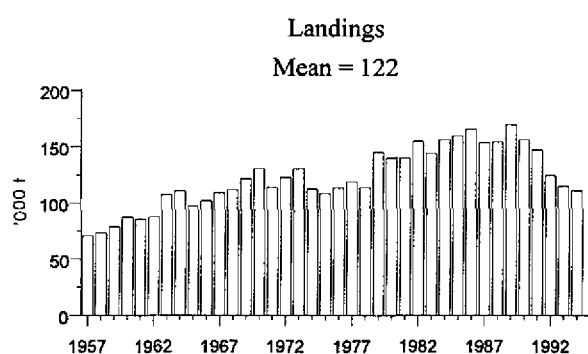
#### Forecast 1996:

SSB(95) = 236, F(95) = 0.44, Basis: F(95) = F(94), Catch(95) = 100, Landings (95) = 100.

Option	Basis	F (96)	SSB (96)	Catch (96)	Lndgs (96)	SSB (97)
A	0.2 F <sub>94</sub>	0.09	234	22	22	289
B	0.4 F <sub>94</sub>	0.18		43	43	270
C	0.6 F <sub>94</sub>	0.26		61	61	253
D	0.8 F <sub>94</sub>	0.35		78	78	237
E	1.0 F <sub>94</sub>	0.44		94	94	222
F	1.2 F <sub>94</sub>	0.53		109	109	209

Weights in '000 t.

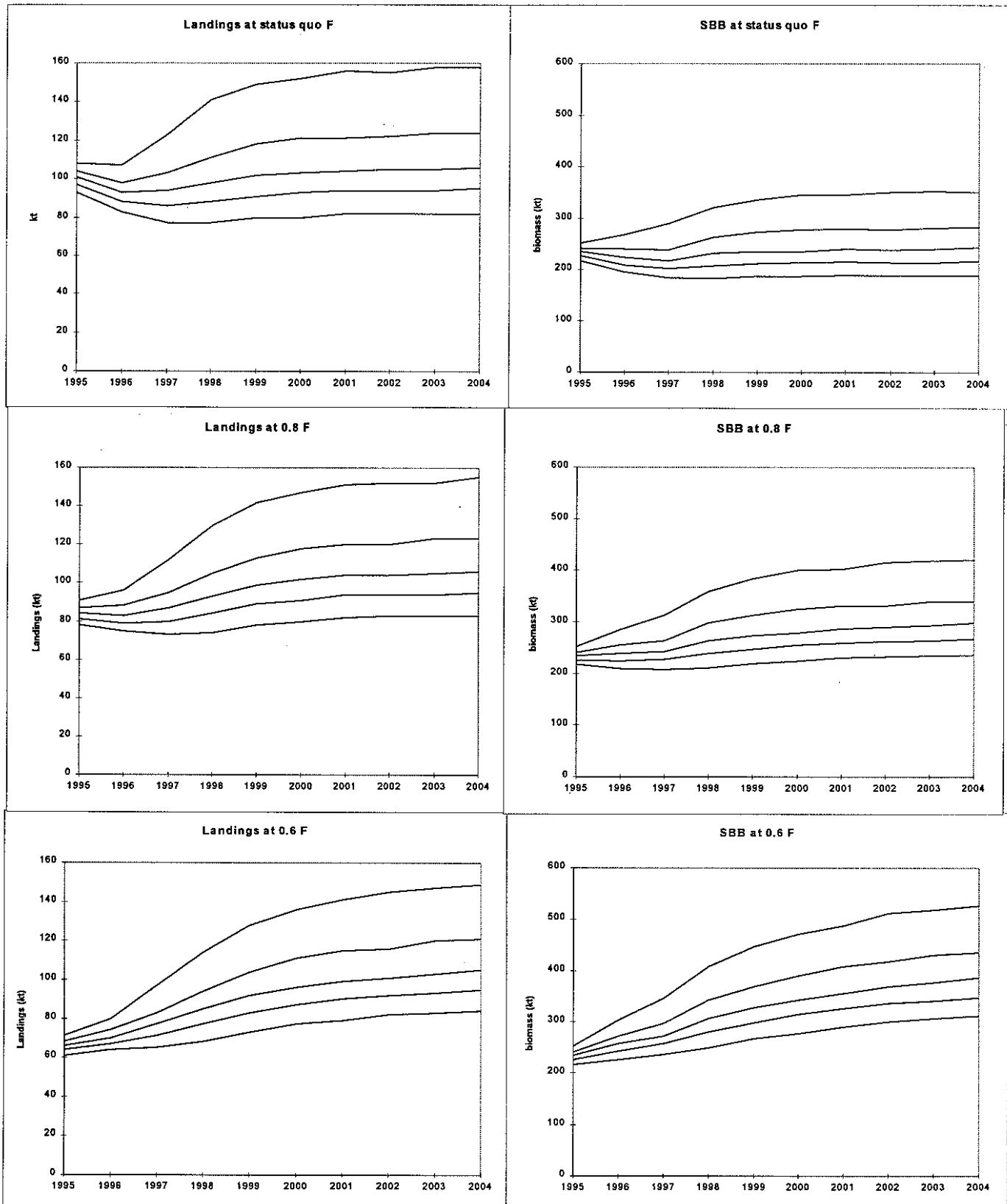
A reduction in F of more than 80% would be required to increase SSB above 300,000 t in 1997.





**Medium-term considerations:** At *status quo* fishing mortality the probability that SSB will reach MBAL in the medium term is extremely low. With a 20% reduction in fishing mortality, SSB is likely to increase and there is less

than a 50% probability that it will reach 300,000 t in the medium term. With a reduction of 40% in  $F$ , the probability that SSB will reach this level in the medium term increases to more than 75%. The results of this analysis shown below are dependent on the assumption that recruitment is independent of spawning stock biomass. In the figures below the lines show 5, 25, 50, 75 and 95 percentiles of the probability distribution..



**Management advice:** In order to allow the spawning stock biomass to increase to a level above MBAL within a few years, a significant and sustained reduction in fishing mortality is required.

**Special comments:** A 40% reduction in  $F$  is the minimum reduction required to achieve a high probability of an increase in SSB above MBAL in the medium term.

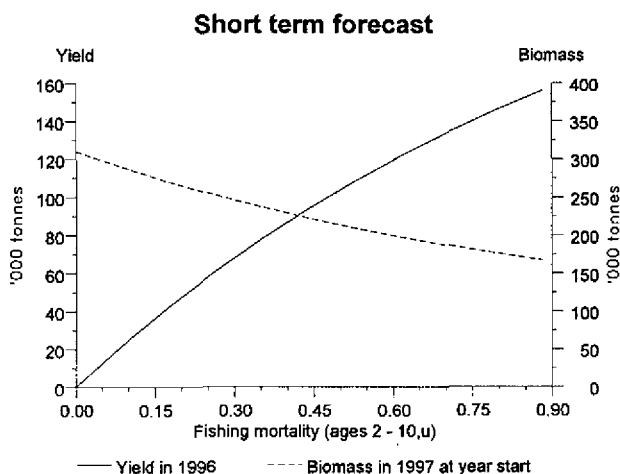
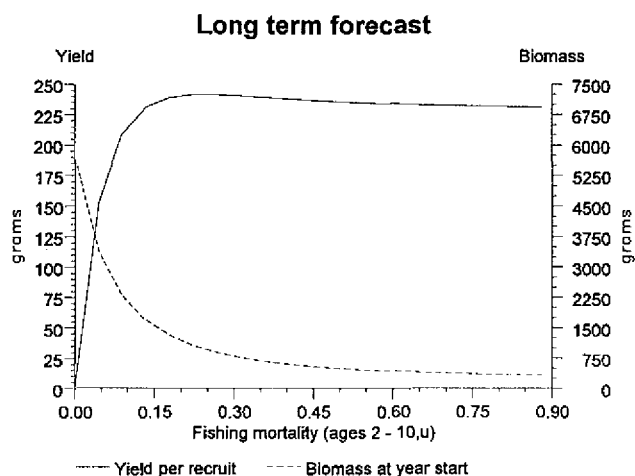
This year's assessment is consistent with that of last year and is considered to be more reliable than the assessment made between 1991 and 1993 which gave a substantial overestimate of the *status quo* catch forecast. The current assessment indicates a significant reduction in SSB in recent years.

The recent fall in SSB is due partly to a decrease in the growth rate and partly to a decrease in the level of recruitment. Effective protection of undersized fish through the "plaice box", which is now closed for the whole year, is expected to enhance recruitment to the fisheries.

**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 1995 surveys.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).

## Yield and Spawning Stock Biomass





### 3.5.7 North Sea sole

Catch data (Table 3.5.7.1):

Year	Rec. TAC	Agreed TAC	Off. Indgs.	ACFM catch
1987	11.0	14.0	13.8	17.4
1988	11.0	14.0	13.4	21.6
1989	14.0	14.0	14.4	21.8
1990	25.0	25.0	26.4	35.1
1991	27.0	27.0	27.6	33.5
1992	21.0	25.0	26.0	29.3
1993	-	32.0	29.8	31.4
1994	- <sup>1</sup>	32.0	31.3	32.7
1995	- <sup>1</sup>	28.0		

<sup>1</sup>No long-term gain in increasing 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 been expanded up to the present. 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:** The stock is considered to be within safe biological limits. The spawning stock is presently slightly above average, and is well above the minimum biologically acceptable level (MBAL) (35,000 t). The two very strong year classes of 1987 and 1991 have rebuilt SSB from historical low levels in the 1980s. Fishing mortality is stable at a high level. Recruitment is highly variable. Three recent year classes (1992-1994) are estimated as average or below average.

Further details in Table 3.5.7.2.

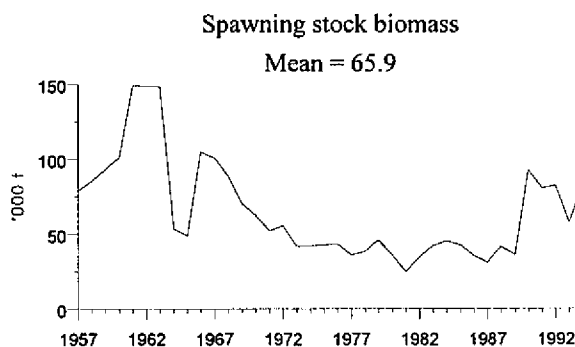
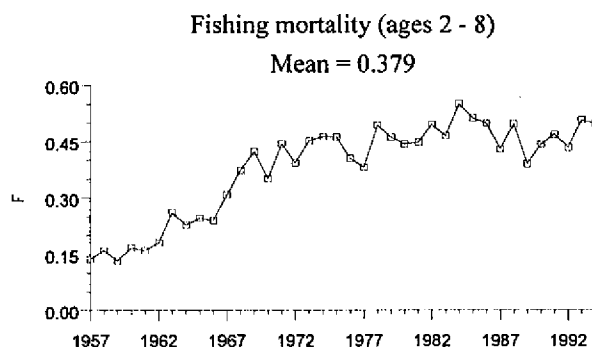
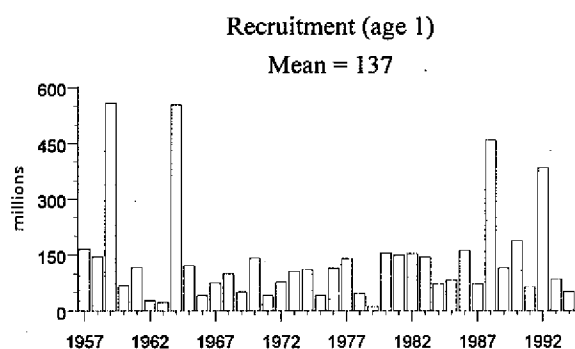
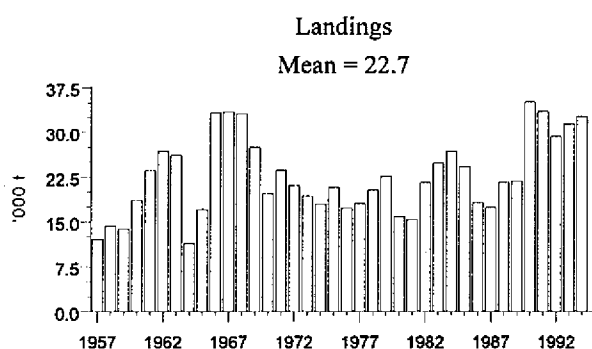
#### Forecast for 1996

SSB(95)= 72, F(95)= 0.50, Basis: F(95)= F(94), Catch(95)= -, Landings (95)= 32

Option	Basis	F (96)	SSB (96)	Catch (96)	Lndgs (96)	SSB (97)
B	0.4 F <sub>94</sub>	0.20	50		11	58
C	0.6 F <sub>94</sub>	0.30			15	53
D	0.8 F <sub>94</sub>	0.40			19	49
E	1.0 F <sub>94</sub>	0.50			23	45
F	1.2 F <sub>94</sub>	0.60			26	41

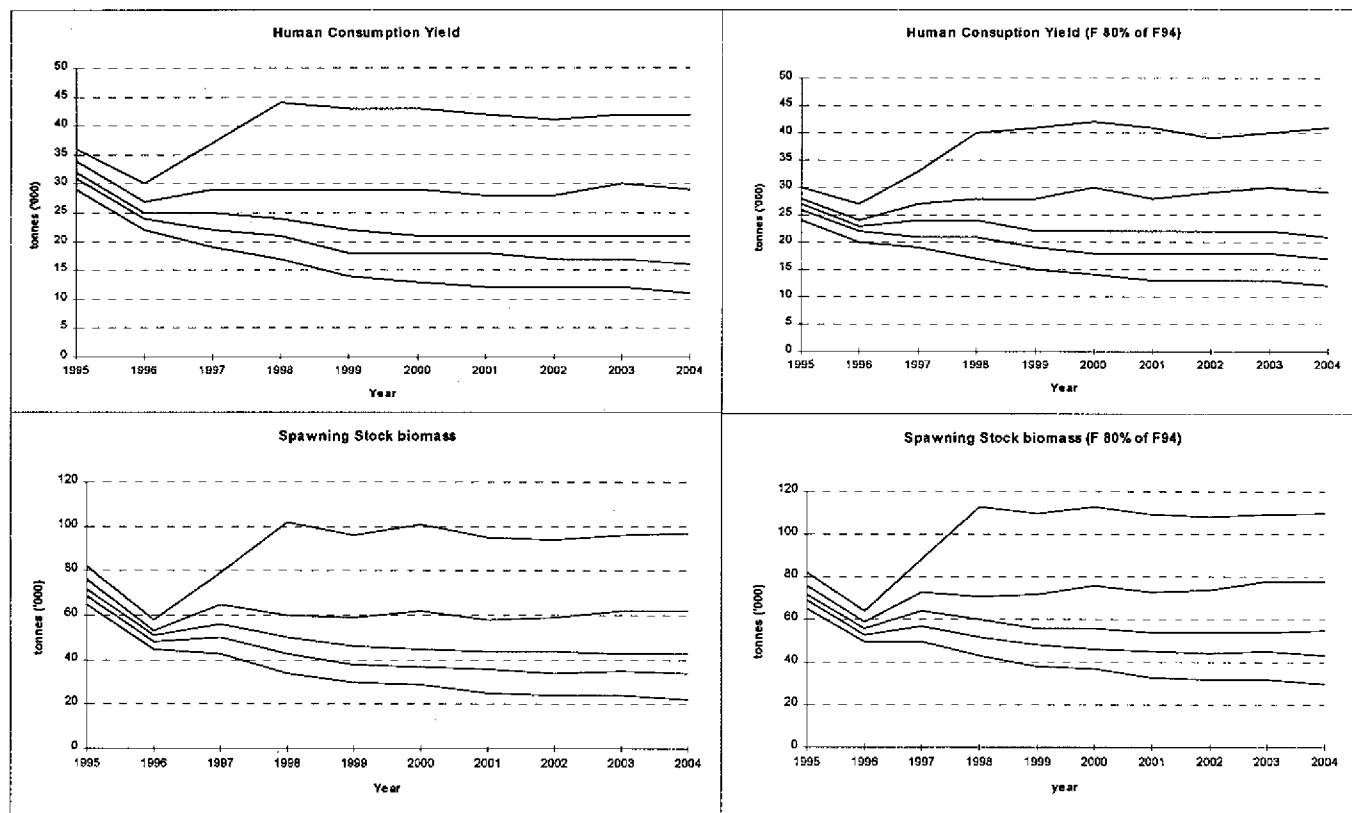
Weights in '000 t.

For all options the spawning stock is expected to decrease in 1997 compared to 1995.



**Medium-term considerations:** Medium-term analyses indicate that at the present level of fishing mortality the spawning stock is expected to decrease. Landings are also expected to decrease. The probability of the spawning stock decreasing below MBAL in the medium term is 30% at the present fishing mortality level. If the fishing mortality is

reduced to 80% of the present level, the probability that this will occur will be reduced to about 10%. The results of the simulation are shown at *status quo* F and with a 20% reduction in F are shown in the figures below which give the 5, 25, 50, 75 and 95 percentiles of the probability distribution.



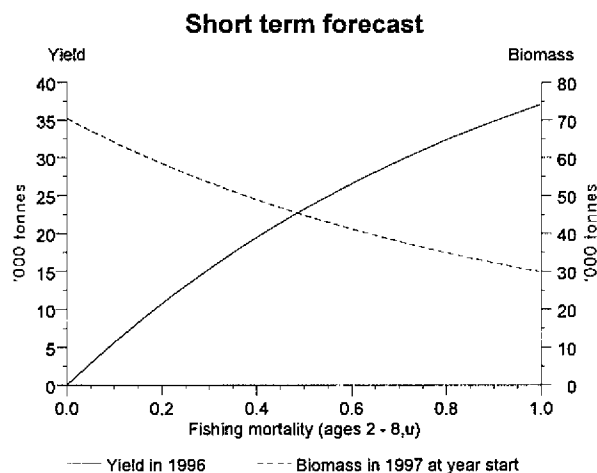
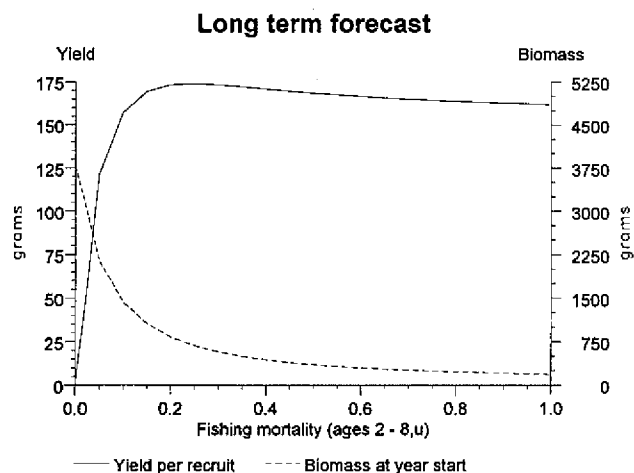
**Management advice:** Sole is mainly taken in a mixed fishery with plaice, and management measures should take into account the recommended reduction in fishing mortality on plaice.

**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 1995 surveys.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).

### Yield and Spawning Stock Biomass



### 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	Rec. TAC	Agreed TAC	ACFM Indgs.	ACFM catch
1987	610	600	625	625
1988	515	530	698	698
1989	514	514	696	700
1990	403	415	544	553
1991	423	420	561	566
1992	406	430	544	549
1993	340 <sup>1</sup>	430	521	524
1994	346 <sup>1</sup>	440	465	468
1995	429 <sup>2</sup>	440		

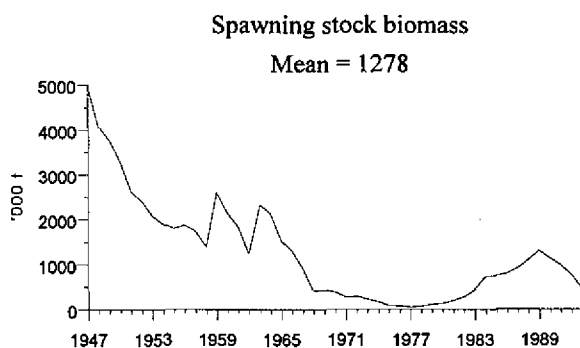
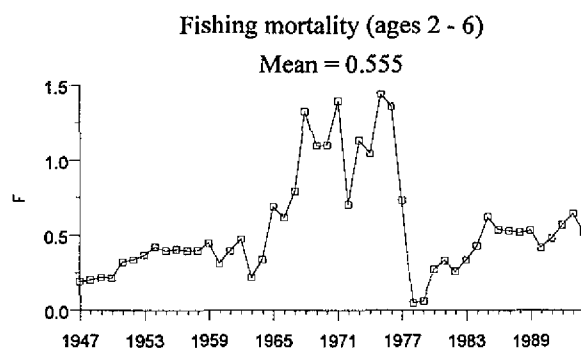
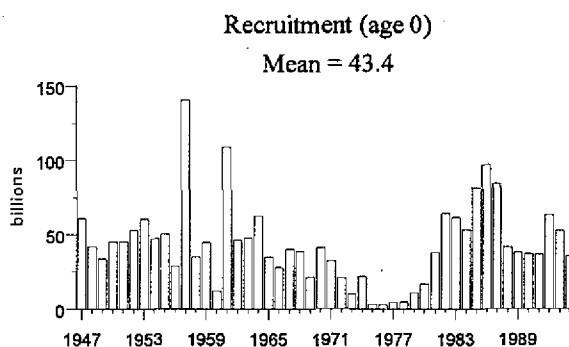
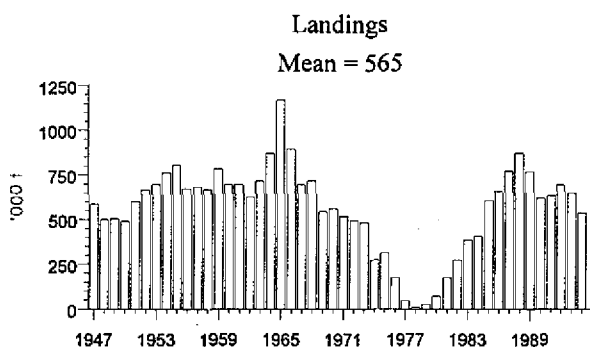
Weights in '000 t. <sup>1</sup> Catch in directed fishery corresponding to  $F = 0.3$ . <sup>2</sup> Catch in directed fishery at *status quo*  $F$ .

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

**Historical development of the fishery:** Stock depletion in the 1970s resulted in closure of the fishery and was followed by recovery. 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 herring are taken in the Kattegat and Skagerrak. The directed North Sea fishery has been managed by TACs since reopening in 1981, but catches have consistently exceeded recommended TACs.

**State of stock:** This stock is now considered to be outside safe biological limits. SSB has declined since 1989 and the most recent assessment indicates that it has fallen below 800,000 t – the level which is considered to be the minimum biologically acceptable level (MBAL) for this stock. Exploitation has been high since the early 1980's, and since 1990 has caused erosion of the older stock so that the fishery has again become dependent upon recruiting year classes. There is evidence of reduced recruitment in this stock when SSB is below 800,000 t.

Details are given in Table 3.5.8.a.1.



**Forecast for 1996:** 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

Basis:  $F(95)=F(94)=0.53$ ; Catch(95); Fleet A=443; B=79; C=36; D=12; E=29;  
Total Catch(95)=599; SSB(95)=764

	F(96) multiplier rel. to F(94) by fleet						Catch (96) by fleet					SSB (96)
	a	b	c	d	e	F <sub>2+</sub> (96)	a	b	c	d	e	
A	0	0	0	0	0	0	0	0	0	0	0	1019
B	.5	.5	.5	.5	.5	0.27	235	40	21	6	16	857
C	.5	.5	1	1	1	0.27	233	40	37	12	30	853
D	.5	1	1	1	1	0.28	232	78	37	12	30	849
E	1	1	1	1	1	0.53	418	76	37	12	29	721
F	1.2	1	1	1	1	0.64	482	76	37	12	29	675

**Medium-term considerations:** Medium-term projections (see Figure on next page) indicate that the stock has a very high probability of remaining below MBAL at current exploitation levels. A substantial (50%) reduction by major fleets (A and B) is projected to result in a 70% probability that SSB would increase above MBAL in 1997. Reduction in by-catch in the industrial fleets is projected to have relatively little impact on SSB growth in the short term, and will not be sufficient to increase SSB to a level above MBAL in the medium term. Reduction of catch in the human consumption fleet (A) is required to improve the probability of achieving MBAL in the medium term.

**Management advice:** ICES recommends a significant reduction in exploitation in order to rebuild SSB and suggests that F in 1996 be reduced by at least 50% of levels observed in 1994. The corresponding catches are given in the Forecast Table above.

#### Special comments:

1. The assessment in 1995 was calibrated with a modified acoustic survey series in which two years, considered to be anomalous, had been removed. This, combined with results from the 1994 fishery and surveys resulted in a more pessimistic view of the resource than the previous assessment. Preliminary results from the 1995 surveys support this conclusion.
2. By-catches of juvenile herring in the small-meshed 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, or to an increased abundance of sprat. Preliminary results suggest that they may have increased again in 1995. ACFM reiterates concern expressed previously about the negative impact of juvenile bycatch on loss of yield in directed fisheries and on the spawning stock biomass.

3. Given the complexity of the North Sea herring fishery, the number of possible scenarios of catch options by fleet and area is high. ACFM would welcome additional guidelines from managers on management objectives for this stock and on which catch options should be investigated in the future.
4. Misreporting of catches causes severe problems in the assessment of the North Sea stock and of stocks in adjacent areas.
5. Available information on the fungus disease *Ichthyophonus* sp., which was identified in 1991, indicates a continued decline in prevalence.
6. Low mean weights in 1993 had a large effect on biomass in that year.

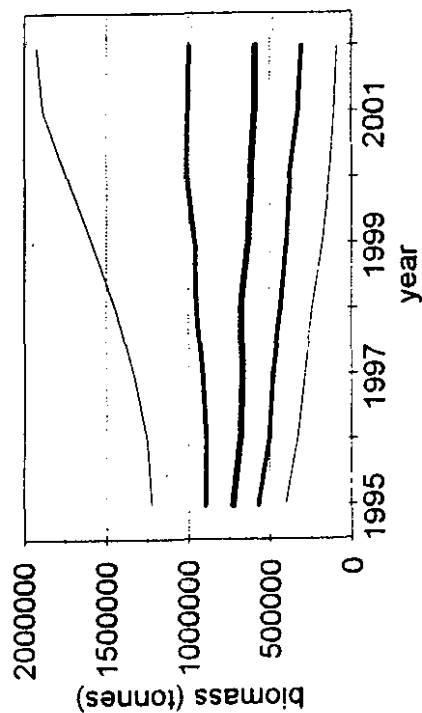
**Data and assessment:** Analytical assessment based on landings and surveys. Termination of herring larval surveys in 1993 has reduced the number of available index series.

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1995 (C.M.1995/Assess: 13).

North Sea Herring. Medium term projections. The spawning stock biomass plots show the 5,25,50,75 and 95 percentiles.

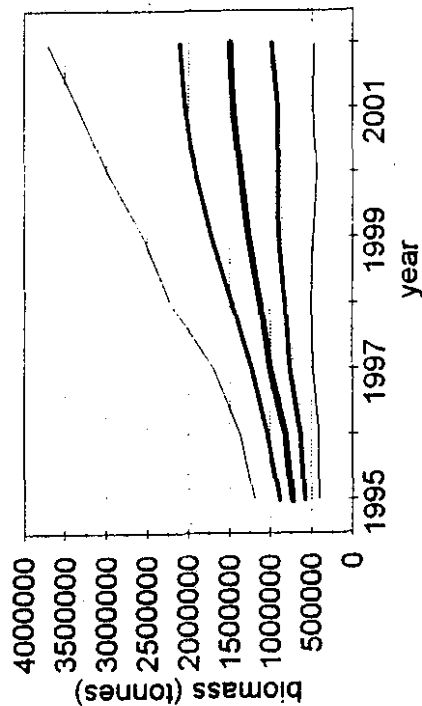
## Spawning stock biomass

Status quo fishing mortality



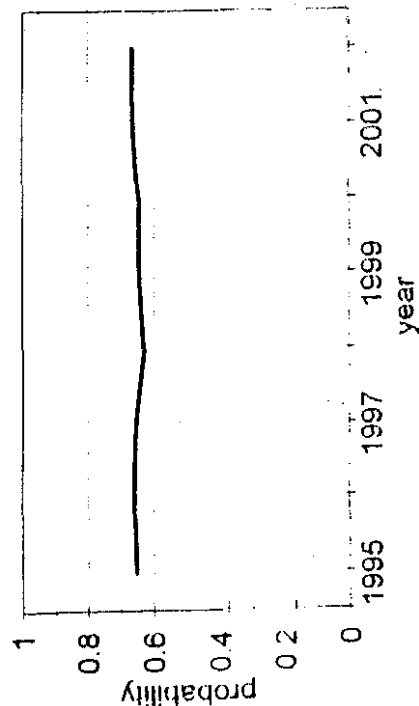
## Spawning stock biomass

50% reduction in fishing mortality



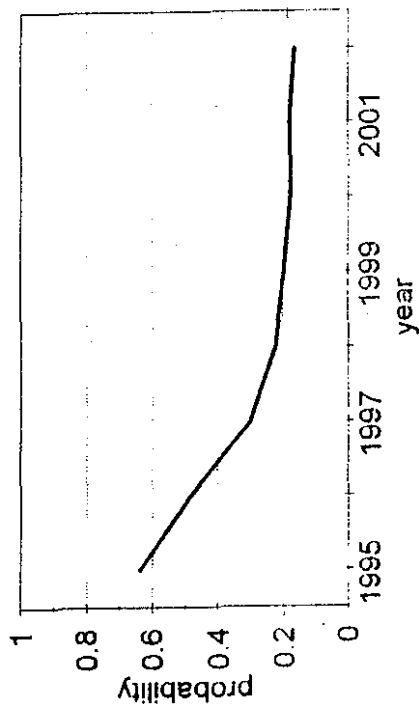
## Probability $SSB < MBAL$

Status quo fishing mortality



## Probability $SSB < MBAL$

50% reduction in fishing mortality







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

Catch data: (Table 3.5.8.5-6)

Year	Rec. TAC	Agreed TAC	Disc. slip.	ACFM catch
1987	10	40		45
1988	15	30		52
1989	30	30	1	79
1990	30	30	5	61
1991	50-60	50	3	61
1992	54	50	2	74
1993	50	50	2	85
1994	50	50	2	73
1995		50		

Weights in '000 t.

**Historical development of the fishery:** Catches increased after reopening of the fishery in 1981 to peak in 1993 at the highest level since 1964. The catches have been higher than the agreed TAC since 1987 and the catch in 1994 was about 40% above the agreed TAC.

**State of stock:** The current state of the stock is not known.

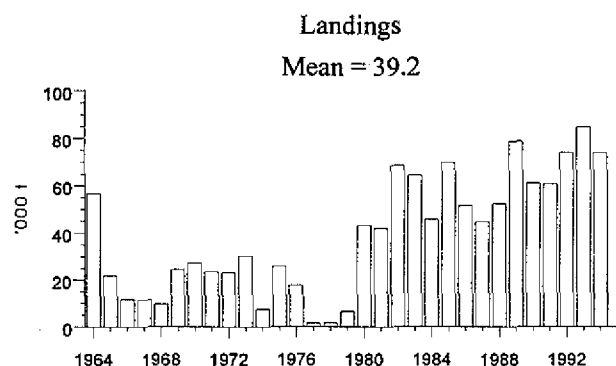
**Forecast for 1996:** No separate forecast is made for this stock which is included in the forecast for the total North Sea.

**Management advice:** The stock is assessed as part of the total North Sea and the management advice is given in Section 3.5.8.a.

**Special comments:** Discrete spawning grounds and seasons increase the susceptibility to stocks in this area to environmental conditions and fishing.

**Data and assessment:** Catch-at-age data were provided, but no assessment was made. As catches for these stocks cannot be separated from others in the North Sea, and there is no suitable fishery-independent index of abundance. Until recently, larvae surveys provided information on this spawning component, but coverage has been reduced and this information can no longer be used for assessment.

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1995 (C.M.1995/Assess:13).



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

Catch data (Table 3.5.9.1):

Year	Rec. TAC	Agreed TAC <sup>1</sup>	Official landings	ACFM catch
1987	0	57	78	33
1988	0	57	93	87
1989	-	59	50	63
1990	-	59	49	71
1991	-	55	92	110
1992	-	55	72	124
1993	-	114	127	200
1994	-	114	184	324
1995	-	175		

<sup>1</sup>EU zone. Weights in '000 t.

**Historical development of the fishery:** Landings peaked in the 1960's but decreased to a low of 16,000 t in 1986. There has been a considerable increase again since 1986, with catches of 71,000 t in 1990 and 324,000 t in 1994.

**State of stock:** The present state of the stock is not known. However, both recruitment and biomass appear to be high at present.

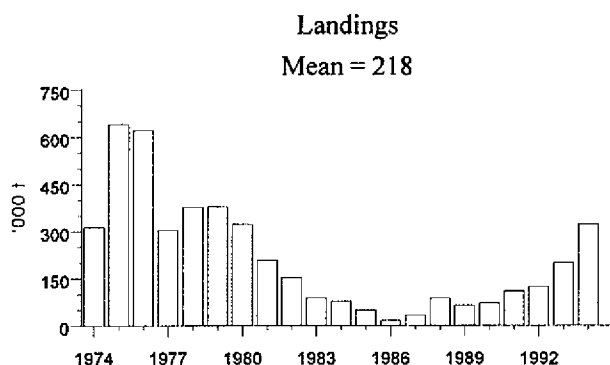
**Forecast for 1996:** No prediction is available to indicate the 1996 catch.

**Special comments:** The existing by-catch regulations limiting the proportion of protected species in sprat fisheries should be maintained.

**Data and assessment:** The catch-at-age data are of poor quality with severe inconsistencies in the age composition data which may be caused by problems of age reading. Sampling of the landings deteriorated in 1993. Inadequate catch-at-age data prevent the use of a standard analytical assessment.

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1995 (C.M.1995/Assess:13).

(Details in Table 3.5.9.2).



### 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 (Division IIIa (eastern part), Divisions IVb,c, VIId)

Catch data (Tables 3.5.11.1-2):

Year	Rec. TAC	Agreed TAC <sup>1</sup>	ACFM catch <sup>2</sup>
1987	-	30	12
1988	-	50	24
1989	-	45	33
1990	-	40	19
1991	-	45	12
1992	-	55	15
1993	-	60	14
1994	-	60	6
1995	-	60	

<sup>1</sup>Division IIa and Sub-area IV (EU waters only). <sup>2</sup>Catch 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. The majority of the catch is taken as by-catch in the small-mesh industrial fishery while catches from the directed fishery for horse mackerel are low.

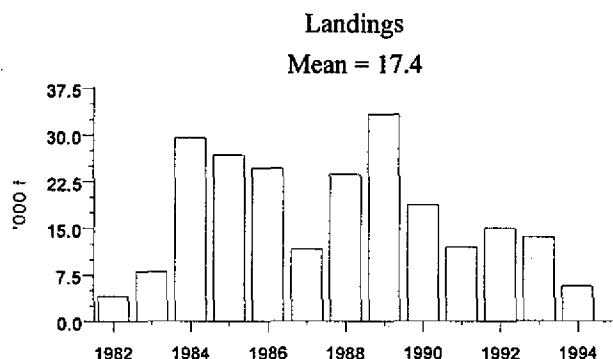
**State of stock:** Egg surveys in 1988 and 1990 indicated a spawning stock biomass of more than 200,000 t. There is no information as to the present state of the stock.

**Forecast for 1995:** No forecast is available.

**Management advice:** No advice given

**Data and assessment:** As the available biological samples are not considered to be representative of the total catch, no estimates of the catch in numbers at age were made and it was not possible to do an analytical assessment.

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, October 1995 (C.M.1996/Assess:7).



### 3.5.12 Norway pout in Sub-area IV

#### Catch data (Tables 3.5.12.1):

Year	Rec. TAC	Agreed TAC <sup>1</sup>	Off. ldngs.	ACFM catch
1987	-	200	215	147
1988	-	200	187	102
1989	-	200	276	162
1990	-	200	216	140
1991	-	200	223	155
1992	-	200	342	255
1993	-	220	239	174
1994	-	220	193	172
1995	-	180		

<sup>1</sup>Ila(EU), IIIa, IV(EU). 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 declined during the 1980s following a decline in the stock size. Most fishing for Norway pout 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 fish protected 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 1993 year class is likely to be very strong but the estimate is still uncertain. SSB has increased in recent years and is at a high level. Fishing mortality has declined.

Details given in Table 3.5.12.2.

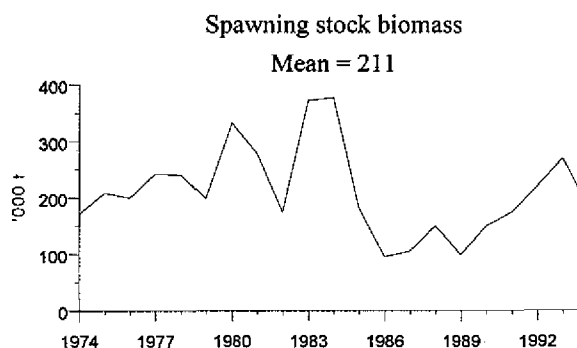
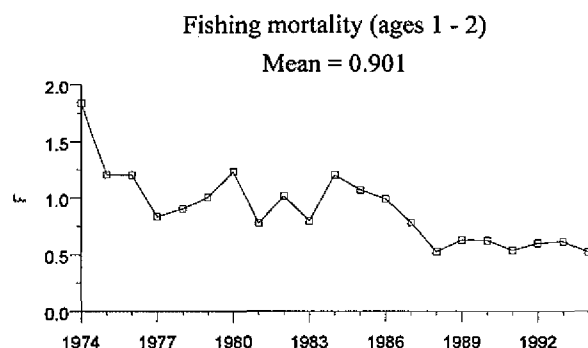
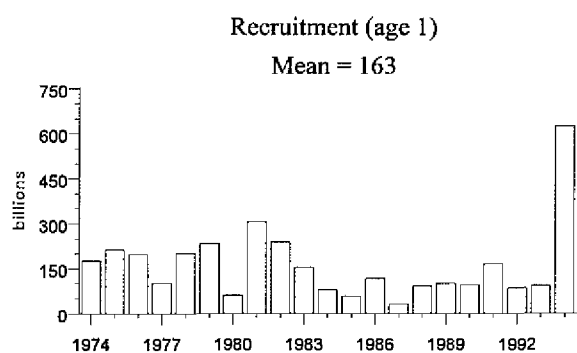
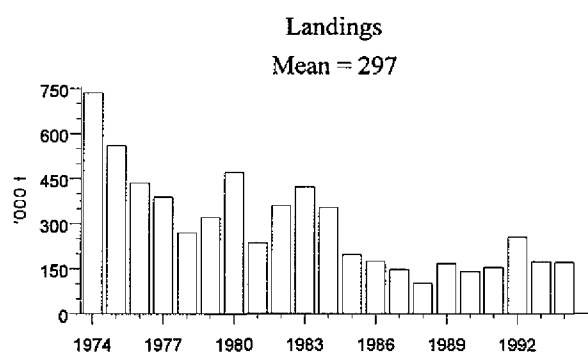
**Forecast for 1996:** As this is a short-lived species, forecasts are not reliable.

**Management advice:** The stock can sustain current fishing mortality in the short term. In managing this stock, bycatches 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, October 1995 (C.M.1996/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 and Table 3.5.13.2.

#### 3.5.13.a Sandeel in Sub-area IV

Year	ACFM catch
1987	825
1988	893
1989	1039
1990	591
1991	843
1992	855
1993	579
1994	766

Weights in '000 t.

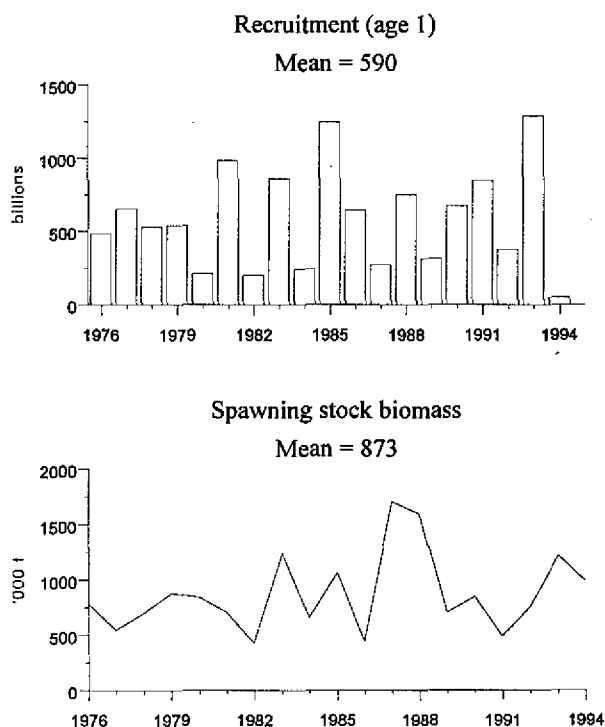
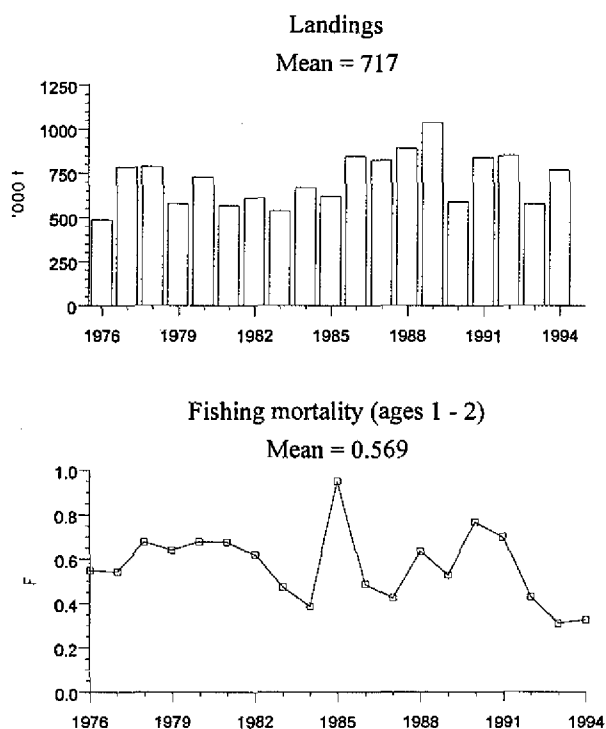
**Historical development of the fishery:** Small-mesh trawl fishery which developed in the 1970s. The fishery began in the areas around the Dogger Bank and later expanded northwards. The fishery is seasonal, taking place mostly in the spring and summer with most catches being taken in April-July. In 1994 approximately half the catches were taken in the north-eastern North Sea.

**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 500,000 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. Fishing mortality has decreased in recent years and is estimated to be approximately half  $F_{med}$  (0.63) in 1994.

Details in Table 3.5.13.a.1

**Management advice:** The stock can sustain the present level of fishing mortality in the short term.

**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 very little by-catch of protected species.



Separate assessments for the northern and the southern part of the North Sea have been presented in earlier years. An analysis of differences between the two areas indicates that differences in growth between the northern and southern area are of minor importance in assessments and may be less than the variation within the subareas. The sandeel is largely stationary and the North Sea sandeel must be considered as a complex of local stocks, which are not separated by a north-south distinction. A combined assessment including the two sub-areas gives the same overall results as the sum of the two

separate assessments. The separate assessment of the stocks in the two sub-areas has therefore been discontinued. The Shetland sandeel stock is still assessed as a separate unit (see Section 3.5.13.b).

**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 1995 (C.M.1996/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 3.5.13.2):

Year	Rec. TAC	ACFM catch
1987	-	7.2
1988	-	4.7
1989	-	3.5
1990	-	2.3
1991	<sup>1</sup>	+
1992	<sup>2</sup>	-
1993	<sup>2</sup>	-
1994	3	-
1995	3	-

<sup>1</sup>ACFM recommended low level of effort. <sup>2</sup>ACFM advised continuation of closure. 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 3,000t, limited access and seasonal closure.

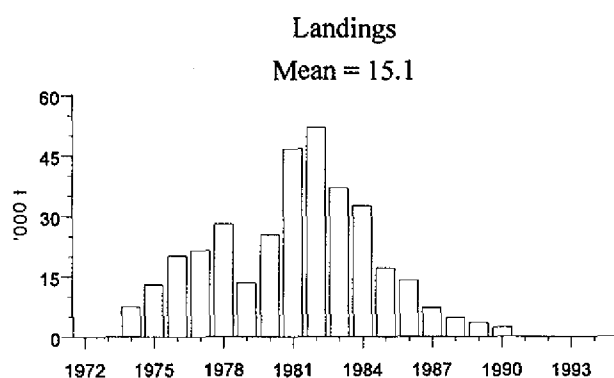
**State of stock:** Spawning biomass has increased due to maturation of the strong 1991 year class and the protection afforded by the closure of the fishery, but the precise level is uncertain. The 1993 year class is above average. The stock is probably within safe biological limits.

**Forecast for 1996:** Not available.

**Special comments:** A multiannual (3-year) TAC of 3,000t is set for this stock

**Data and assessment:** Catch-at-age and standardized effort data are available. Trawl survey indices are available for 1984-1994. No data yet available for 1995 so no updated assessment.

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





### 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	ACFM landings
1987	8.0
1988	1.2
1989	3.0
1990	2.1
1991	0.5
1992	1.6
1993	2.0
1994	1.2

(Weights in '000 t).

The catches have fluctuated widely.

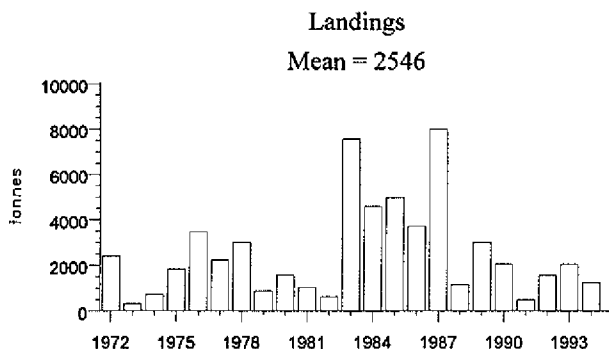
State of stock: Not known.

Forecast: Not available.

**Special comments:** The stock is composed of only 3-4 age groups and is therefore very dependent on the magnitude of annual recruitment. Very good recruitment information is required if short-term predictions are to be made. The effort in this fishery in recent years has also been very dependent on the market price for shrimp.

**Data and assessment:** Catch data were updated. No assessment has been presented for this stock since 1992.

**Source of information:** Report of the Study Group on the Life Histories and Assessment of *Pandalus* stocks in the North Atlantic. ICES CM 1995/K5



### 3.5.14.b *Pandalus borealis* in Division IVb Farn Deep

Catch data (Table 3.5.14.b.1):

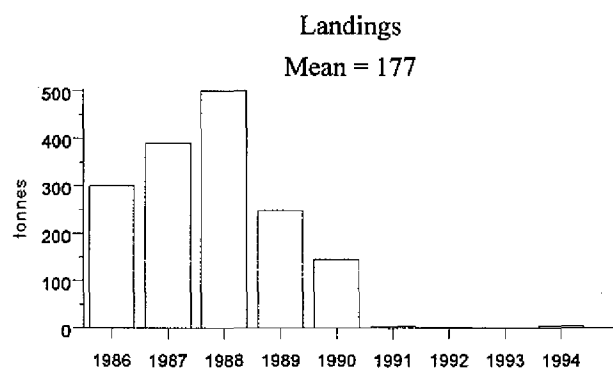
Year	ACFM Landings
1987	0.39
1988	0.50
1989	0.25
1990	0.14
1991	+
1992	+
1993	0
1994	+

(Weights in '000 t)

**Historical development of the fishery:** This is a sporadic fishery which reached a peak in the mid- to late 1980s but declined rapidly to zero landings in 1993. The reason is not thought to be a low stock level, rather a reduction in market price and a drop in demand.

**Data and assessment:** Few data are available and no assessments were attempted.

**Source of information:** Report of the Study Group on the Life Histories and Assessment of *Pandalus* stocks in the North Atlantic. ICES CM 1995/K:5.





### 3.5.15.a *Nephrops* in Division IVa Rectangles 44-48 E6-E7+44 E8

Units included in recommended Management Area: a) Moray Firth (Unit 9) and b) Noup (Unit 10).

Catch data (Tables 3.5.15 a.1 and 3.5.15 a.2):

Year	Rec TAC	Agreed TAC <sup>1</sup>	ACFM landings
1987			2.1
1988			2.1
1989			2.7
1990			2.3
1991	2.33		1.8
1992	~2.40	12.0	1.8
1993	2.40	12.0	2.3
1994	2.40	13.0	2.1
1995	2.40	15.2	

(Weights in '000 t) <sup>1</sup>EU zone of IIa and IV

**Historical Development of the Fishery:** Moray Firth landings in 1994 fell to 1991 levels, and were the lowest in the 10 year period (graph a). Landings from the Noup again rose in 1994 to reach their highest level (graph f). Total landings for the Management Area are shown at the foot of the page.

**State of stock:** a) Moray Firth: long-term data series show LPUE with a low value in 1994 (graph c). Effort is relatively stable at a level well below the high values of 1986-1990 (graph b). Yield per recruit analysis from the length-based assessment suggests that the stock is fully exploited at current levels of effort, with current  $F$  slightly above  $F_{max}$  in males, but well below  $F_{max}$  in females (graph e). The age-based assessment suggests that  $F$  in males has fallen in line with effort.

b) Noup: LPUE fluctuating and relatively high in 1994 (graph h). Effort has expanded rapidly to its highest level in 1994 (graph g).

The stocks in this Management Area are fully exploited.

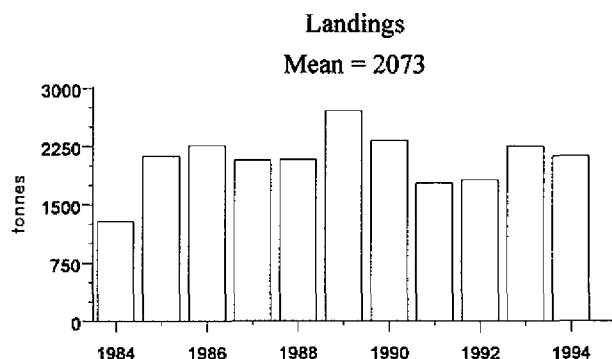
**Management advice:** ACFM advises a precautionary TAC for 1996 and 1997 of about 2,400 t.

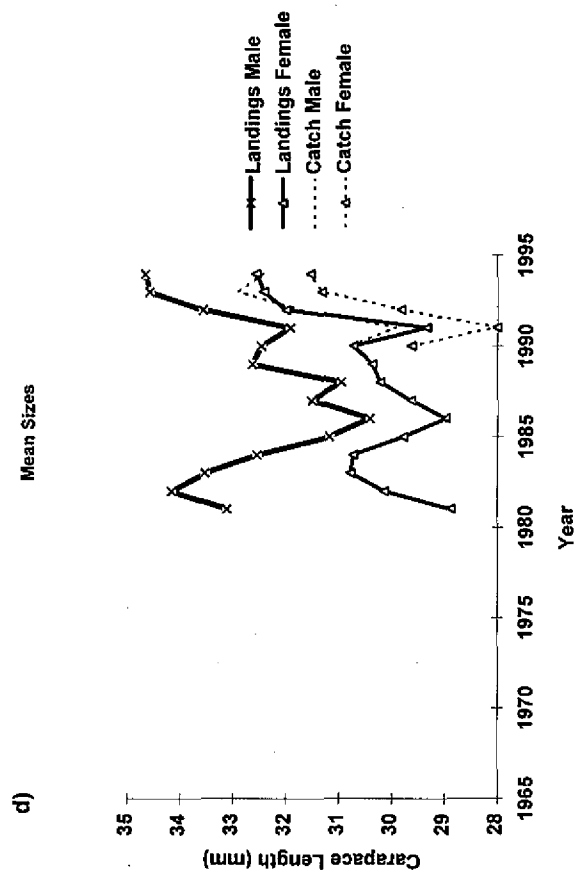
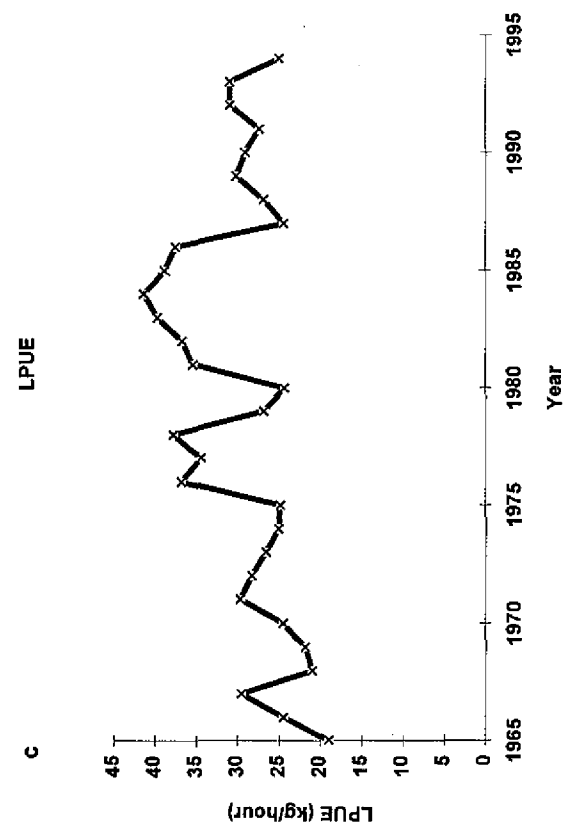
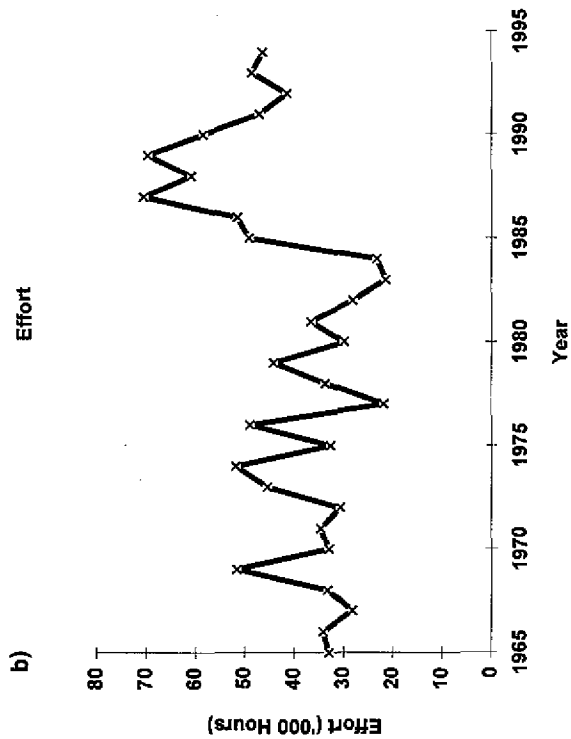
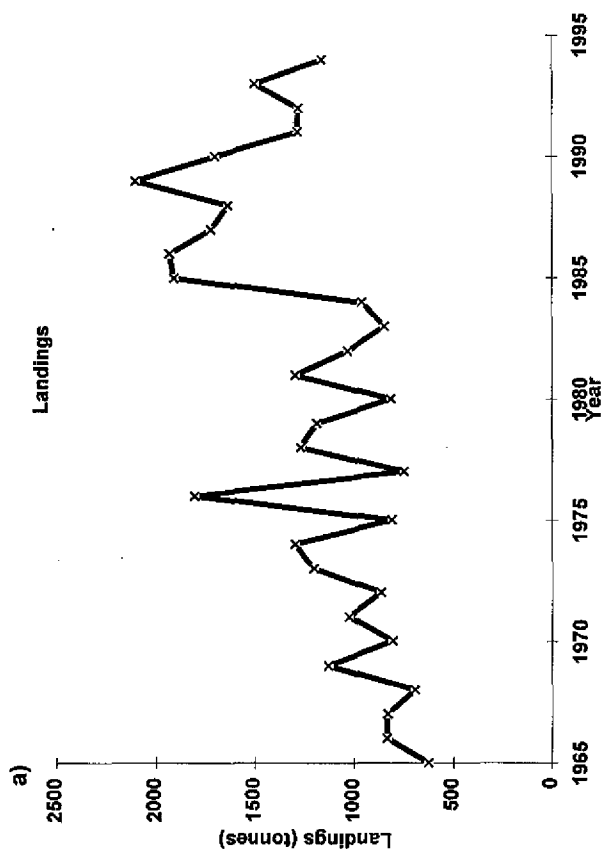
**Special comments:** In 1994, ACFM advised a precautionary TAC of about 2,400 t for 1995. There is no basis for revising this figure for 1996 and 1997. It should be noted that this recommended management area includes two functional units and that a TAC set for the entire area will not necessarily result in balanced exploitation between the two units. In the North Sea area, the total agreed TAC has been increased in 1995 to 15,200 t, which is 27% above the level advised by ACFM for the different management areas combined. This has caused an imbalance of effort distribution in relation to the stocks. Extra effort has been directed to those stocks which are considered at the moment to be at least fully exploited.

**Data and assessment:** LPUE, landings/area and effort/area data available for both units. Mean size data available for the Moray Firth (graph d). Length-based Y/R and age-based assessments were carried out, but uncertainties in the input parameters and low  $F$  values for females make the VPAs unreliable. TV camera survey carried out in Moray Firth in 1993 and 1994. No length composition data available for Noup.

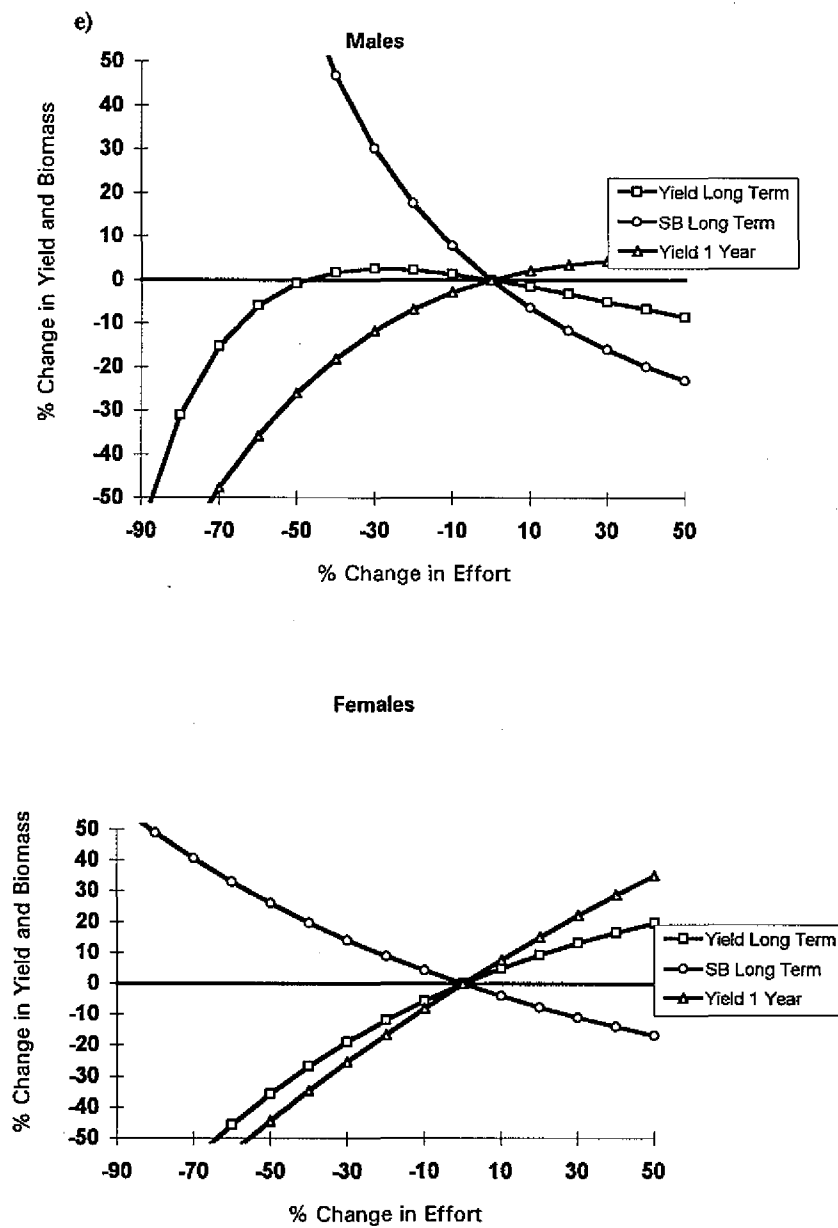
**Source of information:** Report of the Working Group on *Nephrops* Stocks, March 1995 (C.M.1995/Assess:12).

Landings from recommended Management Area  
(Details in Table 3.5.15 a.3)

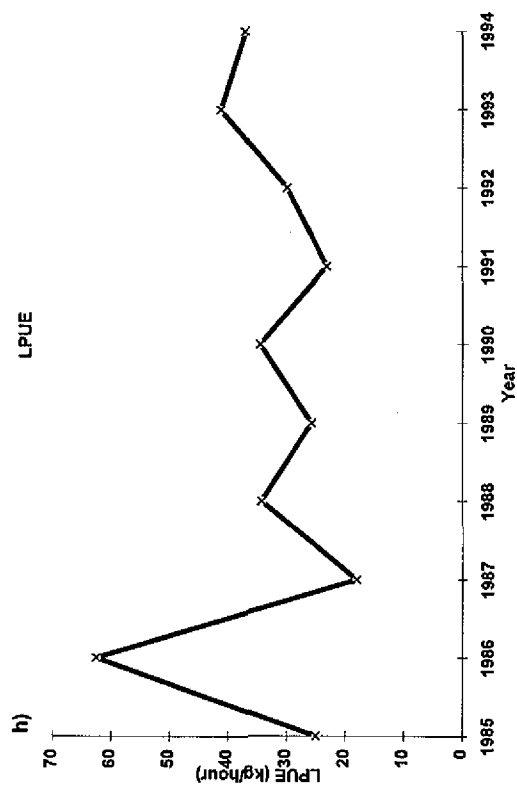
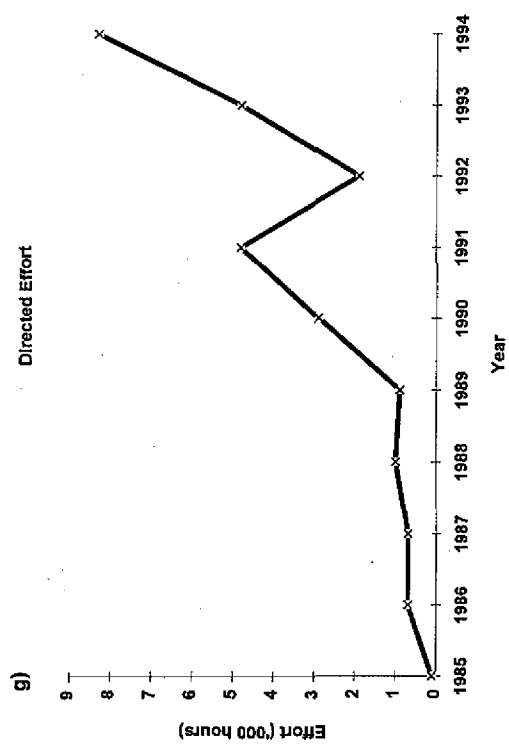
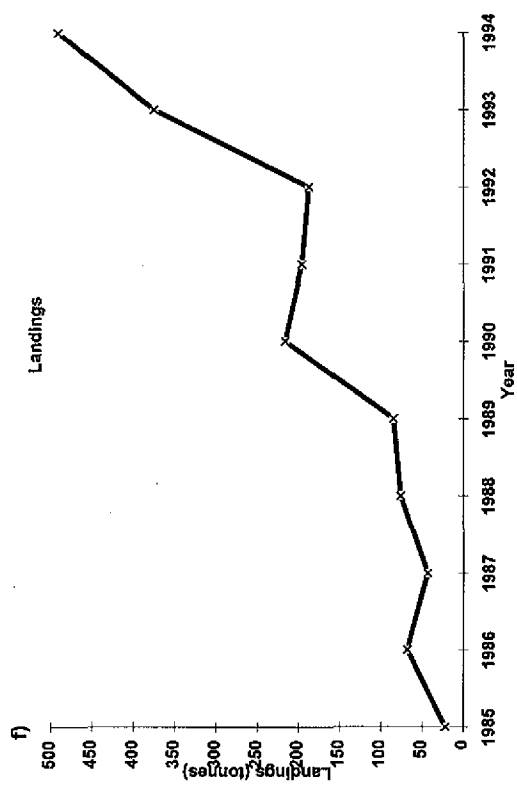




Moray Firth (F08): Long-term trends in Scottish Nephrops trawler landings (tonnes), effort ('000 hours), LPUE (kg/hour) and mean size (mm CL) in catch and landings.



Moray Firth (FU9): Percentage changes in long-term landings and stock biomass, and short-term landings following various changes in fishing effort  
Males and females shown separately



Noup FU10: Long-term trends in UK landings (tonnes), effort by Scottish *Nephrops* trawlers (000 hours), and LPUE (kg/hour).

### 3.5.15.b *Nephrops* in Division IVa (Rectangles not included under Section 3.5.15 a)

Units included in recommended Management Area: a)  
Fladen Ground (Unit 7).

Catch data (Tables 3.5.15 b.1–3.5.15 b.2) :

Year	Rec TAC	Agreed TAC <sup>1</sup>	ACFM landings
1987			1.7
1988			1.6
1989			2.4
1990			2.7
1991	2.37		4.5
1992	~2.7	12.0	3.5
1993	2.7	12.0	3.9
1994	5.0	13.0	4.8
1995	5.0	15.2	

(Weights in '000 t) <sup>1</sup>EU zone of IIa and IV

**Historical Development of the Fishery:** The overall trend in landings from the Fladen Ground is upwards, with the highest level recorded in 1994 (graph a).

**State of stock:** LPUE remains high (Scotland) (graph c) and very high (Denmark). TV camera surveys suggest that the stock is not fully exploited and that it could sustain increased fishing effort.

Fishing effort by *Nephrops* trawlers is stabilising (graph b), but landings by other categories of vessels are rising rapidly. Effort is not considered to be high in relation to the area of ground available.

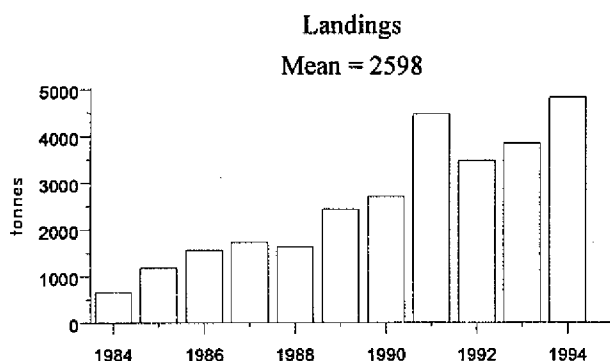
**Management advice:** In the light of the continuing high biomass estimates from TV-trawl surveys, ACFM advises a precautionary TAC of 5,000 t for 1996 and 1997.

**Special comments:** In 1994 ACFM advised a precautionary TAC of 5,000 t for this Management Area for 1995. There is no basis for revising this figure for 1996 and 1997. Because of the different state of exploitation on the Fladen Ground compared to other units in the North Sea, a separate TAC would be advisable and adoption of the recommended Management Areas is again encouraged. Rapid uptake in 1994 led to an increase in the North Sea Precautionary TAC. This allowed effort to increase in other Management Areas within the North Sea where effort should have been held at previous levels. With a subdivision of the North Sea TAC the extra effort could properly be diverted to the Fladen ground.

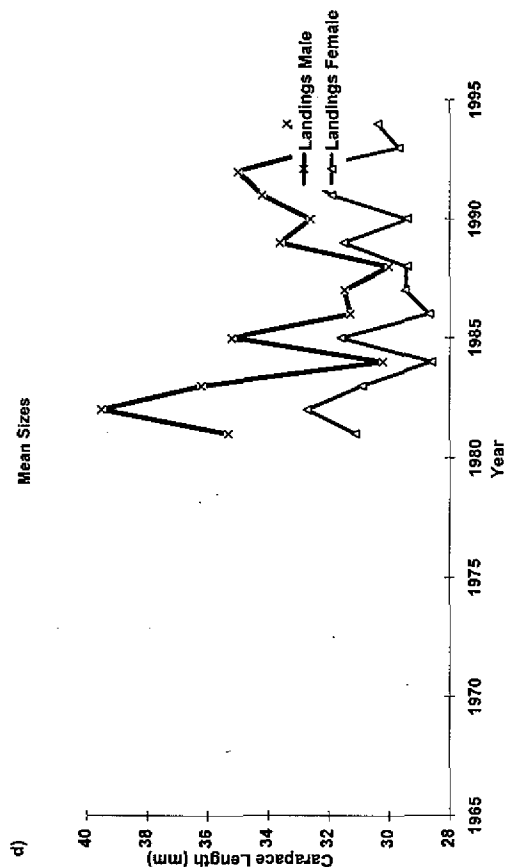
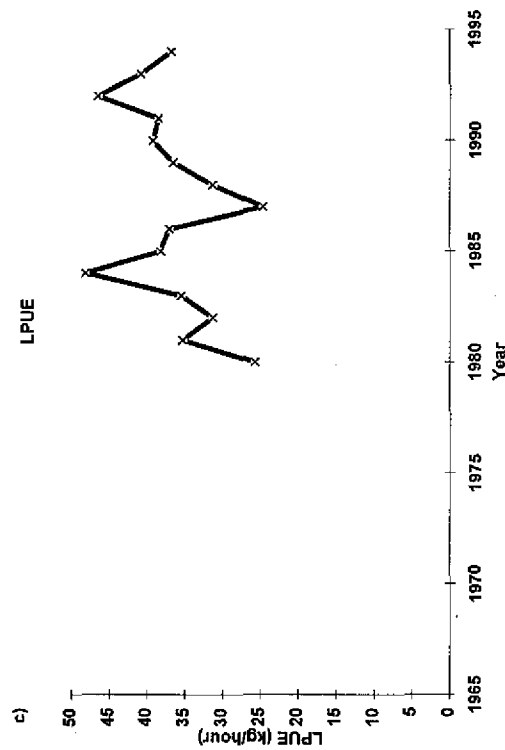
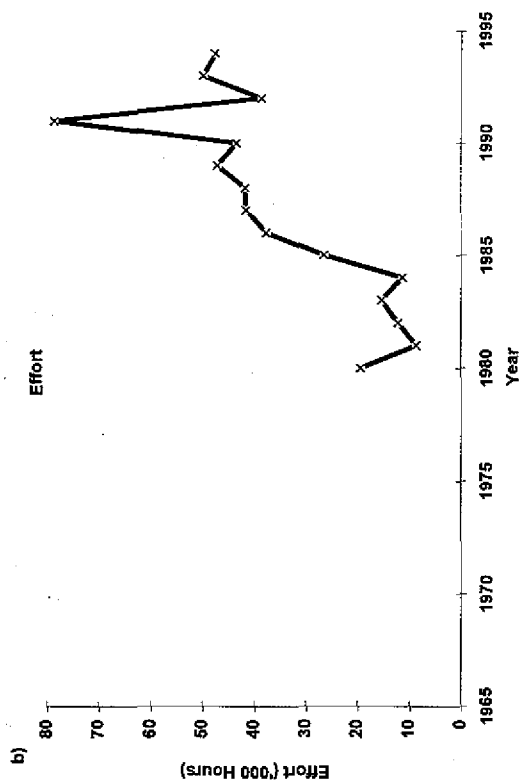
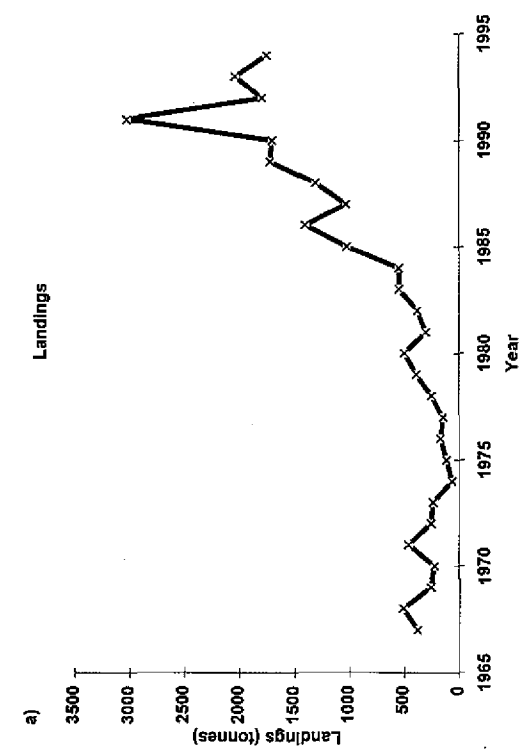
**Data and assessment:** LPUE, mean size (graph d), landings/area and effort/area data are available. Length-based and age-based assessments are considered unreliable because of inadequate data. Stock abundance and biomass estimated from TV surveys in 1992-1994 are considered to be more reliable.

**Source of information:** Report of the Working Group on *Nephrops* Stocks, March 1995 (C.M.1995/Assess:12).

Landings from recommended Management Area  
(Details in Table 3.5.15b.3)







### 3.5.15.c *Nephrops* in Divisions IVb,c east of 1°E

Units included in recommended Management Area: a) Botney Gut and Silver Pit (Unit 5).

Catch data (Table 3.5.15 c.1–3.5.15 c.2) :

Year	Rec TAC	Agreed TAC <sup>1</sup>	ACFM landings
1987			>0.52
1988			0.71
1989			0.89
1990			1.00
1991	0.77		1.05
1992	~0.87	12.0	0.81
1993	0.87	12.0	0.95
1994	0.87	13.0	0.85
1995	0.87	15.2	

(Weights in '000 t) <sup>1</sup>EU zone of IIa and IV.

**Historical Development of the Fishery:** Available data cover landings from 1986 onwards. Landings increased in the period 1986-1991 and then fluctuated until 1993, but fell in 1994 (graph a). There was a considerable decrease in effort in 1993 and again in 1994 as a result of decommissioning of vessels (graph b).

**State of stock:** LPUEs of males have increased since 1991 (graph c). Female LPUEs fluctuating depending on

availability in the third quarter (graph d). Mean size of males has decreased slightly, that of females stable over the time series 1986-1994.

Current  $F$  is close to  $F_{\max}$  for males and far below  $F_{\max}$  for females (graph e). The stock is considered to be fully exploited.

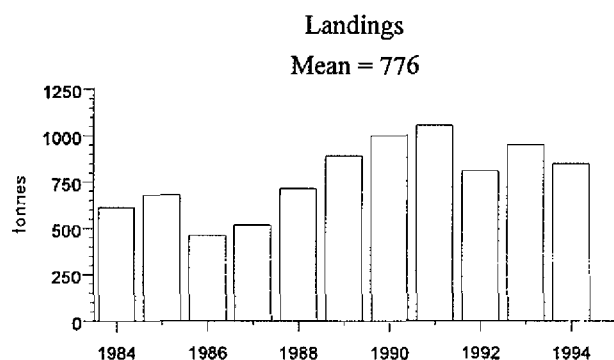
**Management advice:** ACFM recommends a precautionary TAC of 875 t in 1996 and 1997.

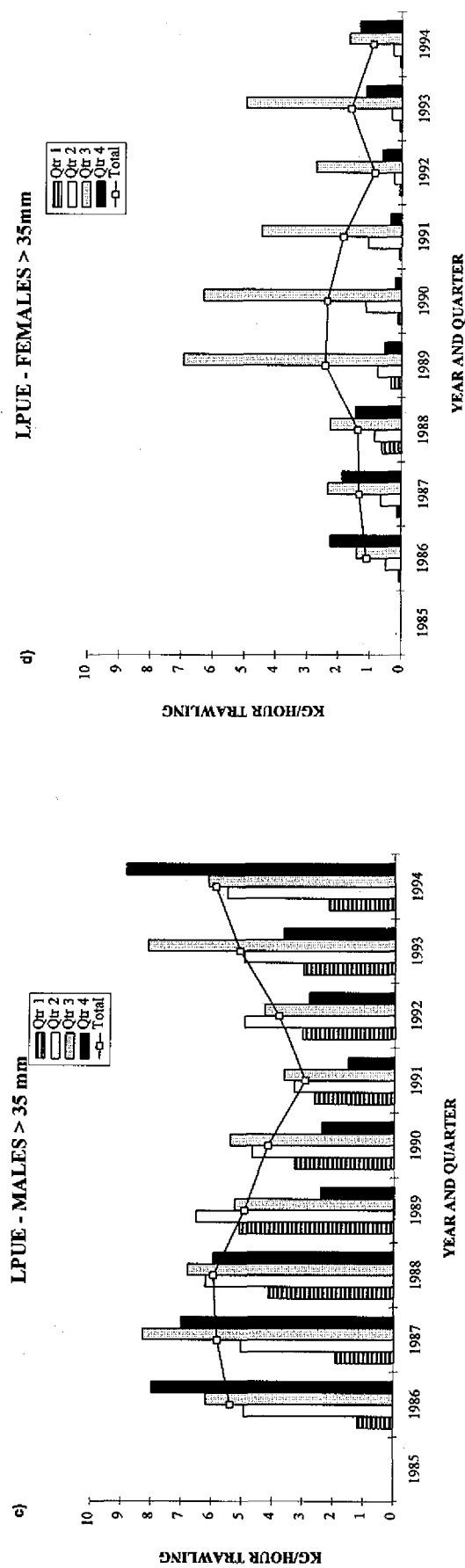
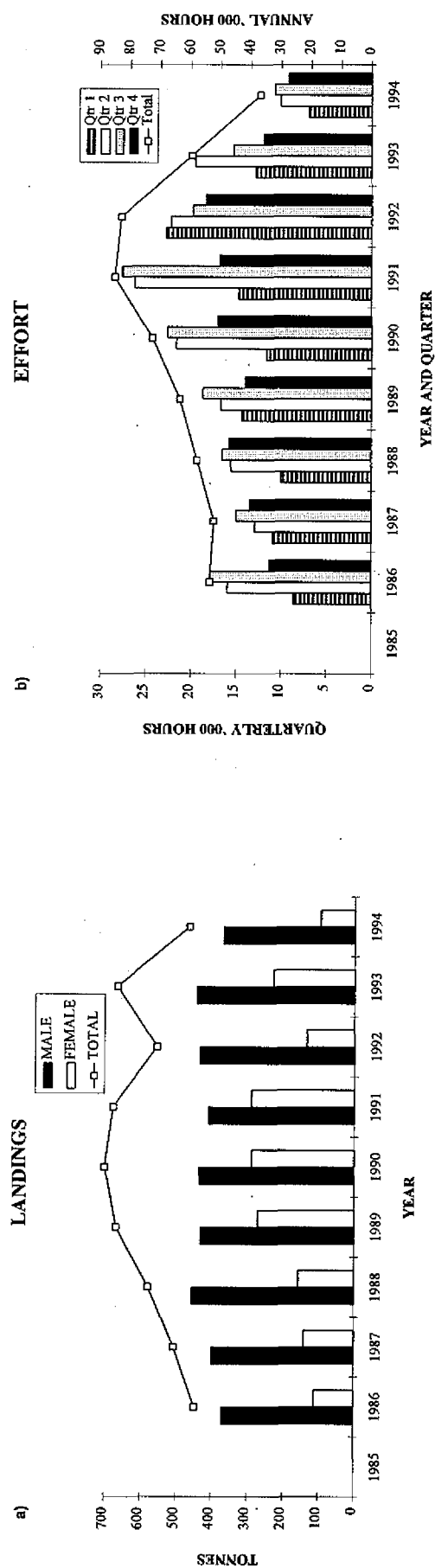
**Special comments:** ACFM advised a precautionary TAC of 875 t for the Management Area in 1993-1995. There is no basis for revising this figure for 1996 and 1997. In the North Sea area, the total agreed TAC was increased in 1995 to 15,200 t, which is 25% above the level ACFM advised for the different management areas combined. This has caused an imbalance of effort distribution in relation to various stocks in the North Sea.

**Data and assessment:** Landings data revised to take account of non-reported landings. Length-based assessment using length frequency data for 1992-1993 for both males and females. The length frequency data were improved for both landings and discards. The assessment is considered to be uncertain due to inadequate biological data.

**Source of information:** Report of the Working Group on *Nephrops* Stocks, March 1995 (C.M.1995/Assess:12).

Landings from recommended Management Area.  
(Details in Table 3.5.15c.3).

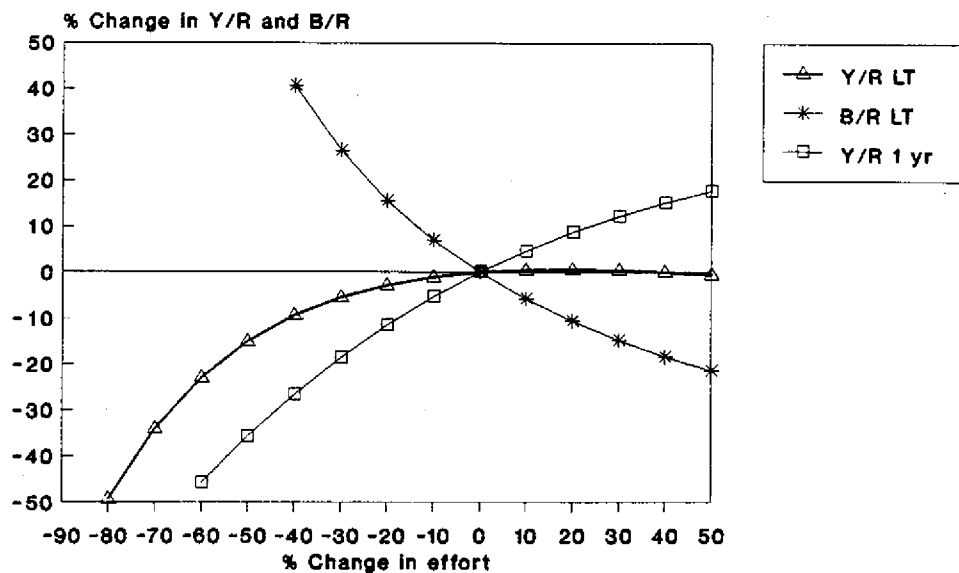




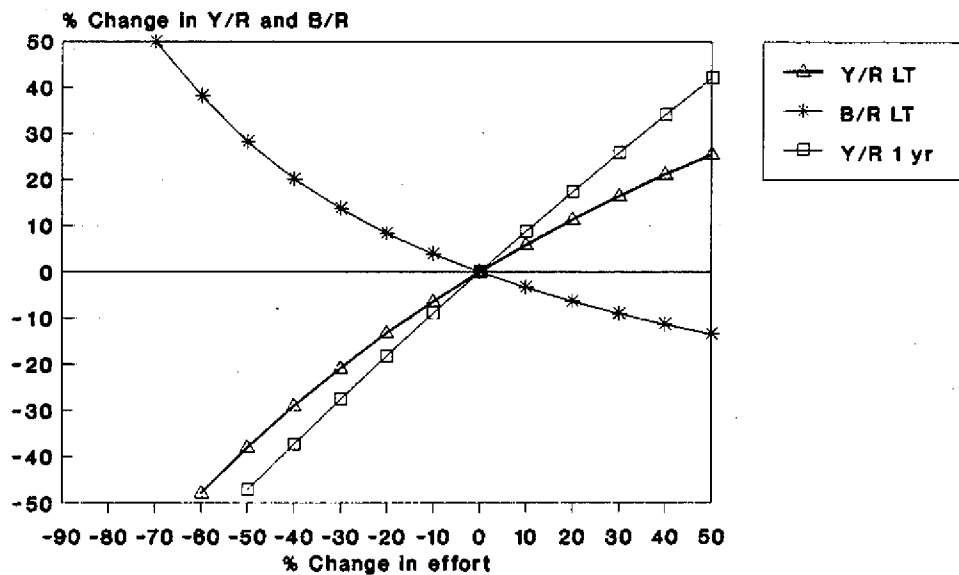
Botney Gut (functional unit 5): trends in landings, effort and LPUE by quarter and sex from belgian Nephrops trawlers.

e)

**Nephrops : Botney Gut - Silver Pit**  
**LCA (ref. period 1992-93)**  
**Males (final run BG-MAL-02)**



**Nephrops : Botney Gut - Silver Pit**  
**LCA (ref. period 1992-93)**  
**Females (final run BG-FEM-03)**





### 3.5.15.d *Nephrops* in Divisions IVb,c west of 1°E

Units included in recommended Management Area: a) Farn Deeps (Unit 6) and b) Firth of Forth (Unit 8).

Catch data (Tables 3.5.15 d.1–3.5.15 d.2) :

Year	Rec. TAC	Agreed TAC <sup>1</sup>	ACFM landings
1987			4.0
1988			5.3
1989			5.1
1990			4.6
1991	4.49		3.8
1992	~4.60	12.0	3.5
1993	~4.17	12.0	5.7
1994	~4.17	13.0	5.9
1995	~4.17	15.2	

(Weights in '000 t) <sup>1</sup>EU zone of IIa and IV

**Historical Development of the Fishery:** a) Farn Deeps landings and effort have increased since the 1960s to a peak in 1989, then fell in 1992, but have since increased to a new peak in 1994 (graphs a and b). b) Firth of Forth landings and effort rose from 1991 to 1993, but fell markedly in 1994 (graphs f and g). Effort has been high since 1985 (graph g).

**State of stock:** a) Farn Deeps: CPUE fairly stable, while LPUE increased, probably due to a change in discarding pattern (graph c). Age-based assessment suggests that male stock has been stable but declined recently. F has again increased following previous lower values. Yield per recruit analysis suggests that current F is above  $F_{max}$  in males but below  $F_{max}$  in females (graph e).

b) Firth of Forth: LPUE at a relatively low level (graph h). Mean size in catch and landings declined in 1994 (graph i). Age-based assessment suggests that F is high on males, although the stock biomass and recruitment are relatively stable. Yield per recruit analysis suggests that current F is well above  $F_{max}$  in males and below  $F_{max}$  in females (graph j).

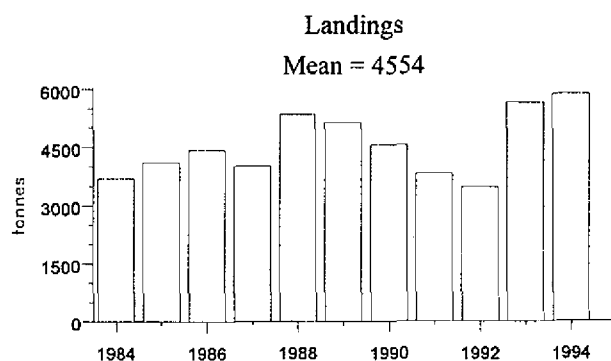
**Management advice:** ACFM recommends a precautionary TAC of 4,170 t for 1996 and 1997.

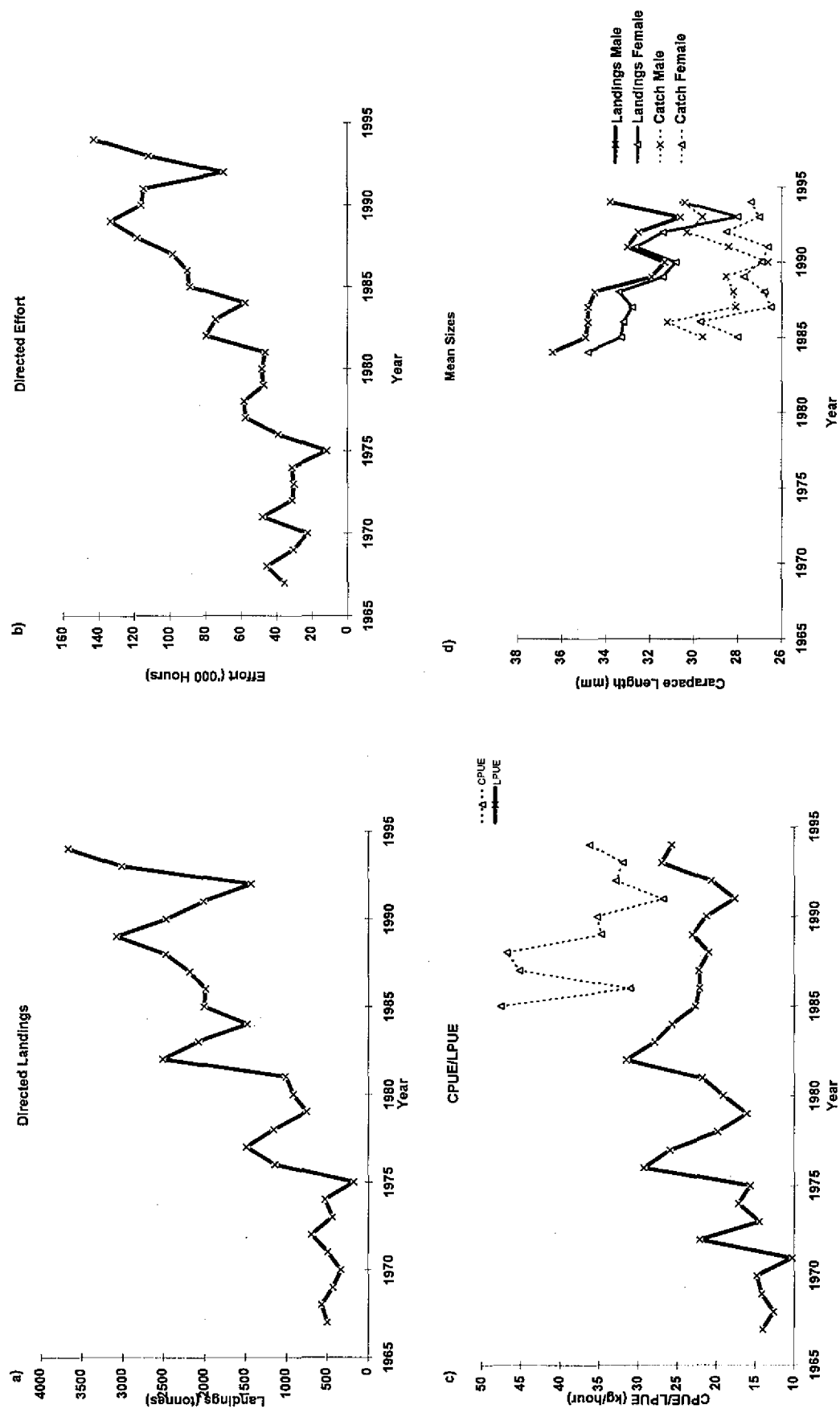
**Special comments:** ACFM advised a precautionary TAC of about 4,170 t for the Management Area in 1993–1995. There is no basis for revising this figure for 1996 and 1997. Higher yields could be obtained in the long term at lower cost by a reduction of effort. Landings in this Management Area have again exceeded the TAC recommended by ACFM. In 1994 this was mainly due to increased landings from the Farn Deeps. The imbalance in effort between different management areas in the North Sea applies also to these functional units. There is no mechanism for controlling effort locally.

**Data and assessment:** LPUE and mean size data available for both units (graphs c,d, h, i). CPUE data available since 1984 for Farn Deeps. Landings/area and effort/area indices available for Firth of Forth. Length- and age-based assessments carried out and performed reasonably well. The Firth of Forth VPA was comparable with the TV surveys carried out since 1993.

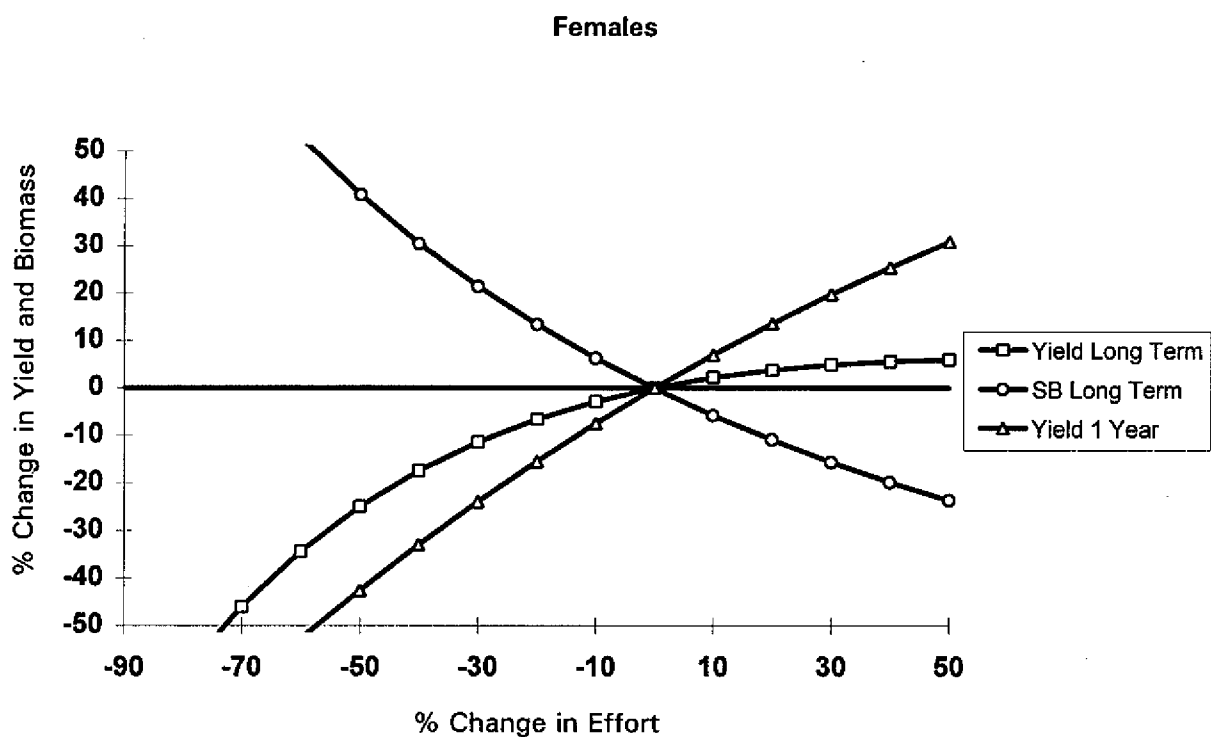
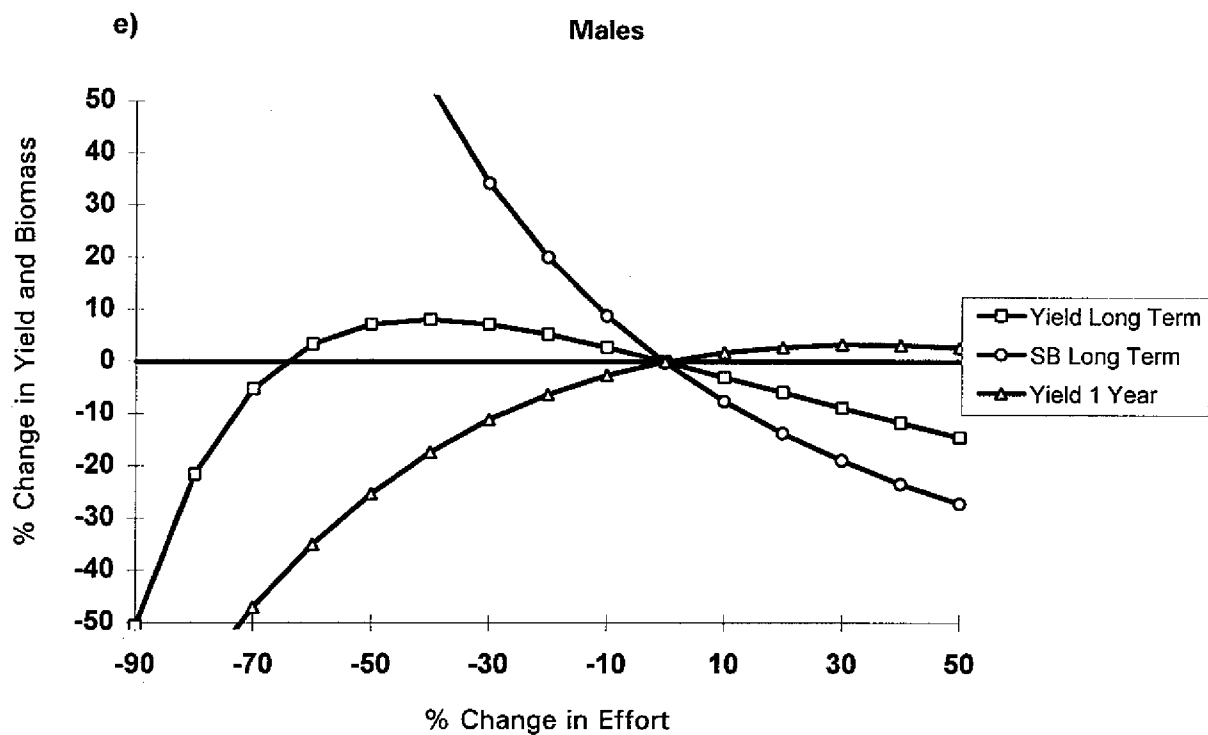
**Source of information:** Report of the Working Group on *Nephrops* Stocks, March 1995 (C.M.1995/Assess:12).

Landings from recommended Management Area  
(Details in Table 3.5.15 d.3).



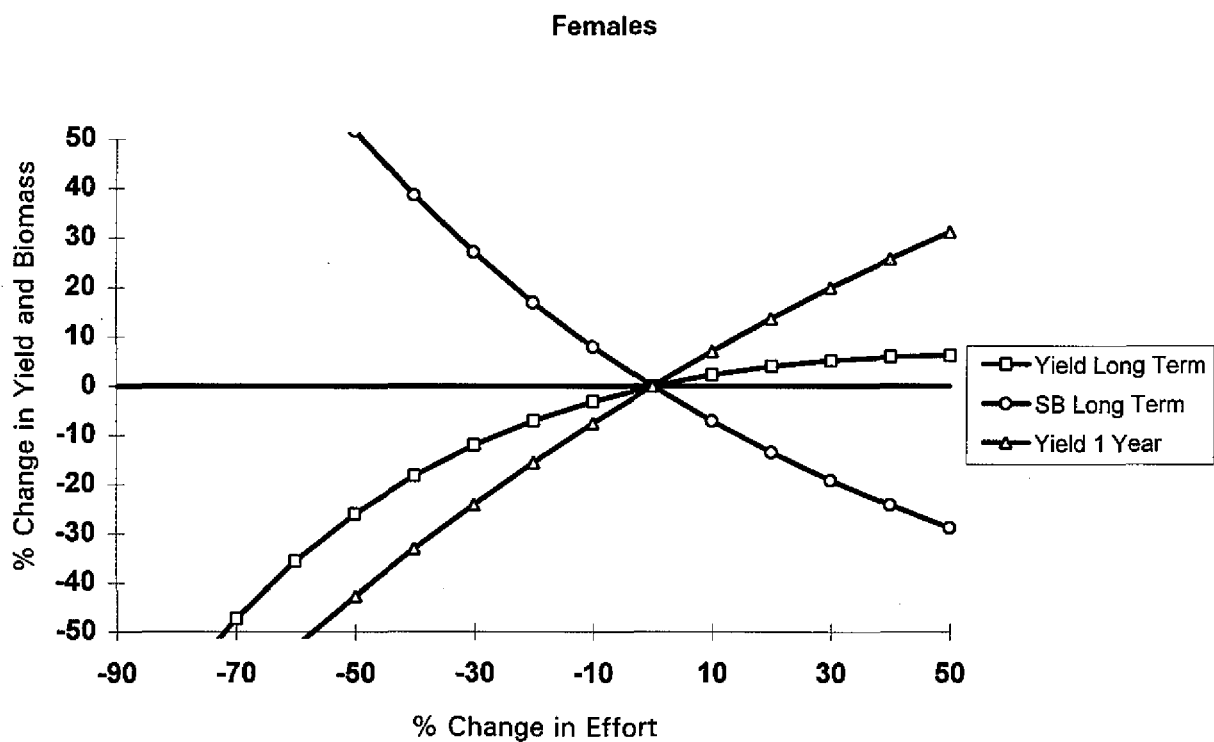
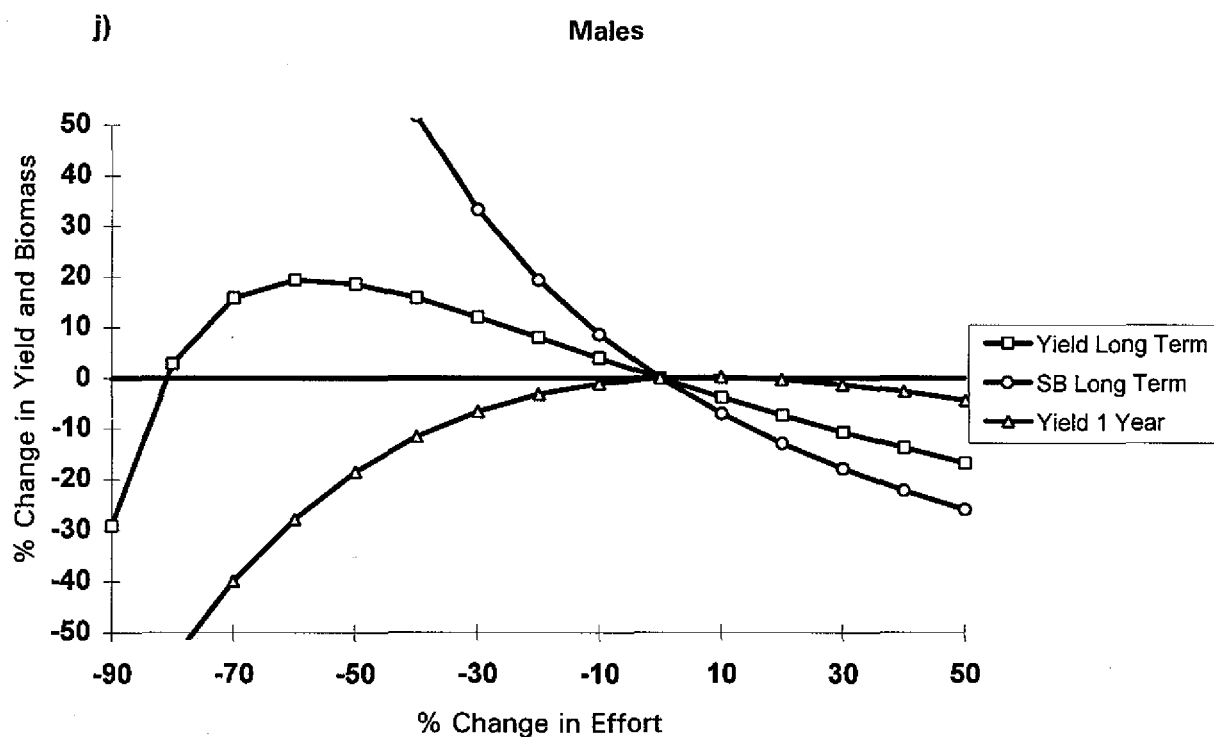


Farn Deep (FU6): Long term trends in directed landings (tonnes), directed effort ('000 hours), CPUE (kg/hour), LPUE (kg/hour) and mean size (mm CL) in catch and landings.

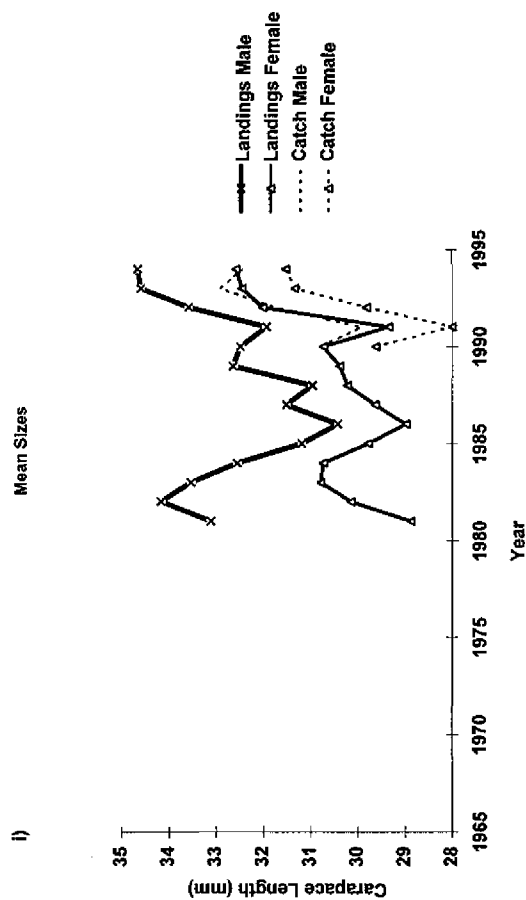
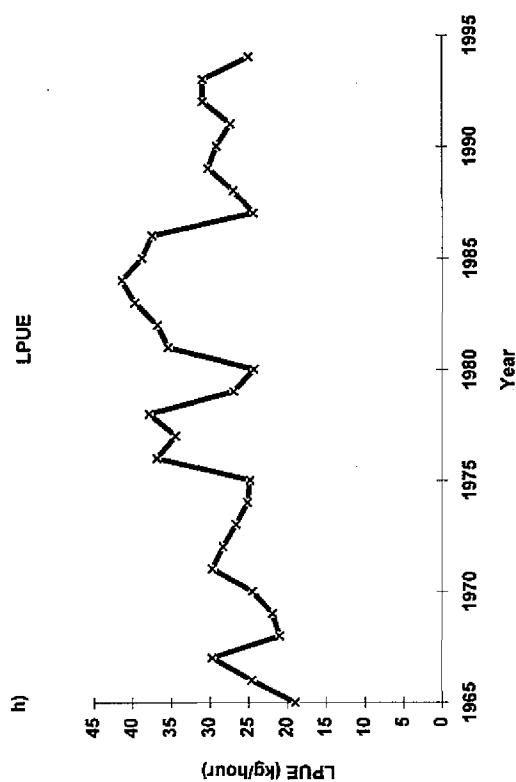
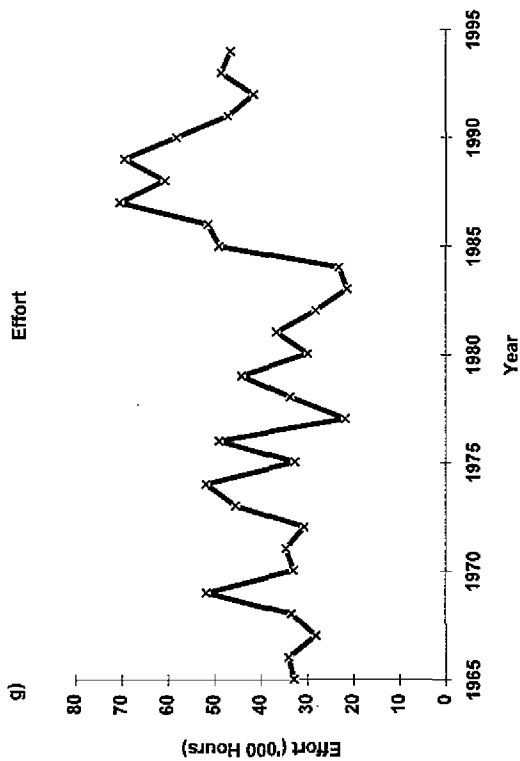
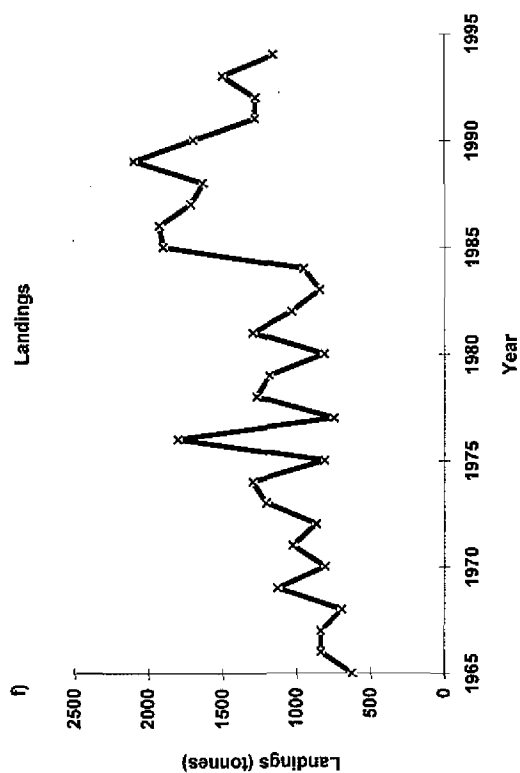


Farn Deepes (FU6): Percentage changes in long term landings and stock biomass, and short term landings following various changes in fishing effort. Males and females shown separately.





Firth of Forth (FU8): Percentage changes in long term landings and stock biomass, and short term landings following various changes in fishing effort. Males and females shown separately.



Firth of Forth (F08): Long term trends in Scottish *Nephrops* trawler landings (tonnes), effort ('000 hours), LPUE (kg/hour) and mean size (mm CL) in catch and landings.



## **3.6 Stocks in the Eastern English Channel (Division VIIId)**

### **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**

Effort directed at flatfish has increased consistently and considerably in all fleets since 1975 and reached a peak during 1989-1990, followed by a decline in the French and Belgian fleets in the early 1990's. French effort for roundfish appears to have remained stable since 1990.

#### **Relevant aspects of management**

Presently, cod, whiting, plaice and sole in Division VIIId are assessed as separate stocks. There are no separate TAC's for cod and whiting in Division VIIId 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.

ACFM reviewed the stock identity of these species. 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). In the future the assessment of these species in the eastern Channel will be combined with those in the North Sea. 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.

#### **Major data problems**

Landings for cod, whiting and plaice are often reported for management areas which are larger than the assessment area. Hence, assessments are based on estimates by scientists. Information on the level of discarding is lacking for all demersal species.

Age sampling for cod, plaice and whiting is generally poor. Commercial fleet data were available for tuning the stock assessments of roundfish and flatfish. For the latter species tuning data and independent recruitment estimates were available from surveys.

#### **General trends/status**

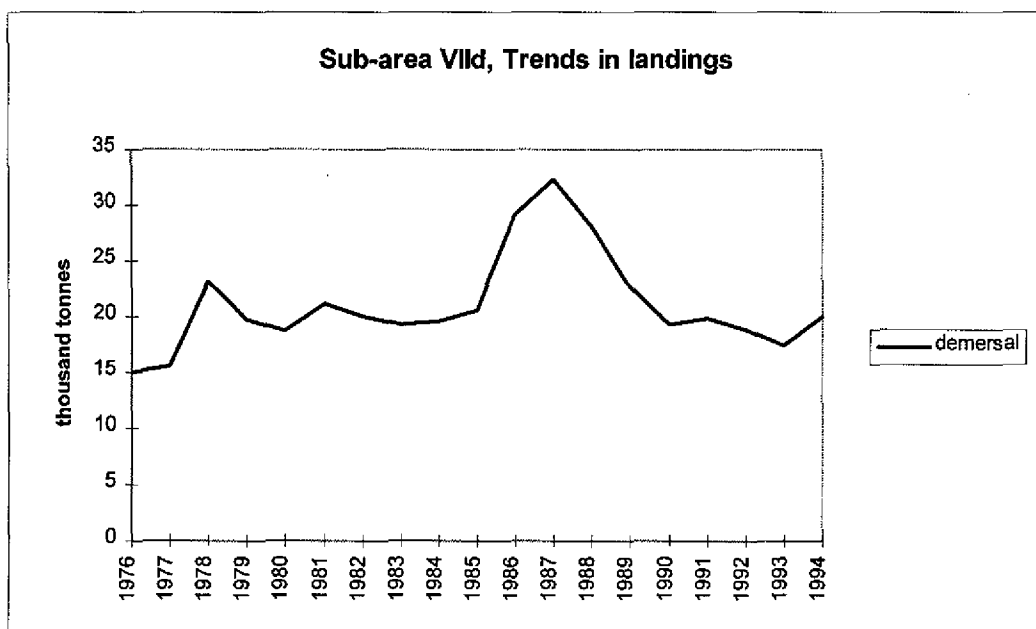
The recent landings of cod are at historically low levels, while sole landings are at an historical high. The landings of plaice and whiting are close to the average but have declined in recent years. Fishing mortalities for cod and whiting in 1994 are close to historically high levels and both are well above  $F_{med}$ . In sole and plaice the current level of  $F$  is estimated to be close to  $F_{med}$ . Trends in landings of the four demersal species combined are shown in the Figure on the opposite page.

The recruitment of cod in Division VIIId shows a similar pattern to that in the North Sea. Year class 1985 was the last good year class. All subsequent year classes are of low or at most average abundance. For whiting also recruitment has been poor in most years since 1984. The spawning stock biomasses of cod and whiting are now at the lowest level in the time series. 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 1993 to a record level in the time series. It is expected to remain high in the short term.

Medium-term analyses indicate that for all stocks the probability is low that spawning stock biomass will increase in the medium term at the present level of exploitation.

#### **Pelagic fisheries**

Pelagic species caught in Division VIIId 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)

Catch data (Table 3.6.2.1):

Year	Rec. TAC	Agreed TAC <sup>3</sup>	Off. Indgs.	ACFM catch
1987	-	-	9.4	14.2
1988	-	-	10.1	9.4
1989	-	-	n/a	5.5
1990	-	-	n/a	2.7
1991	-	-	n/a	1.9
1992	-	-	2.7	2.7
1993	-	-	n/a	2.4
1994	<sup>1</sup>	-	n/a	2.8
1995	<sup>2</sup>	-		

<sup>1</sup>Precautionary. <sup>2</sup>Significant reduction in effort. <sup>3</sup>Included in TAC for Sub-area VII (except Division VIIa). Weights in '000 t.

**Historical development of the fishery:** Cod is mainly taken in a mixed fishery by English and French offshore trawlers and to a lesser extent by inshore fixed netters. The largest catches are made during the first quarter and at the end of the last quarter. In the Channel the minimum mesh size for trawls was increased from 75 to 80 mm in 1989.

**State of stock:** The cod in Division VIId is considered to be outside safe biological limits similarly to the North Sea cod stock. An independent assessment of the cod stock in this area indicates the same trends in terms of SSB and recruitment as found in the North Sea. The cod stock in Division VIId cannot be considered to be separate from the North Sea stock and is therefore considered to be in the same state as the North Sea stock.

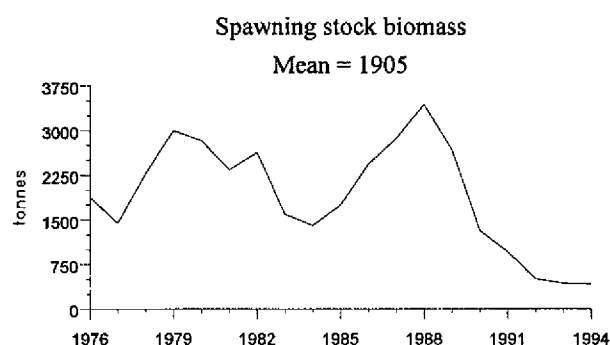
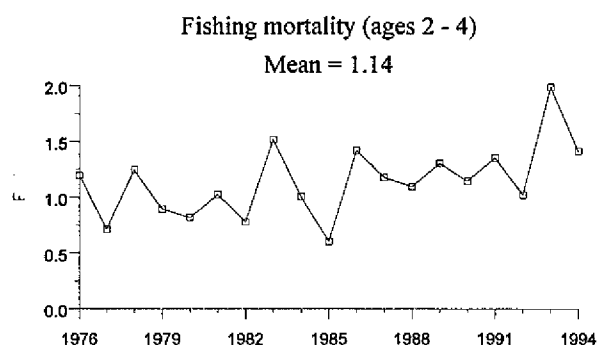
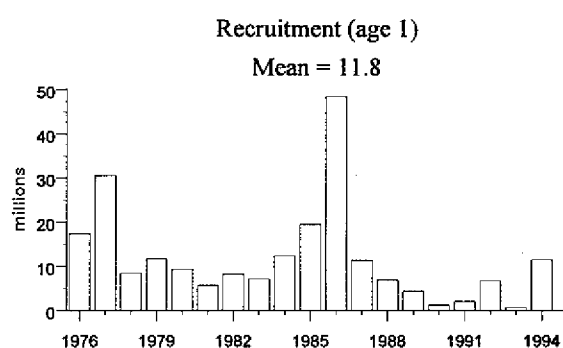
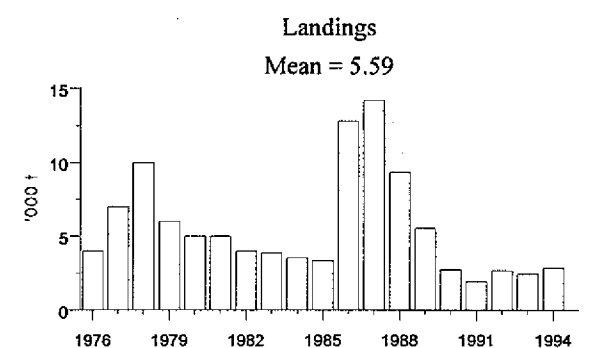
Details in Table 3.6.2.2

**Forecast for 1996 :** Uncertain. At current levels of fishing mortality, assuming mean recruitment for the year classes 1993-94, a catch of 5,500 t is predicted for 1996.

**Management advice:** Reference is made to the management advice given for North Sea cod.

**Special comments:** This stock is managed by means of a TAC that applies to all of Sub-area VII (except Division VIIa).

All evidence suggests that cod in the eastern Channel (Division VIId) have strong links with those in the southern North Sea and that there is little interchange with the western Channel (Division VIIe). This evidence includes tagging experiments and correlation between the two areas of CPUE, biomass and recruitment. The cod in Division VIId should therefore not be assessed separately from the North Sea cod stock and will not be assessed separately in 1996.



**Data and assessment:** Analytical assessment based on CPUE data for one fleet only. No recruitment index is available. The sampling level is poor. Fishing mortality levels estimated in the assessments are very high and very variable.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).

### 3.6.3 Whiting in Division VIId (Eastern English Channel)

Catch data (Table 3.6.3.1):

Year	Rec. TAC	Agreed TAC <sup>2</sup>	Off ldngs.	ACFM catch
1987	-	-	7.2	4.7
1988	-	-	7.8	4.4
1989	-	-	n/a	4.2
1990	-	-	n/a	3.5
1991	-	-	n/a	5.8
1992	-	-	5.9	5.8
1993	-	-	n/a	5.2
1994	-	-	n/a	6.6
1995	- <sup>1</sup>	-		

<sup>1</sup> Significant reduction in effort. <sup>2</sup> Included in TAC for Sub-area VII (except Division VIIa). Weights in '000 t.

**Historical development of the fishery:** Whiting is mainly taken in a mixed fishery by English and French offshore trawlers and to a lesser extent by inshore fixed netters. In the Channel the minimum mesh size for trawls was increased from 75 to 80 mm in 1989.

**State of stock:** The state of the stock is uncertain. The spawning stock is around its lowest recorded level. An independent assessment of the whiting stock in this area indicates the same trends in spawning biomass and recruitment as the North Sea whiting stock. The whiting stock in Division VIId cannot be considered to be separate from the North Sea stock and is therefore considered to be in the same state as the North Sea stock.

Details in the Table 3.6.3.2.

**Forecast for 1996:** Assuming mean recruitment for year classes since 1993.

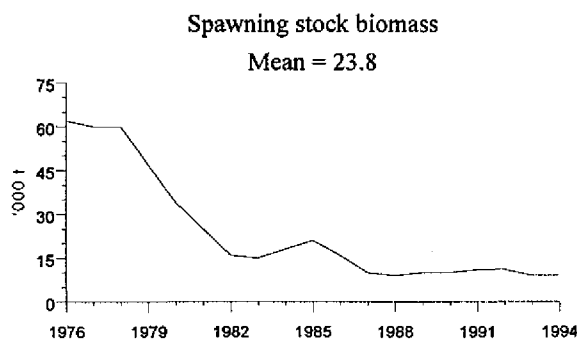
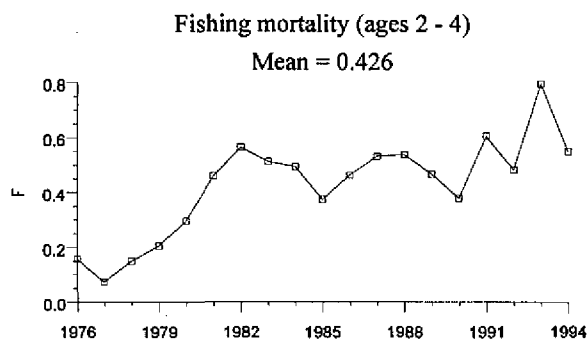
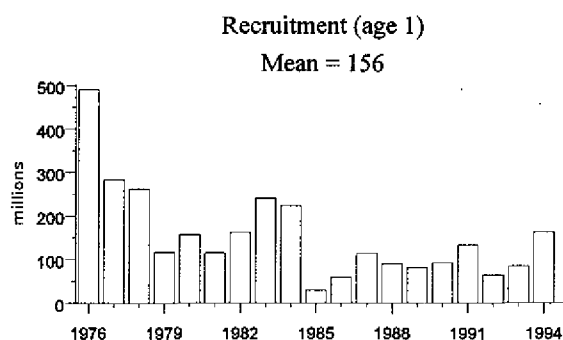
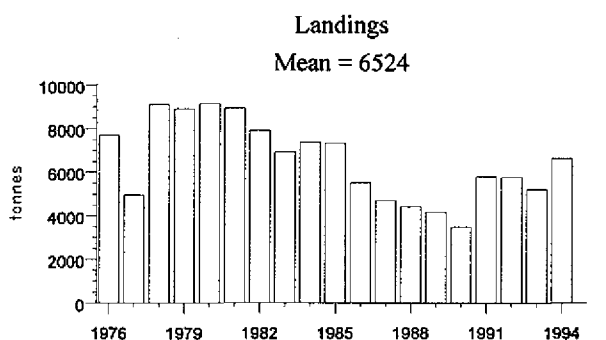
SSB(95) = 10.7, F(95) = 0.55, Basis : F(95) = F(94), Catch(95) = 6.1, Landings (95) = 6.1

Option	Basis	F (96)	SSB (96)	Catch (96)	Lndgs (96)	SSB (97)
A	0.4 F <sub>94</sub>	0.22	12.4	3.1	3.1	16.1
B	0.6 F <sub>94</sub>	0.33		4.5	4.5	15.0
C	0.8 F <sub>94</sub>	0.44		5.8	5.8	14.0
D	1.0 F <sub>94</sub>	0.55		6.9	6.9	13.0
E	1.2 F <sub>94</sub>	0.66		8.0	8.0	12.2

Weights in '000 t.

At the current level of fishing mortality SSB is expected to slowly increase (F<sub>94</sub> > F<sub>med</sub>).

**Management advice:** Reference is made to the management advice given for North Sea whiting.





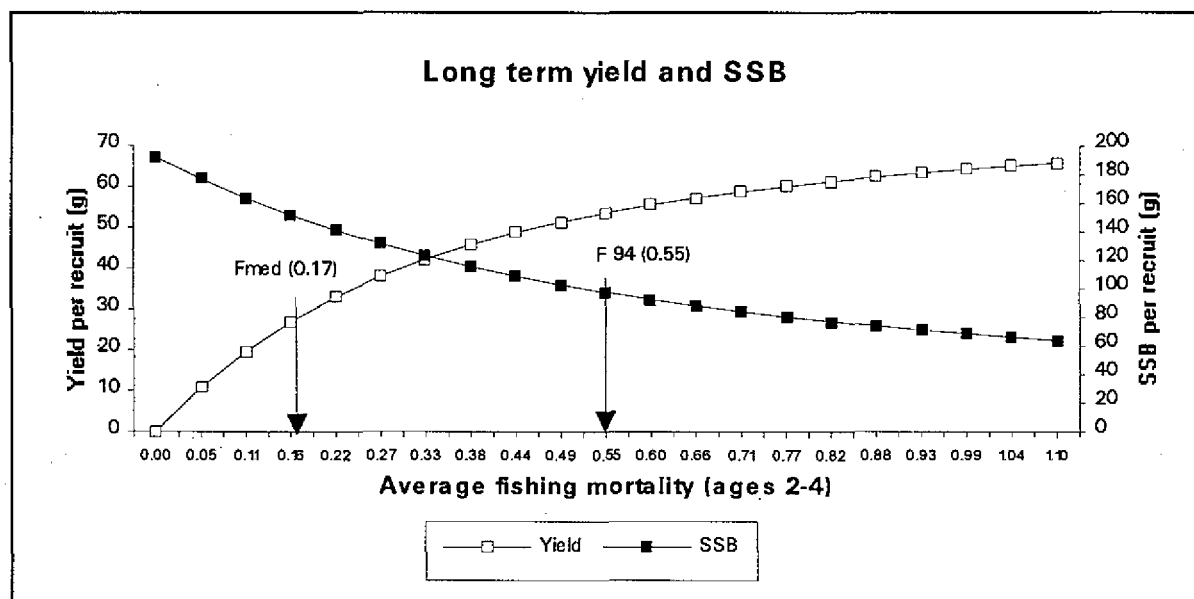
**Special comments:** This stock is managed by means of a TAC that applies to all of Sub-area VII (except Division VIIa).

The whiting in the eastern Channel (Division VIId) is closely associated with whiting in the southern North Sea. The association is demonstrated through tagging experiments, genetic analysis, parasite data and similar trends in SSB and recruitment. The whiting stock in Division VIId should therefore not be assessed separately from the North Sea whiting stock and will not be assessed separately in 1996.

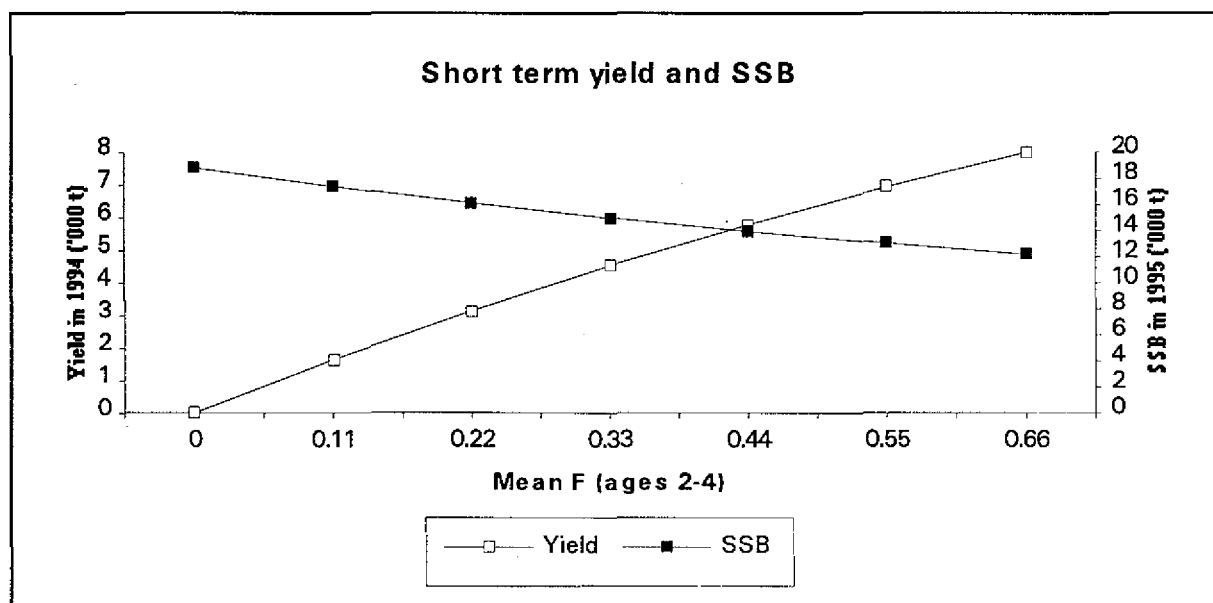
**Data and assessment:** Analytical assessment based on CPUE data for one fleet. No recruitment index is yet available for whiting in Division VIId.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).

#### Yield per recruit-Long term yield and spawning biomass .



#### Short term yield and spawning biomass .



### 3.6.4 Sole in Division VIId (Eastern English Channel)

Catch data (Table 3.6.4.1)

Year	Rec. TAC	Agreed TAC	Off. Indgs.	ACFM catch
1987	3.1	3.85	3.8	5.0
1988	3.4	3.85	3.3	4.0
1989	3.8	3.85	2.9	4.2
1990	3.7	3.85	3.0	4.1
1991	3.4	3.85	3.8	4.4
1992	≤2.7	3.5	3.8	4.1
1993	2.8	3.2	3.4	4.5
1994	<3.8	3.8	3.7	4.6
1995	3.8	3.8		

<sup>1</sup> Catch at status quo F. Weights in '000 t.

**Historical development of the fishery:** There are 5 main commercial fleets fishing for sole in Division VIId: 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 shows some signs of a decline 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. F is relatively stable. Recent recruitment is above average.

Further details in Table 3.6.4.2.

#### Forecast for 1996:

SSB(95) = 9.5, F(95) = 0.423, Basis: F(95) = F(94), Catch(95) = 4.45, Landings (95) = 4.45.

Option	Basis	F (96)	SSB (96)	Catch (96)	Landgs (96)	SSB (97)
A	0.4 F <sub>94</sub>	.169	10.6	2.08	2.08	13.3
B	0.6 F <sub>94</sub>	.254		3.01	3.01	12.4
C	0.8 F <sub>94</sub>	.338		3.86	3.86	11.6
D	1.0 F <sub>94</sub>	.423		4.66	4.66	10.8
E	1.2 F <sub>94</sub>	.507		5.39	5.39	10.0

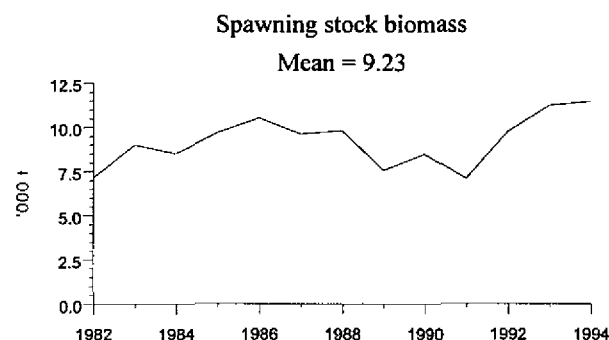
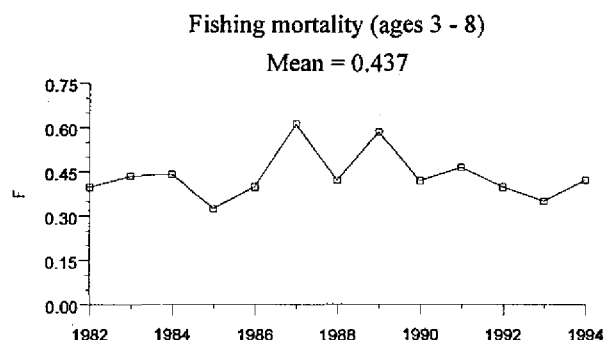
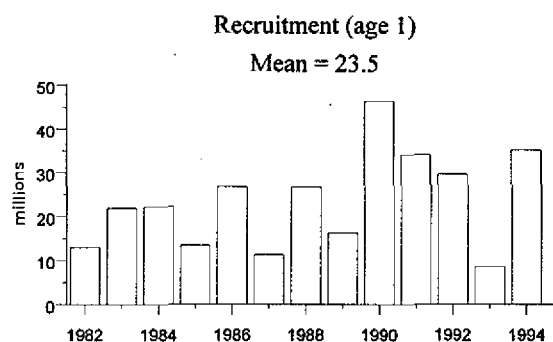
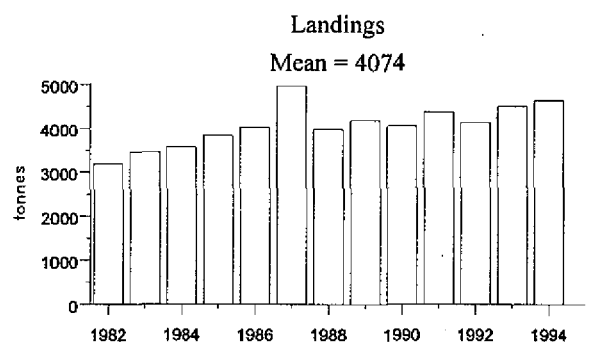
Weights in '000 t.

At present levels of fishing mortality, SSB is expected to rise slightly.

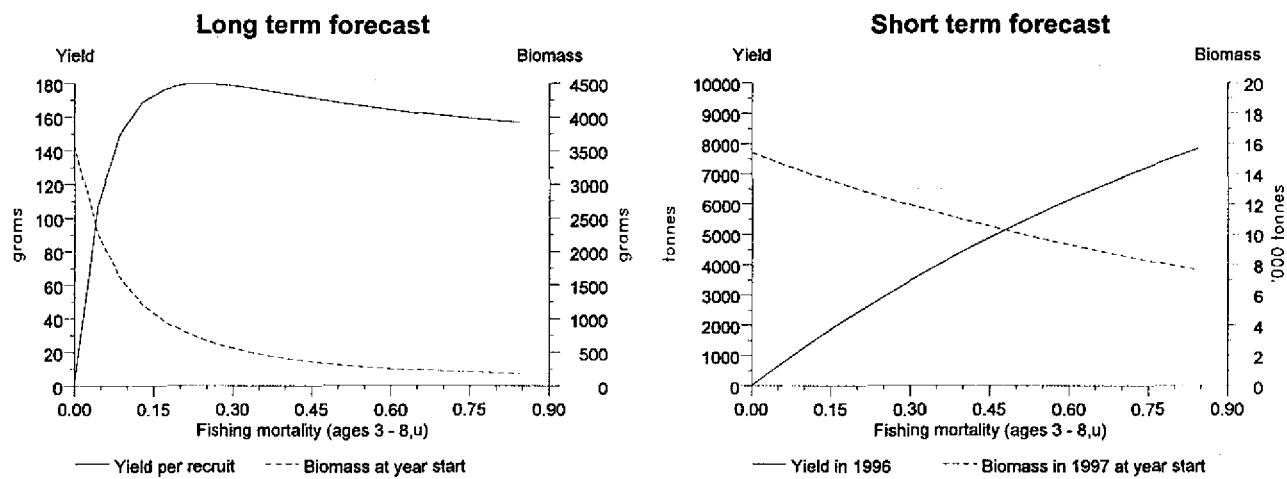
**Management advice:** There is no long-term gain in yield to be expected with an increase in fishing mortality.

**Data and assessment:** Analytical assessment, using data from commercial fleets and surveys.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).



## Yield and Spawning Stock Biomass



### 3.6.5 Plaice in Division VIId (Eastern English Channel)

Catch data (Table 3.6.5.1) :

Year	Rec. TAC <sup>1</sup>	Agreed TAC <sup>1</sup>	Off. Lndgs.	ACFM catch
1987	6.8	8.3	7.9	8.4
1988	6.9	9.96	9.1	10.4
1989	11.7	11.7	6.7 <sup>2</sup>	8.8
1990	10.7	10.7	7.7 <sup>2</sup>	9.0
1991	8.8	10.7	7.4 <sup>2</sup>	7.8
1992	-	9.6	5.9 <sup>2</sup>	6.3
1993	-	8.5	4.4 <sup>2</sup>	5.3
1994	-	9.1	5.2 <sup>2</sup>	5.8
1995	5.6	8.0		

<sup>1</sup>TACs for Divisions VIId,e. <sup>2</sup>For France Division VIId landings are estimated by ACFM. <sup>3</sup>Catch 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. Due to the minimum mesh size (80 mm) 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. Apart from one above average year class (1991), recent recruitment has been close to average.

Further details in Table 3.6.5.2.

**Forecast for 1996:**

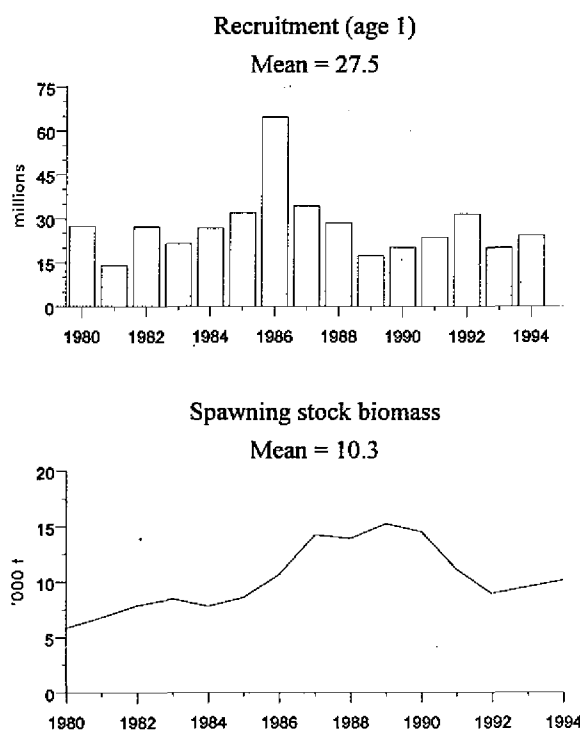
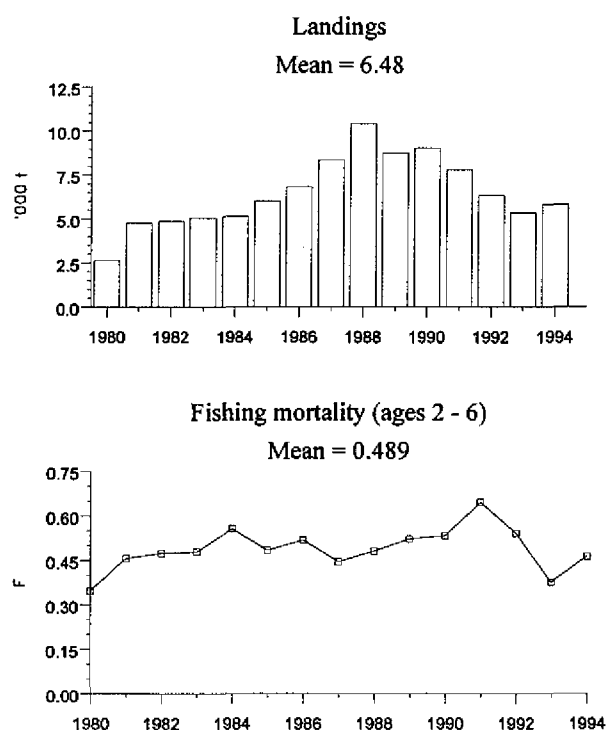
SSB(95) = 10.5, F(95) = 0.46, Basis: F(95)=F(94), Catch(95) = , Landings (95) = 6.5

Option	Basis	F (96)	SSB (96)	Catch (96)	Lndgs (96)	SSB (97)
A	0.4 F <sub>94</sub>	0.19	10.2	-	2.9	13.3
B	0.6 F <sub>94</sub>	0.28		-	4.2	12.2
C	0.8 F <sub>94</sub>	0.37		-	5.4	11.2
D	1.0 F <sub>94</sub>	0.46		-	6.5	10.3
E	1.2 F <sub>94</sub>	0.56		-	7.5	9.4

Weights in '000 t.

At the current level of fishing mortality, SSB is expected to be stable (F<sub>94</sub>=F<sub>med</sub>).

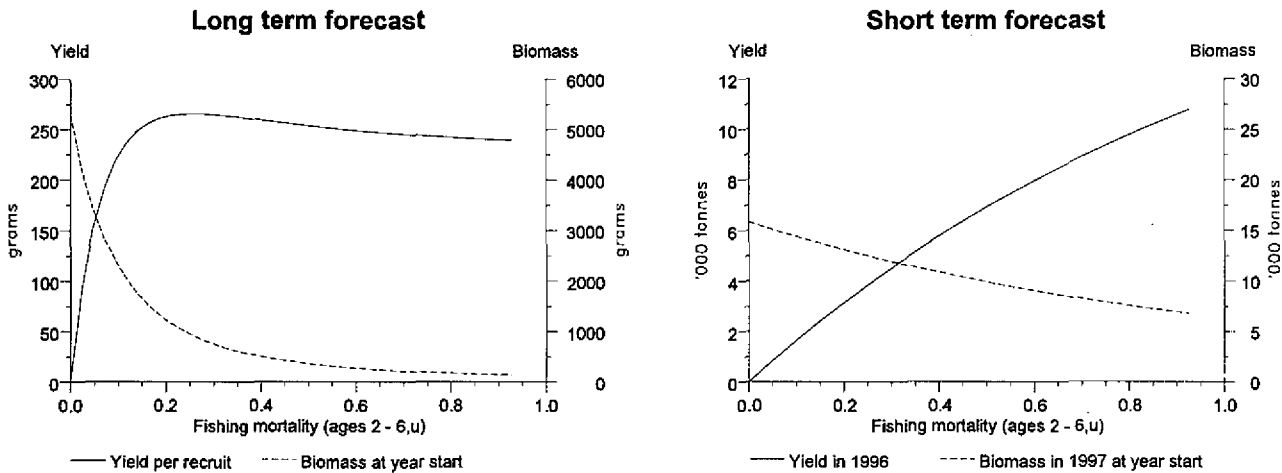
**Management advice:** There is no gain in long-term yield to be obtained by increasing fishing mortality above the 1994 level.



**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.

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1995 (C.M.1996/Assess:6).

**Yield and Spawning Stock Biomass**



### 3.6.6 *Nephrops* in Divisions VII d,e

**Special comments:** There are no reported landings of *Nephrops* for this area, so it is suggested that a TAC of zero would prevent misreporting.

**Source of information:** Report of the Working Group on *Nephrops* Stocks, March 1995 (C.M.1995/Assess:12).

**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 <sup>1</sup>	334,847	311,585	103,861	25,000	775,293

<sup>1</sup>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 <sup>2</sup>	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	7,056	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 <sup>3</sup>	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 <sup>1</sup>	22,826	5,384	6,881	8,283	317,932	14,929	15,579	291,925	36,737	29,817	775,193

<sup>1</sup>Provisional figures.

<sup>2</sup>USSR prior to 1991.

<sup>3</sup>Includes Baltic countries.



**Table 3.1.2.a.3 North-East Arctic Cod**

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 5-10
1946	729.76	2,588.60	706.00	0.193
1947	419.95	1,805.69	882.02	0.313
1948	440.69	1,355.92	774.30	0.352
1949	466.66	1,153.65	800.12	0.370
1950	705.51	1,197.69	731.98	0.365
1951	1,085.89	1,271.64	827.18	0.398
1952	1,190.84	876.20	876.80	0.539
1953	1,592.01	760.30	695.55	0.360
1954	644.33	643.78	826.02	0.401
1955	272.94	708.85	1,147.84	0.550
1956	440.23	836.48	1,343.07	0.643
1957	805.06	771.84	792.56	0.506
1958	497.10	894.00	769.31	0.512
1959	684.73	732.89	744.61	0.560
1960	790.43	527.95	622.04	0.473
1961	918.95	462.22	783.22	0.623
1962	729.96	430.67	909.27	0.752
1963	473.30	291.50	776.34	0.970
1964	338.96	197.44	437.70	0.669
1965	778.09	190.39	444.93	0.539
1966	1,582.38	317.35	483.71	0.508
1967	1,292.66	400.65	572.61	0.526
1968	169.75	416.27	1,074.08	0.552
1969	111.97	409.09	1,197.23	0.809
1970	197.05	453.54	933.25	0.728
1971	404.98	756.18	689.05	0.588
1972	1,015.59	727.41	565.25	0.674
1973	1,818.30	446.58	792.69	0.594
1974	525.33	238.87	1,102.43	0.561
1975	622.07	191.65	829.38	0.620
1976	614.20	234.53	867.46	0.646
1977	347.74	309.94	905.30	0.835
1978	639.62	402.50	698.72	0.929
1979	198.96	245.69	440.54	0.718
1980	140.41	164.94	380.43	0.716
1981	158.19	167.75	399.04	0.805
1982	157.84	401.17	363.73	0.740
1983	168.79	320.93	289.99	0.738
1984	382.68	259.61	277.65	0.891
1985	502.17	201.72	307.92	0.797
1986	1,117.82	161.89	430.11	0.913
1987	304.60	143.23	523.07	1.010
1988	230.33	146.45	434.94	0.882
1989	180.67	171.77	332.48	0.685
1990	215.77	349.70	212.00	0.270
1991	511.54	717.83	319.16	0.298
1992	798.40	983.38	513.49	0.353
1993	1,195.62	911.00	581.61	0.403
1994	908.85	774.20	775.29	0.506
Average	622.85	594.36	677.21	0.600
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 1,000 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	*) No data				
24	25	35	44	48**)	**) Provisional data				

**B) Russian/USSR data in Division I (in 1,000 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	47,753	27,009	3,037	77,619
1994 <sup>1</sup>	68,148	44,820	8,142	121,111

<sup>1</sup>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.	Germany, Fed. Rep.	Norway	Poland	United Kingdom	Russia <sup>2</sup>	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	<u>Spain</u>	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	<u>Greenland</u>	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 <sup>1</sup>	2,761	678	770	2,395	64,467	22	4,339	44,468	1,211	121,111

<sup>1</sup>Provisional figures.

<sup>2</sup>USSR prior to 1991.

**Table 3.1.3.3 North-East Arctic Haddock**

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-7
1950	67.03	142.07	131.73	0.835
1951	558.77	111.98	120.06	0.626
1952	62.87	65.01	127.66	0.733
1953	1,041.09	81.70	123.45	0.532
1954	123.75	123.99	156.45	0.385
1955	52.78	179.16	202.75	0.515
1956	170.75	240.09	213.28	0.442
1957	53.77	197.96	122.71	0.444
1958	69.70	156.94	112.67	0.533
1959	328.56	135.00	88.18	0.392
1960	245.65	129.89	155.45	0.497
1961	110.48	135.46	193.23	0.648
1962	243.51	124.90	187.89	0.826
1963	277.34	92.44	146.74	0.890
1964	323.23	63.54	98.90	0.655
1965	101.13	92.44	118.08	0.509
1966	242.41	127.63	160.62	0.621
1967	293.29	162.36	136.49	0.431
1968	20.06	182.13	181.73	0.518
1969	17.40	178.65	130.51	0.405
1970	165.96	159.23	86.60	0.356
1971	96.71	179.82	78.30	0.253
1972	1,028.10	143.70	265.32	0.706
1973	272.27	124.38	320.07	0.580
1974	54.38	194.14	221.14	0.494
1975	49.17	236.78	175.74	0.511
1976	56.69	192.01	137.28	0.691
1977	115.44	133.81	110.16	0.837
1978	172.05	102.10	95.42	0.659
1979	135.20	82.89	103.62	0.731
1980	18.96	69.73	87.89	0.556
1981	5.70	124.55	77.15	0.615
1982	8.03	98.69	46.96	0.506
1983	4.76	63.08	21.61	0.422
1984	8.85	38.20	17.66	0.333
1985	261.30	37.65	41.27	0.438
1986	349.50	47.59	96.59	0.490
1987	93.78	32.08	150.66	0.547
1988	33.49	53.82	91.74	0.512
1989	17.18	66.33	55.12	0.385
1990	18.51	71.37	25.82	0.161
1991	75.01	88.38	33.61	0.233
1992	193.11	104.96	53.89	0.318
1993	519.77	142.58	77.62	0.445
1994	234.78	78.16	121.11	0.630
Average	186.49	119.76	122.24	0.530
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.1.4.1** North-East Arctic SAITHE. Nominal catch (tonnes) by countries in Sub-area I and Divisions IIa and IIb combined as officially reported to ICES.

Country	1985	1986	1987	1988	1989
Denmark	-	-	1	-	-
Faroe Islands	490	426	712	441	388
France	657	308	576	411	460 <sup>2</sup>
German Dem.Rep.	11	-	-	17	-
Germany, Fed.Rep.	1,837	3,470	4,909	4,557	606
Greenland	-	-	-	-	-
Iceland	-	-	-	-	-
Ireland	-	-	-	-	-
Norway	103,899	63,090	85,710	108,244	119,625
Portugal	-	-	-	-	-
Spain	-	-	-	-	506
UK (Engl.& Wales)	202	54	54	436	-
UK (Scotland)	+	21	3	6	702
USSR	51	27	426	130	23
Total	107,147	67,396	92,391	114,242	122,310

Country	1990	1991	1992	1993 <sup>1</sup>	1994 <sup>1</sup>
Denmark	-	5	-	2	-
Faroe Islands	1,207	963	165	31	67
France	340 <sup>2</sup>	77 <sup>2</sup>	1,980	307 <sup>2</sup>	151 <sup>2</sup>
German Dem.Rep.	14	-	-	-	-
Germany, Fed.Rep	1,129	2,003	3,451	3,687	1,606
Greenland	-	-	734	78	15
Iceland	-	-	-	3	4
Ireland	-	-	-	139,181	2
Norway	92,397	103,283	119,765 <sup>1</sup>	-	137,295
Portugal	-	-	-	1	1
Russia <sup>3</sup>	52	504 <sup>4</sup>	964	2,209	1,640
Spain	-	-	6	4	655
UK (Engl.& Wales)	681	449	516	408	549
UK (Scotland)	28	42	25	7	9
Total	95,848	107,326	127,606	145,918	141,994

<sup>1</sup>Provisional figures.

<sup>2</sup>As reported to Norwegian authorities.

<sup>3</sup>USSR prior to 1991.

<sup>4</sup>Includes Estonia.

**Table 3.1.4.2** North-East Arctic Saithe

Year	Recruitment Age 2	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1960	121.60	320.57	136.01	0.267
1961	213.22	406.78	109.82	0.234
1962	355.34	422.87	122.84	0.229
1963	121.70	439.03	148.04	0.224
1964	368.73	525.08	198.11	0.226
1965	210.15	519.52	184.55	0.226
1966	241.02	562.79	201.86	0.277
1967	191.55	580.47	191.19	0.275
1968	367.46	612.49	107.18	0.161
1969	346.93	529.57	140.38	0.212
1970	379.31	621.02	260.40	0.330
1971	219.29	509.75	244.73	0.368
1972	277.43	477.14	210.51	0.423
1973	117.02	468.02	215.66	0.439
1974	206.05	448.46	262.30	0.633
1975	373.34	369.13	233.45	0.470
1976	304.62	246.64	242.49	0.688
1977	178.72	165.31	182.81	0.589
1978	283.66	171.38	154.47	0.546
1979	167.72	158.56	164.23	0.525
1980	356.56	142.05	154.38	0.557
1981	152.88	139.65	175.52	0.557
1982	140.14	122.10	170.90	0.627
1983	118.80	163.64	155.41	0.532
1984	137.85	149.20	158.80	0.738
1985	271.04	121.30	107.15	0.560
1986	204.40	89.81	70.46	0.403
1987	103.09	90.85	91.68	0.349
1988	77.55	126.02	114.51	0.412
1989	87.98	139.80	122.66	0.566
1990	288.59	123.16	95.39	0.488
1991	377.70	109.52	107.33	0.444
1992	322.06	104.87	127.61	0.470
1993	178.80	123.07	145.92	0.403
1994	134.84	174.61	141.99	0.384
Average	228.49	299.26	161.45	0.424
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-areas I, Divisions IIa and IIb combined as officially reported to ICES.**

Year	Canada	Denmark	Faroe Islands	France	Greenland	Germany	Iceland	Ireland	Norway	Portugal	Spain	UK (England & Wales)	UK (Scotland)	Russia <sup>4</sup>	Total
1984	-	-	-	2 970	-	7 457	-	-	18 650	1 806	25	716	-	69 689	101 313
1985	-	-	-	3 326	-	6 566	-	-	20 456	2 056	38	167	-	59 943	92 552
1986	-	-	29	2 719	-	4 884	-	-	23 255	1 591	-	129	14	20 694	53 315
1987	-	+	450 <sup>3</sup>	1 611	-	5 829	-	-	18 051	1 175	25	230	9	7 215	34 595
1988	-	-	973	3 369	-	2 355	-	-	24 662	500	26	468	2	9 139	41 494
1989	-	-	338	1 877 <sup>1</sup>	-	4 245	-	-	25 295	340	5 <sup>2</sup>	259	13	14 344	46 716
1990	-	37 <sup>3</sup>	386	1 826 <sup>1</sup>	-	6 741	-	-	34 090	830	-	332	1	18 918	63 161
1991	-	23	644	804	-	981	-	-	49 464	166	1	285	64	15 354	67 786
1992	-	9	58	1 306	614	530	-	-	23 451	977	16	447	34	4 335	31 777
1993 <sup>1</sup>	8 <sup>3</sup>	4	152	278 <sup>3</sup>	15	685	-	-	17 847	1 040	65	733	1	7 573	28 401
1994 <sup>1</sup>	-	28	26	721 <sup>3</sup>	6	795 <sup>2</sup>	4	3	19 837	985	34 <sup>2</sup>	259	13	6 220	28 931

<sup>1</sup> Provisional figures.

<sup>2</sup> Working Group figure.

<sup>3</sup> As reported to Norwegian authorities.

<sup>4</sup> USSR prior to 1991.



**Table 3.1.5.a.1** *Sebastes mentella* in Sub-areas I and Divisions IIa and IIb combined.

Year	Canada	Denmark	Faroe Islands	France	Germany <sup>3</sup>	Greenland	Ireland	Norway	Portugal	Spain	UK England and Wales	UK Scotland	Russia <sup>4</sup>	Total
1986	-	-	-	-	1,252	-	-	1,274	1,273	-	84	-	17,815	23,112 <sup>2</sup>
1987	-	-	200	63	1,321	-	-	1,488	1,175	25	49	1	6,196	10,518
1988	No species specific data presently available													
1989	-	-	335	1,093	3,833	-	-	4,633	340	5	166	9	13,080	23,494
1990	-	-	108	142	6,354	36	-	10,173	830	-	72	-	17,355	35,070
1991	-	-	492	85	-	23	-	33,592	166	1	57	17	14,302	48,735
1992	-	-	23	12	-	-	-	10,751	972	14	222	16	3,577	15,587
1993 <sup>1</sup>	8	4	13	39	35	1	-	4,982	963	57	293	-	4,386	10,781
1994 <sup>1</sup>	-	28	4	74	12	1	3	5,910	895	30	124	12	5,021	12,114

<sup>1</sup> Provisional figures.

<sup>2</sup> Including 1,414 tonnes in IIb not splitted on countries.

<sup>3</sup> Includes former GDR prior to 1991.

<sup>4</sup> 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 I.

Year	Faroe Islands	Germany <sup>4</sup>	Norway	UK England & Wales	UK Scotland	Russia <sup>5</sup>	Total
1986 <sup>3</sup>	-	-	1,274	-	-	911	2,185
1987 <sup>3</sup>	-	2	1,166	3	-	234	1,405
1988	no species specific data presently available						
1989	13	-	60	8 <sup>2</sup>	1 <sup>2</sup>	484	566
1990	2	-	-	-	-	100	102
1991	-	-	8	-	-	420	428
1992	-	-	561	-	-	408	969
1993 <sup>1</sup>	2 <sup>2</sup>	-	17	-	-	422	441
1994 <sup>1</sup>	2 <sup>2</sup>	-	30	-	-	308	340

<sup>1</sup>Provisional figures.

<sup>2</sup> Split on species according to the reports to Norwegian authorities.

<sup>3</sup>Based on preliminary estimates of species breakdown by area.

<sup>4</sup>Includes former GDR prior to 1991.

<sup>5</sup>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 <sup>4</sup>	Green-land	Ire-land	Norway	Portugal	UK England & Wales	UK Scotland	Russia <sup>5</sup>	Total
1986 <sup>3</sup>			1,252		-		1,273	84		16,904	19,513
1987 <sup>3</sup>	200	63	970		-	149	1,156	34	1	4,469	7,042
1988	No species specific data presently available										
1989	312 <sup>2</sup>	1,065 <sup>2</sup>	3,200		-	4,573	251	151 <sup>2</sup>	6 <sup>2</sup>	9,749	19,307
1990	98 <sup>2</sup>	137 <sup>2</sup>	1,673		-	8,842	824	9		6,492	18,075
1991	487 <sup>2</sup>	72 <sup>2</sup>	-	-	-	32,810	159 <sup>2</sup>	19 <sup>2</sup>	4 <sup>2</sup>	7,596	41,147
1992	23 <sup>2</sup>	7 <sup>2</sup>	-		-	9,816	824 <sup>2</sup>	25 <sup>2</sup>	-	1,096	11,791
1993 <sup>1</sup>	11 <sup>2</sup>	4 <sup>2</sup>	35	1 <sup>2</sup>	-	4,857	648 <sup>2</sup>	2 <sup>2</sup>	-	3,705	9,263
1994 <sup>1</sup>	2 <sup>2</sup>	33 <sup>2</sup>	12 <sup>2</sup>	1 <sup>2</sup>	2 <sup>2</sup>	5,554	687 <sup>2</sup>	4 <sup>2</sup>	-	4,692	10,987

<sup>1</sup> Provisional figures.<sup>2</sup> Split on species according the reports to Norwegian authorities.<sup>3</sup> Based on preliminary estimates of species breakdown by area.<sup>4</sup> Includes former GDR prior to 1991.<sup>5</sup> 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	Denmark	Faroe Islands	France	Germany <sup>5</sup>	Greenland	Ireland	Norway	Portugal	Spain	UK England and Wales	UK Scotland	Russia <sup>6</sup>	Total
1986 <sup>4</sup>	-	-	-	-	-	Data not available on countries	-	173	19	25	12	-	1,493	1,414
1987 <sup>4</sup>	-	-	-	-	-	349	-	-	-	-	-	-	-	2,071
1988	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	10	28	633	-	-	-	89	5	7 <sup>2</sup>	2 <sup>2</sup>	2,847	3,621
1990	-	-	8 <sup>2</sup>	5 <sup>2</sup>	4,681	36 <sup>2</sup>	-	1,331	6	-	63 <sup>2</sup>	-	10,763	16,893
1991	-	-	5 <sup>1</sup>	13 <sup>2</sup>	-	23	-	774	7	1	38 <sup>2</sup>	13 <sup>2</sup>	6,286	7,160
1992	-	-	-	5 <sup>2</sup>	-	-	-	374	148 <sup>2</sup>	14	197 <sup>2</sup>	16 <sup>2</sup>	2,073	2,827
1993 <sup>1</sup>	8 <sup>2</sup>	4 <sup>2</sup>	-	35 <sup>2</sup>	-	-	-	108	315 <sup>2</sup>	57 <sup>3</sup>	291 <sup>2</sup>	-	259	1,077
1994	-	28 <sup>2</sup>	-	41 <sup>2</sup>	-	-	1 <sup>2</sup>	326	208 <sup>2</sup>	30 <sup>3</sup>	120 <sup>2</sup>	12 <sup>2</sup>	21	787

<sup>1</sup> Provisional figures.<sup>2</sup> Split on species according the reports to Norwegian authorities.<sup>3</sup> Split on species according to the 1992 catches.<sup>4</sup> Based on preliminary estimates of species breakdown by area.<sup>5</sup> Includes former GDR prior to 1991.<sup>6</sup> USSR prior to 1991.

Table 3.1.5.a.5

*Sebastes mentella* in North-East Arctic (Fishing Areas I & II).

Year	Landings
1965	15,662
1966	10,143
1967	6,239
1968	5,413
1969	6,836
1970	22,916
1971	45,063
1972	28,862
1973	38,380
1974	69,372
1975	239,070
1976	269,022
1977	146,365
1978	92,611
1979	87,145
1980	79,354
1981	81,546
1982	115,383
1983	105,273
1984	72,934
1985	63,068
1986	23,112
1987	10,518
1988	15,586
1989	23,494
1990	35,070
1991	48,735
1992	15,587
1993	10,781
1994	12,114
Average	59,855
Unit	tonnes

Table 3.1.5.b.1 *Sebastes marinus* in Sub-area I and Divisions IIa and IIb combined

Year	Faroe Islands	France	Germany <sup>2</sup>	Greenland	Ireland	Norway	Portugal	Spain	UK England & Wales	UK Scotland	Russia <sup>3</sup>	Total
1986	29	2,719	3,369	-	-	21,680	-	-	42	14	2,350	30,203
1987	250	1,553	4,508	-	-	16,728	-	-	181	7	850	24,077
1988	No species specific data presently available on countries											
1989	3	784	412	-	-	20,662	-	-	93	4	1,264	23,222
1990	278	1,684	387	1	-	23,917	-	-	260	15	1,549	28,091
1991	152	719	981	-	-	15,872	-	-	228	47	1,052	19,051
1992	35	1,294	530	623	-	12,700	5	2	225	18	758	16,190
1993	139	239	650	14	-	12,865	77	8	440	1	923	15,356
1994 <sup>1</sup>	22	647	783	5	4	13,927	90	4	135	1	1,199	16,817

<sup>1</sup>Provisional figures.

<sup>2</sup>Includes former GDR prior to 1991.

<sup>3</sup>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 <sup>4</sup>	Iceland	Norway	UK England & Wales	UK Scotland	Russia <sup>5</sup>	Total
1986 <sup>3</sup>	-	50	-	2,972	32	3	155	3,212
1987 <sup>3</sup>	-	8	-	2,013	11	-	50	2,082
1988	No species specific data presently available							
1989	-	-	-	1763	4 <sup>2</sup>	1 <sup>2</sup>	110	1,878
1990	5	-	-	1263	-	14	-	1,282
1991	-	-	-	1,993	-	-	92	2,085
1992	-	-	-	2,162	-	-	174	2,336
1993 <sup>1</sup>	24 <sup>2</sup>		-	1,317	-	-	237	1,578
1994 <sup>1</sup>	12 <sup>2</sup>	-	4	1,683	+	-	109	1,808

<sup>1</sup>Provisional figures.

<sup>2</sup>Split on species according the reports to Norwegian authorities.

<sup>3</sup>Based on preliminary estimates of species breakdown by area.

<sup>4</sup>Includes former GDR prior to 1991.

<sup>5</sup>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 <sup>4</sup>	Greenland	Norway	Portugal	UK England & Wales	UK Scotland	Russia <sup>5</sup>	Total
1986 <sup>3</sup>	29	2,719	3,319		18,708		10	11	2,195	26,991
1987 <sup>3</sup>	250	1,553	2,967		14,715		170	7	800	20,462
1988	No species specific data presently available									
1989	3 <sup>2</sup>	784 <sup>2</sup>	412		18,833		89 <sup>2</sup>	3 <sup>2</sup>	912	21,036
1990	273	1,684	387		22,444		260	1	392	25,441
1991	152 <sup>2</sup>	719 <sup>2</sup>	678		13,835	-	228 <sup>2</sup>	47 <sup>2</sup>	534	16,193
1992	35 <sup>2</sup>	1,294 <sup>2</sup>	211	614	10,536	-	192 <sup>2</sup>	18 <sup>2</sup>	404	13,304
1993 <sup>1</sup>	115 <sup>2</sup>	239 <sup>2</sup>	473	14 <sup>2</sup>	11,548	77 <sup>2</sup>	430 <sup>2</sup>	1 <sup>2</sup>	654	13,551
1994 <sup>1</sup>	10 <sup>2</sup>	647 <sup>2</sup>	501 <sup>2</sup>	5 <sup>2</sup>	12,231	90 <sup>2</sup>	129 <sup>2</sup>	-	1,030	14,643

<sup>1</sup> Provisional figures.

<sup>2</sup> Split on species according the reports to Norwegian authorities.

<sup>3</sup> Based on preliminary estimates of species breakdown by area.

<sup>4</sup> Includes former GDR prior to 1991.

<sup>5</sup> 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 <sup>5</sup>	Greenland	Norway	Portugal	Spain	UK England & Wales	UK Scotland	Russia <sup>6</sup>	Total
1986 <sup>4</sup>									+
1987 <sup>4</sup>	1533	-	-	-	-	-	-	-	1533
1988	No species specific data presently available								
1989	-	-	66	-	-	-	-	242	308
1990	-	1 <sup>2</sup>	210	-	-	-	-	1157	1368
1991	303	-	44	-	-	-	-	426	773
1992	319	9 <sup>2</sup>	2	5 <sup>2</sup>	2	33 <sup>2</sup>	-	180	550
1993 <sup>1</sup>	177	-	+	-	8 <sup>3</sup>	10 <sup>2</sup>	-	32	227
1994 <sup>1</sup>	282	-	13	-	4 <sup>3</sup>	6 <sup>2</sup>	1 <sup>2</sup>	60	366

<sup>1</sup>Provisional figures.  
<sup>2</sup> Split on species according the reports to Norwegian authorities.  
<sup>3</sup> Split on species according to the 1992 catches.  
<sup>4</sup>Based on preliminary estimates of species breakdown by area.  
<sup>5</sup>Includes former GDR prior to 1991.  
<sup>6</sup>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	15,356
1994	16,817
Average	24,008
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	Germany	Greenland	Iceland	Ireland	Lithuania	Norway	Portugal	Russia <sup>4</sup>	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 <sup>2</sup>	-	10	-	23,183
1991	11	2,564	314	119	101	-	-	-	-	27,587	-	2,490 <sup>2</sup>	132 <sup>2</sup>	+	2	33,320
1992	-	-	16	111 <sup>1</sup>	13	13	-	-	-	8,313	31	718	23	7	3	9,253
1993	2 <sup>2</sup>	-	61	40 <sup>3</sup>	22	8	56	-	30 <sup>3</sup>	10,366 <sup>2</sup>	43	1,235	-	16	-	11,879
1994 <sup>1</sup>	4	-	86 <sup>3</sup>	27 <sup>3</sup>	69 <sup>2</sup>	3	15	5	4 <sup>3</sup>	8,219 <sup>2</sup>	36	283	2 <sup>2</sup>	76	2	8,831

<sup>1</sup> Provisional figures.

<sup>2</sup> Working Group figure.

<sup>3</sup> As reported to Norwegian authorities.

<sup>4</sup> 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	Germany	Iceland	Norway	Russia <sup>3</sup>	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 <sup>2</sup>	482	+	-	804
1990		7	-	-	312 <sup>2</sup>	321 <sup>2</sup>	-	-	640
1991	164	-	-	-	2,033 <sup>2</sup>	522 <sup>2</sup>	-	-	2,719
1992	-	-	+	-	2,282 <sup>2</sup>	467	-	-	2,749
1993	-	32	-	56	1,691 <sup>2</sup>	867	-	-	2,646
1994 <sup>1</sup>	-	17	-	15	1,154 <sup>2</sup>	175	+	-	1,361

<sup>1</sup> Provisional figures.

<sup>2</sup> Working Group figures.

<sup>3</sup> 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	Germany	Greenland	Ireland	Norway	Portugal	Russia <sup>5</sup>	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 <sup>2</sup>	-	4,964	6	-	12,105
1990		133	49	12	-	-	8,224 <sup>2</sup>	-	1,246 <sup>2</sup>	1	-	9,665
1991	1,400	314	119 <sup>1</sup>	21	-	-	10,268 <sup>2</sup>	-	305 <sup>2</sup>	+	1	12,428
1992	-	16	108 <sup>1</sup>	1	13 <sup>4</sup>	-	4,144 <sup>2</sup>	15 <sup>3</sup>	58	1	-	4,356
1993	-	29	38 <sup>3</sup>	14	8 <sup>4</sup>	-	7,989 <sup>2</sup>	17	210	2	-	8,307
1994 <sup>1</sup>	-	68 <sup>3</sup>	19 <sup>3</sup>	23 <sup>2</sup>	3 <sup>4</sup>	4	6,106 <sup>2</sup>	26	67	14	-	6,330

<sup>1</sup> Provisional figures.

<sup>2</sup> Working Group figure.

<sup>3</sup> As reported to Norwegian authorities.

<sup>4</sup> Includes Division IIb.

<sup>5</sup> 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	Denmark	Estonia	Faroe Islands	France	Germany	Ireland	Lithuania	Norway	Portugal	Russia <sup>4</sup>	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 <sup>2</sup>	-	3,366	-	-	-	7,229
1990	-	-	23 <sup>2</sup>	-	942	-	-	8,707 <sup>2</sup>	-	3,197 <sup>2</sup>	-	9	-	12,878
1991	11	1,000	-	-	80	-	-	15,286 <sup>2</sup>	-	1,663 <sup>2</sup>	132	+	1	18,173
1992	-	-	-	3 <sup>2</sup>	12	-	-	1,892 <sup>2</sup>	16 <sup>2</sup>	193	23	6	3	2,148
1993	2 <sup>3</sup>	-	-	2 <sup>3</sup>	8	-	30 <sup>3</sup>	686 <sup>2</sup>	26	158	-	14	-	926
1994 <sup>1</sup>	4	-	1 <sup>3</sup>	8 <sup>3</sup>	46 <sup>2</sup>	1	4 <sup>3</sup>	959 <sup>2</sup>	10	41	2 <sup>2</sup>	62	2	1,140

<sup>1</sup> Provisional figures.<sup>2</sup> Working Group figure.<sup>3</sup> As reported to Norwegian authorities.<sup>4</sup> USSR prior to 1991.

**Table 3.1.6.5** Greenland halibut in Sub-areas I and II.

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 6-10
1970	45.33	240.38	89.48	0.420
1971	42.53	188.06	79.03	0.422
1972	36.05	151.81	43.06	0.302
1973	30.84	141.49	29.94	0.225
1974	30.36	136.48	37.76	0.278
1975	32.43	120.71	38.17	0.336
1976	28.85	97.93	36.07	0.426
1977	27.50	74.89	28.83	0.340
1978	26.61	63.39	24.62	0.364
1979	26.00	71.85	17.31	0.189
1980	27.70	62.14	13.28	0.170
1981	26.65	68.67	15.02	0.143
1982	25.59	65.47	16.79	0.214
1983	27.22	77.55	22.15	0.284
1984	27.12	70.71	21.88	0.327
1985	26.97	70.99	19.95	0.295
1986	31.71	69.24	22.88	0.333
1987	30.84	60.85	19.11	0.345
1988	25.80	54.40	19.59	0.418
1989	27.55	56.07	20.14	0.324
1990	24.43	55.31	23.18	0.423
1991	14.45	55.70	33.32	0.621
1992	8.08	36.75	9.25	0.204
1993	2.92	45.66	11.88	0.227
1994	4.38	42.32	8.83	0.145
Average	26.32	87.15	28.06	0.311
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.1.7.1** Catches of Norwegian spring-spawning herring (tonnes) since 1972.

Year	A	B <sup>1</sup>	C	D	Nominal catches	Total catch as used by the Working Group
1972	-	9,895	3,266 <sup>2</sup>	-	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	-	8,557	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 <sup>3</sup>
1986	71,122 <sup>4</sup>	55,507	156	-	126,785	225,256 <sup>3</sup>
1987	62,910	49,798	181	-	112,899	127,306 <sup>3</sup>
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 <sup>5</sup>	110,212 <sup>5</sup>	50	-	227,457	232,457
1994	288,581 <sup>5</sup>	190,643 <sup>5</sup>	4	-	479,228	479,228

A = catches of adult herring in winter

B = mixed herring fishery in autumn

C = by-catches of 0- and 1-group herring in the sprat fishery

D = USSR-Norway by-catch in the capelin fishery (2-group)

<sup>1</sup> Includes also by-catches of adult herring in other fisheries

<sup>2</sup> In 1972, there was also a directed herring 0-group fishery

<sup>3</sup> Includes mortality caused by fishing operations in addition to unreported catches

<sup>4</sup> Includes 26,000 t of immature herring (1983 year-class) fished by USSR in the Barents Sea

<sup>5</sup> Preliminary Norwegian catch



**Table 3.1.7.2** Total catch of Norwegian spring-spawning herring (tonnes) since 1972.

Year	Norway	USSR/Russia	Denmark	Faroes	Iceland	Netherlands	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	199,812	32,645	-	-	-	-	232,457
1994	380,771	74,400	-	2,911	21,146	-	479,228
1995 <sup>1</sup>	410,000 <sup>2</sup>	100,000	30,131 <sup>3</sup>	57,000	170,611	6,886	-

<sup>1</sup>Preliminary, <sup>2</sup>Per 1 October 1995, <sup>3</sup>Preliminary, provided by Working Group members

**Table 3.1.7.3** Norwegian spring-spawning herring.

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 5-11
1950	13,768.00	8,728.66	933.00	0.070
1951	6,254.21	8,481.04	1,278.40	0.080
1952	3,781.88	8,181.70	1,254.80	0.080
1953	50,671.70	7,904.19	1,090.60	0.050
1954	6,529.42	7,902.38	1,644.50	0.080
1955	2,953.76	9,227.86	1,359.80	0.070
1956	3,010.64	11,197.20	1,659.40	0.090
1957	612.73	10,296.90	1,319.50	0.080
1958	518.44	9,529.97	986.60	0.070
1959	167.35	7,557.20	1,111.10	0.110
1960	252.04	5,941.52	1,101.80	0.110
1961	239.99	4,122.23	830.10	0.071
1962	21,168.30	3,322.89	848.60	0.090
1963	7,323.13	2,489.90	984.50	0.070
1964	2,158.27	2,604.06	1,281.80	0.140
1965	198.72	2,996.58	1,547.70	0.280
1966	8,271.64	2,754.97	1,955.00	0.810
1967	3,801.73	1,184.90	1,677.20	1.260
1968	107.69	247.44	712.20	1.920
1969	228.18	100.70	67.80	0.490
1970	15.89	51.72	62.30	0.810
1971	7.48	23.06	21.10	1.180
1972	420.90	8.94	13.16	2.240
1973	17.75	80.57	7.02	1.530
1974	4.34	94.55	7.62	0.790
1975	25.50	87.61	13.71	0.100
1976	839.06	148.02	10.44	0.030
1977	565.80	299.99	22.71	0.040
1978	241.32	379.78	19.82	0.060
1979	494.05	420.42	12.86	0.020
1980	329.58	499.89	18.58	0.030
1981	410.50	507.40	13.74	0.030
1982	681.81	495.24	16.66	0.020
1983	119.51	577.69	23.05	0.030
1984	68.59	617.50	53.53	0.100
1985	146.03	531.77	169.87	0.379
1986	24,387.80	533.69	225.26	0.823
1987	427.54	1,018.36	127.31	0.331
1988	1,349.94	3,221.73	135.30	0.036
1989	138.25	3,927.56	103.83	0.023
1990	216.92	3,935.21	86.41	0.019
1991	2,446.96	4,177.65	84.68	0.022
1992	6,039.34	3,642.63	104.45	0.029
1993	6,651.79	3,421.11	232.46	0.068
1994	21,553.60	3,855.41	479.23	0.125
Average	4,435.96	3,274.00	571.32	0.331
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			Total	Summer-autumn			Total
	Norway	Russia	Other		Norway	Russia	Total	
1965	217	7	0	224	0	0	0	224
1966	380	9	0	389	0	+	+	389
1967	403	6	0	408	0	+	+	408
1968	460	15	0	476	62	+	62	538
1969	436	1	0	436	243	+	243	680
1970	955	8	0	963	346	5	351	1314
1971	1300	14	0	1314	71	7	78	1392
1972	1208	25	0	1234	347	12	359	1593
1973	1078	34	0	1112	213	11	223	1336
1974	749	80	0	829	237	82	319	1148
1975	549	301	43	893	394	131	524	1417
1976	1230	230	0	1460	719	366	1085	2545
1977	1412	345	2	1758	704	477	1181	2940
1978	772	436	25	1233	350	311	661	1894
1979	539	342	5	886	569	327	896	1782
1980	539	253	9	801	459	388	847	1648
1981	784	429	28	1240	454	284	738	1978
1982	568	260	5	833	591	336	927	1760
1983	735	373	36	1145	758	439	1197	2342
1984	330	257	42	629	482	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 <sup>1</sup>
1992	620	247	24	891	73	159	232	1123 <sup>1</sup>
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

<sup>1</sup>Revised.

**Table 3.1.8.2** Barent Sea Capelin. (Sub-areas I and II, excluding Division IIa west of 5°W).  
Weights in '000 t.

Year	Recruitment Age 1	Spawning <sup>1</sup> Stock Biomass	Landings
1965			224
1966			389
1967			409
1968			537
1969			680
1970			1,314
1971			1,392
1972			1,592
1973	1,175		1,336
1974	762	389	1,149
1975	510	95	1,440
1976	447	1,147	2,587
1977	789	919	2,987
1978	857	475	1,915
1979	553	579	1,783
1980	592	21	1,648
1981	487	1,654	1,986
1982	574	505	1,760
1983	613	25	2,358
1984	174	150	1,478
1985	43	102	868
1986	11	13	123
1987	49	31	0
1988	21	13	0
1989	181	198	0
1990	700	187	0
1991	405	1,794	933
1992	395	1,072	1,123
1993	3	663	586
1994	27	165	0
1995	8	57	0 <sup>2</sup>

<sup>1</sup>At 1 April

<sup>2</sup>Expected catch

**Table 3.2.2.a.1** Nominal catch (tonnes) of Cod in NAFO Sub-area 1, 1981-1994 as officially reported to NAFO.

Country	1981	1982	1983	1984	1985	1986	1987
Faroe Islands	-	-	1.339	-	-	-	-
Germany	417	8.139	10.158	8.941	2.170	41	55
Greenland	53.039	47.693	44.970	24.457	12.651	6.549	12.284
Japan	-	-	-	13	54	11	33
Norway	-	-	-	5	1	2	1
United Kingdom	-	-	1.174	-	-	-	-
Total	53.456	55.832	57.641	33.416	14.876	6.603	12.373
Country	1988	1989	1990	1991	1992 <sup>1</sup>	1993 <sup>2</sup>	1994 <sup>3</sup>
Faroe Islands	-	-	51	1	-	-	-
Germany	6.574	12.892	7.515	96	-	-	-
Greenland	52.135	92.152	58.816	20.238	5.723	1.924	2.115
Japan	10	-	-	-	-	-	-
Norway	7	2	948	-	-	-	-
United Kingdom	927	3780	1.631	-	-	-	-
Total	59.653	108.826	68.961	20.335	5.723	1.924	2.115
WG estimate <sup>4</sup>	62.653	111.567	-	-	-	-	-

<sup>1</sup>) Provisional data (NAFO SCS Doc. 93/22)

<sup>2</sup>) Provisional data (NAFO SCS Doc. 94/24)

<sup>3</sup>) Provisional data as reported to Greenland authorities.

<sup>4</sup>) Includes 3,000 t in 1988 and 2,741 t in 1989 reported to be from ICES Sub-area XIV.

**Table 3.2.2.a.2** Nominal catch (tonnes) of cod in ICES Sub-area XIV, 1981-1994 as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Faroe Islands	292	-	368	-	-	86	-
Germany	7.367	8.940	8.238	7.035	2.006	4.063	5.358
Greenland	890	898	438	1.051	106	606	1.550
Iceland	1	-	-	-	-	-	1
Norway	-	-	-	794	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-
Total	8.550	9.838	9.044	8.880	2.112	4.755	6.909
WG estimate <sup>1</sup>	16.000	27.000	13.378	8.914	-	-	-
Country	1988	1989	1990	1991	1992	1993	1994 <sup>6</sup>
Faroe Islands	12	40	-	-	-	-	1
Germany	12.049	10.613	26.419	8.434	5.893	164	-
Greenland	345	3.715	4.442	6.677	1.283	241	73
Iceland	9	-	-	-	22	-	-
Norway	-	-	17	828	1.030 <sup>6</sup>	183 <sup>6</sup>	43
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
Total	12.415	15.661	33.336	21.800	11.349	796	413
WG estimate	9.457 <sup>2</sup>	14.669 <sup>3</sup>	33.513 <sup>4</sup>	21.818 <sup>5</sup>	-	-	437 <sup>7</sup>

<sup>1</sup>) Includes estimates of discards and catches reported in Sub-area XII

<sup>2</sup>) Excluding 3,000 t assumed to be from NAFO Division 1F and including 42 t taken by Japan.

<sup>3</sup>) 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).

<sup>4</sup>) Includes 129 t by Japan and 48 t additional catches by Greenland (Horsted, 1994).

<sup>5</sup>) Includes 18 t by Japan.

<sup>6</sup>) Provisional data.

<sup>7</sup>) Includes 24 t by Germany reported to Greenland authorities.

**Table 3.2.2 a.3** Greenland cod (ICES Sub-area XIV and NAFO Sub-area 1)

Year	R. index age 3	Stock biomass index	Total Landings ('000 t)
1966			379.04
1967			454.25
1968			409.30
1969			232.73
1970			134.77
1971			153.43
1972			137.43
1973			74.69
1974			54.49
1975			53.83
1976			46.31
1977			91.00
1978			99.00
1979			133.00
1980			66.00
1981			69.46
1982	34.309	152.107	82.83
1983	3.42	116.531	71.02
1984	3.433	45.309	42.33
1985	1.015	69.236	16.99
1986	6.067	127.902	11.36
1987	710.355	690.181	19.28
1988	108.795	660.935	72.11
1989	8.112	573.395	126.24
1990	3.452	100.395	102.47
1991	0.823	37.901	42.15
1992	0.296	1.823	17.07
1993	2.406	5.959	2.72
1994	0.228	2.93	2.55
<b>Average</b>	<b>68</b>	<b>199</b>	<b>110.27</b>

**Table 3.2.2 b.1** Nominal catch (tonnes) of COD in Division Va, by countries, 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Belgium	1,321	236	188	254	207	226	597
Faroe Islands	6,183	5,297	5,626	2,041	2,203	2,554	1,848
Iceland	461,038	382,297	293,890	281,481	322,810	365,852	389,808
Norway	559	557	109	90	46	1	4
UK (Engl. and Wales)	-	-	-	2	1	-	-
Total	469,101	388,387	299,813	283,868	325,267	368,633	392,257
Working Group estimate	-	-	-	-	-	-	-

Country	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Belgium	365	309	260	548	222	145	135
Faroe Islands	1,966	2,012	1,782	1,323	883	664	754
Iceland	375,741	353,985	333,348	306,697	266,662	251,170	175,296
Norway	4	3	-	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	+	-
Total	378,076	356,309	335,390	308,568	267,767	251,979	176,185
Working Group estimate	-	-	-	-	-	-	178,822 <sup>2</sup>

1) Provisional.

2) Additional catch by Iceland of 2637 t included.

**Table 3.2.2 b.2 Icelandic Cod (Division Va)**

Year	Recruitment	Spawning Stock	Fishing Mortality	
	at age 3	Biomass	Landings	Age 5-10
1955	147	1261	595	0.31
1956	202	1199	556	0.26
1957	176	1145	502	0.32
1958	260	1034	536	0.32
1959	307	928	464	0.33
1960	153	825	492	0.38
1961	191	760	394	0.33
1962	143	729	413	0.40
1963	163	683	437	0.45
1964	292	569	434	0.54
1965	255	454	391	0.61
1966	273	412	334	0.54
1967	328	476	312	0.49
1968	174	594	398	0.67
1969	255	693	427	0.53
1970	186	684	521	0.56
1971	178	615	518	0.62
1972	136	477	476	0.71
1973	303	436	369	0.71
1974	170	329	368	0.76
1975	265	339	365	0.81
1976	432	282	346	0.78
1977	145	318	340	0.66
1978	224	374	330	0.49
1979	248	449	366	0.43
1980	145	605	432	0.46
1981	145	390	465	0.69
1982	135	265	380	0.79
1983	229	212	298	0.79
1984	141	218	282	0.63
1985	146	268	323	0.66
1986	339	270	365	0.78
1987	338	256	390	0.83
1988	170	194	378	0.97
1989	82	271	363	0.67
1990	131	346	335	0.72
1991	98	232	308	0.77
1992	177	241	269	0.82
1993	183	214	251	0.95
1994	60	261	178	0.72
<b>Average</b>	<b>203</b>	<b>508</b>	<b>393</b>	<b>0.61</b>

Spawning stock and landings in '000 t; Recruitment in millions.



**Table 3.2.3.1** Nominal catch (tonnes) of SAITHE in Division Va, by countries, 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Belgium	532	201	224	269	158	218	217
Faroe Islands	3,545	3,582	2,138	2,044	1,778	783	2,139
France	-	23	-	-	-	-	-
Iceland	54,921	65,124	55,904	60,406	55,135	63,867	78,175
Norway	3	1	+	-	1	-	-
UK (Engl. and Wales)	-	-	-	-	29	-	-
Total	59,001	68,931	58,266	62,719	57,101	64,868	80,531
Working Group estimate	-	-	-	-	-	66,376 <sup>2</sup>	-

Country	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Belgium	268	369	190	236	195	104	30
Faroe Islands	2,596	2,246	2,905	2,690	1,570	1,562	975
France	-	-	-	-	-	-	-
Iceland	74,383	79,796	95,032	99,390	77,832	69,982	62,722
Norway	-	-	-	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	-	-
Total	77,247	82,411	98,127	102,316	79,597	71,648	63,727
Working Group estimate	-	-	-	102,737 <sup>3</sup>	-	-	64,549 <sup>4</sup>

1) Provisional.

2) Additional catch by Faroe Islands of 1,508 t included.

3) Additional catch by Iceland of 451 t included.

4) Additional catch by Iceland of 822 t included.

**Table 3.2.3.2 Icelandic Saithe (Division Va)**

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-9
1961	33	130	51	0.218
1962	31	142	51	0.287
1963	84	145	48	0.304
1964	55	142	60	0.250
1965	94	166	60	0.231
1966	70	214	52	0.178
1967	68	279	76	0.237
1968	60	346	78	0.210
1969	89	395	116	0.295
1970	66	399	117	0.323
1971	51	381	137	0.443
1972	26	335	111	0.361
1973	26	314	111	0.345
1974	25	288	98	0.287
1975	26	265	88	0.278
1976	31	227	82	0.326
1977	22	187	62	0.282
1978	49	166	50	0.237
1979	55	160	64	0.245
1980	28	167	58	0.310
1981	20	170	59	0.311
1982	22	180	69	0.387
1983	34	196	58	0.340
1984	50	183	63	0.311
1985	36	171	57	0.248
1986	76	182	66	0.265
1987	120	178	81	0.360
1988	60	175	77	0.332
1989	33	185	82	0.258
1990	26	212	98	0.293
1991	32	222	103	0.328
1992	21	221	80	0.313
1993	56	214	72	0.299
1994	78	209	65	0.272
Average	49	222	76	0.293
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.2.4.1

GREENLAND HALIBUT. Nominal catches (tonnes) by countries, in Sub-areas V and XIV 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	-	6
Faroe Islands	767	1,532	1,146	2,502	1,052	853	1,096
France	8	27	236	489	845	52	19
Germany	3,007	2,581	1,142	936	863	858	565
Greenland	+	1	5	15	81	177	154
Iceland	15,457	28,300	28,360	30,080	29,231	31,044	44,780
Norway	-	-	2	2	3	+	2
Russia	-	-	-	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	-	-
Total	19,239	32,441	30,891	34,024	32,075	32,984	46,622
Working Group estimate	-	-	-	-	-	-	-

Country	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Denmark	+	-	-	-	-	-	-
Faroe Islands	1,378	2,319	1,803	1,566	2,128	4,233	6,241
France	25	-	-	-	3	-	-
Germany	637	493	336	303	382	415	-
Greenland	37	11	40	66	437	289	866
Iceland	49,040	58,330	36,557	34,883	31,954	34,359	27,260
Norway	1	3	50	34	273	642	1,571
Russia	-	-	-	-	5	-	-
UK (Engl. and Wales)	-	-	27	38	127	809	597
Total	51,118	61,156	38,813	36,890	35,309	40,747	36,535
Working Group estimate <sup>2</sup>	-	61,936	39,326	37,950	35,487	41,247	37,187

1) Provisional data

2) Working Group estimate as in Tables 3.2.4.2-3.2.4.4

**Table 3.2.4.2 GREENLAND HALIBUT.** Nominal catches (tonnes) by countries, in Division Vb 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	-	6
Faroe Islands	442	863	1,112	2,456	1,052	775	907
France	8	27	236	489	845	52	19
Germany	114	142	86	118	227	113	109
Greenland	-	-	-	-	-	-	-
Norway	2	+	2	2	2	+	2
UK (Engl. and Wales)	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-
Total	566	1,032	1,436	3,065	2,126	940	1,043
Working Group estimate	-	-	-	-	-	-	-

Country	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Denmark	+	-	-	-	-	-	-
Faroe Islands	901	1,513	1,064	1,293	2,105	4,058	5,163
France <sup>7</sup>	25	...	...	...	3	...	...
Germany	42	73	43	24	71	24	-
Greenland	-	-	-	-	-	-	-
Norway	1	3	42	16	25 <sup>1</sup>	371 <sup>1</sup>	53
UK (Engl. and Wales)	-	-	-	-	1	15	-
UK (Scotland)	-	-	-	-	1	-	-
Total	969	1,589	1,149	1,333	2,206	4,468	5,216
Working Group estimate	-	1,606 <sup>2</sup>	1,282 <sup>3</sup>	1,662 <sup>4</sup>	2,269 <sup>5</sup>	-	5,224 <sup>6</sup>

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) Includes 8 t taken by Germany as reported to Faroe Islands.

7) Quantity unknown 1989-1991 and 1993-1994.

Table 3.2.4.3

GREENLAND HALIBUT. Nominal catches (tonnes) by countries, in Division Va 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Faroe Islands	325	669	33	46	-	-	15
Iceland	15,455	28,300	28,359	30,078	29,195	31,027	44,644
Norway	-	-	+	+	2	-	-
Total	15,780	28,969	28,392	30,124	29,197	31,027	44,659
Working Group estimate	-	-	-	-	-	-	-

Country	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Faroe Islands	379	719	739	273	23	166	910
Iceland	49,000	58,330	36,557	34,883	31,954	34,340	27,192
Norway	-	-	-	-	3	-	-
Total	49,379	59,049	37,296	35,156	31,980	34,506	28,102
Working Group estimate	-	59,272 <sup>2</sup>	37,308 <sup>3</sup>	35,413 <sup>4</sup>	-	-	28,781 <sup>5</sup>

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.

5) Includes additional catches of 677 t by Iceland, 1 t by Greenland, and 1 t by Germany.

**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
Faroe Islands	-	-	-	-	-	78	74
Germany	2,893	2,439	1,054	818	636	745	456
Greenland	+	1	5	15	81	177	154
Iceland	-	-	1	2	36	17	136
Norway	-	-	-	+	-	-	-
Russia	-	-	-	-	-	-	-
UK (Engl. and Wales)	-	-	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-
Total	2,893	2,440	1,060	835	753	1,017	820
Working Group estimate	-	-	-	-	-	-	-

Country	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Faroe Islands	98	87	-	-	-	181	168
Germany	595	420	293	279	311	391	-
Greenland	37	11	40	66	437	288	866
Iceland	40	+	-	-	-	19	68
Norway	-	-	8	18	248 <sup>1</sup>	537 <sup>1</sup>	1,518
Russia	-	+	-	-	5	-	-
UK (Engl. and Wales)	-	-	27	38	108	796	...
UK (Scotland)	-	-	-	-	18	26	...
United Kingdom	-	-	-	-	-	-	597
Total	770	518	368	401	1,127	2,238	3,217
Working Group estimate	-	-	736 <sup>2</sup>	875 <sup>3</sup>	1,240 <sup>4</sup>	2,275 <sup>5</sup>	3,182 <sup>6</sup>

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.

**Table 3.2.4.5** Greenland halibut in Sub-areas V and XIV.

Year	Recruitment Age 5	Spawning Stock Biomass	Landings	Fishing Mortality Age 8-12
1976	26	54	6	0.072
1977	26	65	17	0.254
1978	27	76	14	0.172
1979	34	77	24	0.274
1980	40	79	31	0.428
1981	39	73	19	0.282
1982	33	80	32	0.395
1983	29	72	31	0.381
1984	31	83	34	0.397
1985	43	94	32	0.243
1986	43	102	33	0.232
1987	37	112	47	0.306
1988	31	115	51	0.357
1989	32	103	61	0.482
1990	33	87	39	0.380
1991	26	91	38	0.341
1992	25	70	35	0.426
1993	32	72	41	0.556
1994	29	63	37	0.515
Average	32	82	33	0.342
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.2.5 a.1** REDFISH. Nominal catches (tonnes) by countries, 'in Division Va 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Belgium	924	283	389	291	400	423	398
Faroe Islands	1,212	1,046	1,357	686	291	144	332
Germany, Fed. Rep.	-	-	-	-	-	-	-
Iceland	93349	115,051	122,749	108,270	91,381	85,992	87,768
Norway	32	11	32	12	8	2	7
Total	95,517	116,391	124,527	109,259	92,080	86,561	88,505

Country	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Belgium	372	190	70	146	107	96	46
Faroe Islands	372	394	624	412	389	438	202
Germany, Fed. Rep.	-	-	-	-	-	-	49
Iceland	93,995	91,536	90,891	96,770	94,382	96,577	93,504
Norway	7	1	-	-	-	-	-
Total	94,746	92,121	91,585	97,328	94,878	97,111	93,801

1) Provisional

**Table 3.2.5 a.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		91,488	1	92,073
1990	70	624		90,891	0	91,585
1991	146	412		96,770	0	97,328
1992	107	389		96,350 <sup>2</sup>	0	96,846
1993	91	438		99,180 <sup>3</sup>	0	99,709
1994 <sup>1</sup>	46	202	49	111,667 <sup>4</sup>	0	111,964

1 Provisional data

2 Including 1968 tonnes oceanic *S. mentella*.

3 Including 2603 tonnes oceanic *S. mentella*.

4 Including 16667 tonnes oceanic *S. mentella*.



**Table 3.2.5 a.3**

REDFISH. Nominal catches (tonnes) by countries, in Division Vb 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	36	176
Faroe Islands	3,232	3,999	4,642	8,770	12,634	15,224	13,477
France	59	204	439	559	1,157	752	819
Germany, Fed. Rep. <sup>2</sup>	3,841	4,660	4,300	4,460	5,091	5,142	3,060
Iceland	-	1	-	-	-	-	-
Norway	13	7	3	1	4	2	5
UK (Engl. and Wales)	-	-	-	-	-	-	-
USSR	-	-	-	142	-	-	-
Total	7,145	8,871	9,384	13,932	18,886	21,156	17,537

Country	1988	1989	1990	1991	1992	1993	1994
Denmark	8	-	+	-	-	-	-
Faroe Islands	12,966	12,636	10,017	14,090	15,279	9,687	8,872
France	582	996	909	473	114	354	61
Germany, Fed. Rep. <sup>2</sup>	1,595	1,191	441	447	450	239	156
Norway	5	21	21	20	35 <sup>1</sup>	26 <sup>1</sup>	31
UK (Engl. and Wales)		-	-	2	21	28	...
UK (Scotland)		-	+	1	8	1	...
United Kingdom							19
USSR/Russia <sup>3</sup>		-	-	-	15	44	
Total		14,844	11,388	15,032	15,899	10,060	9,139

1) Provisional

2) Includes former GDR.

3) As from 1991.

**Table 3.2.5 a.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 <sup>2</sup>	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 <sup>1</sup>	0	8,872	61	156	0	-	31	-	19	0	9,139

1 Provisional data.

2 USSR 1978-1991, Russia 1992-1994

**Table 3.2.5 a.5** REDFISH. Nominal catches (tonnes) by countries, in Sub-area VI 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Faroe Islands	-	-	-	19	18	-	-
France	24	44	93	102	397	480	1,032
Germany, Fed. Rep.	983	604	359	563	76	24	-
Ireland	-	-	-	-	-	-	-
Norway	3	4	2	9	-	14	2
Spain	1	-	2	-	-	-	-
UK (Engl. and Wales)	-	2	-	1	1	2	3
UK (Scotland)	-	-	-	1	-	10	17
Total	1,011	654	456	695	492	530	1,054

Country	1988	1989	1990	1991	1992	1993	1994
Faroe Islands	1	61	-	22	6	-	-
France	1,024	726	684	483	127	-	-
Germany, Fed. Rep.	16	1	6	8		77	87
Ireland	-	-	-	-	1	1	-
Norway	1	2	5	+	4 <sup>1</sup>	3 <sup>1</sup>	2
Spain	-						
UK (Engl. and Wales)	75	4	29	11	4	4	...
UK (Scotland)	6	4	6	39	32	94	...
United Kingdom							119
Total	1,123	798	730	563	174	179	208

1) Provisional

**Table 3.2.5 a.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 <sup>1</sup>	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	-	77	1	3	0	98	185
1994 <sup>1</sup>	-	-	87	-	2	-	119	208

<sup>1</sup> Provisional data.

**Table 3.2.5 a.7 REDFISH. Nominal catches (tonnes) by countries, in Sub-area XII 1982-1994, as officially reported to ICES and/or FAO.**

Country	1982	1983	1984	1985	1986	1987
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
<b>Total</b>	<b>45,479</b>	<b>62,288</b>	<b>60,643</b>	<b>17,300</b>	<b>24,131</b>	<b>2,948</b>

Country	1988	1989	1990	1991	1992	1993	1994
Bulgaria	-	-	1,617	-	628	3,216	-
Estonia	-	-	-	-	1,810	6,365	-
Faroe Islands	-	-	-	-	-	4,026	2,896
Germany Fed.	-	353	7	62	1,084	6,459	6,353
Greenland	-	-	-	-	9	710	-
Iceland	-	567	185	95	361	8,098	19,341
Latvia	-	-	-	-	780	6,803	-
Lithuania	-	-	-	-	6,656	7,899	-
Norway	-	-	249	726	10,560 <sup>1</sup>	6,207 <sup>1</sup>	4,283
Poland	-	112	-	-	-	-	-
UK (Scotland)	-	-	-	-	-	+	-
Ukraine	-	-	-	-	160	2,622	-
USSR/Russia <sup>2</sup>	9,772	15,543	4,274	6,624	2,485	4,106	10,489
<b>Total</b>	<b>9,772</b>	<b>16,575</b>	<b>6,332</b>	<b>7,507</b>	<b>24,533</b>	<b>56,511</b>	<b>43,362</b>

1) Provisional

2) As from 1991.

3) Includes former GDR

**Table 3.2.5 a.8** Landings of REDFISH (in tonnes) by countries in Sub-area XII as used by the Working Group.

Year	Bulgaria	Estonia	Faroes	France	FRG <sup>4</sup>	Greenland	Iceland	Latvia	Lithuania	Norway	Poland	Ukraine	Russia <sup>3</sup>	Total
1981	0	0	0	0	0	0	0			0	0	0	0	0
1982	0	0	0	0	0	0	0			0	0	0	39,783	39,783
1983	0	0	0	0	0	0	0			0	0	0	60,079	60,079
1984	0	0	0	0	0	0	0			0	0	0	60,643	60,643
1985	0	0	0	0	0	0	0			0	0	0	17,300	17,300
1986	0	0	0	0	0	0	0			0	0	0	24,131	24,131
1987	0	0	0	0	0	0	0			0	0	0	2,948	2,948
1988	0	0	0	0	0	0	0			0	0	0	9,772	9,772
1989	0	0	0	0	353	0	658 <sup>5</sup>			0	112	0	15,543	16,671
1990	1,617	0	0	0	7	0	215 <sup>5</sup>			926 <sup>2</sup>	0	0	4,274	7,046
1991	0	0	0	0	62	0	110 <sup>5</sup>			764 <sup>2</sup>	0	0	6,624	7,567
1992	628	1,810	0	2	1,084	9	419 <sup>5</sup>	780	6,656	369 <sup>2</sup>	0	160	11,266	23,183
1993	3,216	6,365	4,026	0	6,459	710	9,394 <sup>5</sup>	6,803	7,899	5,735 <sup>2</sup>	0	2,622	18,669	71,898
1994 <sup>1</sup>	-	-	2,896	606 <sup>6</sup>	6,353	0	22,436 <sup>5</sup>	-	-	4,867 <sup>2</sup>	-	-	10,489	47,647

1 Provisional data.

2 Area and quantum adjusted according to official log-books and raised by 5% to account for discarding.

3 USSR 1981-1991, Russia 1992-1994.

4 Includes former GDR.

5 Raised by 16% to account for discarding.

6 As reported to Greenland

**Table 3.2.5 a.9 REDFISH.** Nominal catches (tonnes) by countries in Sub-area XIV 1982-1994,  
as officially reported to ICES and/or FAO.

Country	1982	1983	1984	1985	1986	1987
Bulgaria	-	-	2,961	5,825	11,385	12,270
Denmark	11	-	-	-	-	-
Faroe Islands	-	27	-	-	5	382
Germany, Dem. Rep.	-	155	989	5,438	8,574	7,023
Germany, Fed. Rep.	37,119	28,878	14,141	5,974	5,584	4,691
Greenland	+	1	10	5,519 <sup>2</sup>	9,542 <sup>2</sup>	670
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
Total	57,945	29,061	18,357	65,864	96,102	93,582

Country	1988	1989	1990	1991	1992	1993	1994
Bulgaria	8,455	4,546	1,073	-	-	-	-
Denmark	-	-	-	-	-	-	-
Faroe Islands	1,634	226	-	115	3,765	3,095	164
Germany <sup>4</sup>	22,582	8,816	11,218	9,122	7,959	26,969	22,404
Greenland	42	3	24	42	962	264	422
Iceland	-	814	3,726	7,477	12,982	11,650	27,178
Norway	-	-	6,070	4,954	636 <sup>1</sup>	7,162 <sup>1</sup>	1,052
Poland	-	-	-	-	-	-	-
UK (Engl. and	-	5	39	219	178	241	...
UK (Scotland)	-	-	3	+	28	8	...
United Kingdo	-	-	-	-	-	-	142
USSR/Russia <sup>3</sup>	55,254	7,177	3,040	2,665	1,844	6,560	13,917
Total	87,967	21,587	25,193	24,594	28,354	55,949	65,279

1) Provisional data

2) Fished mainly by Japan

3) As from 1991

4) Includes former GDR

**Table 3.2.5 a.10** Landings on REDFISH (in tonnes) by country in Sub-area XIV, as used by the Working Group.

Year	Bulgaria	Faroes	France	FRG <sup>5</sup>	Greenland	Iceland	Japan	Norway	Poland	UK	Russia <sup>3</sup>	Total
1978	0	0	0	20,711	3	151	0	2	0	13	0	20,880
1979	0	0	490	20,428	0	0	0	0	0	0	0	20,918
1980	0	0	0	32,520	0	89	0	0	0	0	0	32,609
1981	0	18	0	42,980	1	0	0	0	0	0	0	42,999
1982	0	0	0	42,815	0	17	0	0	581	0	20,217	63,630
1983	0	27	0	30,970	1	0	0	0	0	0	0	30,998
1984	2,961	0	0	15,130	10	0	0	15	239	0	0	18,355
1985	5,825	0	0	11,412	5,519	0	0	0	135	0	42,973	65,864
1986	11,385	5	0	14,158	9,542	0	0	0	149	0	60,683	95,922
1987	12,270	382	0	11,714	2,912	0	0	0	25	0	68,521	95,824
1988	8,455	1,634	0	22,582	3,751	0	0	0	0	0	55,254	91,676
1989	4,546	226	0	8,816	285	3,158 <sup>4</sup>	307	0	0	5	7,177	24,520
1990	1,073	0	0	11,218	24	4,322 <sup>4</sup>	3,450	6,159 <sup>2</sup>	0	42	4,973	31,261
1991	0	115	0	9,122	42	8,673 <sup>4</sup>	1,224	5,434 <sup>2</sup>	0	219	2,665	27,494
1992	0	3,765	0	7,959	3,769	13,091 <sup>4</sup>	0	14,322 <sup>2</sup>	0	206	4,467	47,579
1993	0	3,095	0	26,969	264	10,911 <sup>4</sup>	938	8,848 <sup>2</sup>	0	249	5,496	56,770
1994 <sup>1</sup>	-	164	-	22,404	422	14,859 <sup>4</sup>	-	2,711 <sup>2</sup>	-	142	13,917	54,619

1) Provisional data.

2) Area and quantum adjusted according to official log-books and raised by 5% to account for discards in the oceanic *S. mentella* fishery.

3) USSR 1978-1991; Russia 1992-1994.

4) Raised by 16% to account for discarding.

5) Includes former GDR

**Table 3.2.5.b.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	49,678	2,140	292	0	3,911	56,021
1992	51,464	3,435	40	0	1,133	56,072
1993	45,885	2,213	101	0	1,679	49,879
1994 <sup>1</sup>	38,632	2,268	121	0	1,362	42,383

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	47,652	12,897	271	0	6,514	67,334
1992	43,414	12,533	137	0	6,090	62,173
1993	51,221	8,156	84	0	15,090	74,550
1994 <sup>1</sup>	56,665	6,871	87	0	18,629	82,252

1) Provisional data.



**Table 3.2.5 d.1 Oceanic *S. mentella*. Landings (in tonnes) by area 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	16,671	21,546	38,217
1990	0	0	0	7,046	24,470	31,516
1991	0	0	0	7,567	17,170	24,737
1992	1,968	0	0	23,183	40,775	65,926
1993	2,603	0	0	71,898	40,035	114,543
1994 <sup>1</sup>	16,667	0	0	47,647	34,486	98,800

1) Provisional data.

**Table 3.2.5 d.2 Oceanic *S. mentella*. Landings (in tonnes) by countries used by the Working Group.**

Year	Bulgaria	Estonia	Faroes	France	Germany <sup>4</sup>	Greenland	Iceland	Latvia	Lithuania	Norway	Poland	Russia <sup>2</sup>	Ukraine	Total
1981	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	244	0	8,891			6,198	0	9,289		24,737
1992	628	1,810	3,765	2	6,251	9	15,478	780	6,656	14,654	0	15,733	160	65,926
1993	3,216	6,365 <sup>3</sup>	7,121	0	18,168	710	22,908	6,803	7,899	14,566	0	24,165	2,622	114,543
1994 <sup>1</sup>	-	-	2,896	606	15,987	0	53,962	-	-	7,535	-	17,814	-	98,800

1 Provisional data.

2 USSR 1981-1991; Russia since 1992

3 Officially reported to ICES in 1993 but not in 1994.

4 Includes former GDR

**Table 3.2.5 d.3 Oceanic Redfish *Sebastes mentella* in Division Va and Sub-areas XII and XIV**

Year	Landings
1982	61
1983	60
1984	65
1985	72
1986	105
1987	91
1988	91
1989	38
1990	32
1991	25
1992	66
1993	115
1994	99
Average	71
Unit	1000 tonnes

**Table 3.2.6.1** Icelandic summer-spawning herring. Catch in weight (including discards since 1989) as used by the Working Group.

Year	Catch (tonnes)
1972	310
1973	255
1974	1,274
1975	13,280
1976	17,168
1977	28,924
1978	37,333
1979	45,072
1980	53,269
1981	39,544
1982	56,528
1983	58,665
1984	50,293
1985	49,092
1986	65,413
1987	75,439
1988	91,760
1989	100,733
1990/1991	105,593 <sup>1</sup>
1991/1992	109,499 <sup>1</sup>
1992/1993	106,825 <sup>1</sup>
1993/1994	102,802 <sup>1</sup>
1994/1995	134,003 <sup>1</sup>

<sup>1</sup> Seasonal catches.

**Table 3.2.6.2 Icelandic summer-spawning herring (Division Va).**

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-14 <sup>1)</sup>
1947	179.51	140.72	47.80	0.350
1948	68.01	120.36	56.80	1.597
1949	77.47	90.94	5.40	0.089
1950	197.37	86.95	13.60	0.195
1951	116.48	87.74	15.80	0.257
1952	323.93	100.54	10.50	0.437
1953	197.30	108.25	17.60	0.359
1954	167.41	147.06	11.00	0.148
1955	191.20	169.40	20.50	0.140
1956	469.18	169.86	20.40	0.148
1957	791.38	179.87	22.80	0.201
1958	369.22	199.64	33.50	0.220
1959	555.11	278.23	35.00	0.253
1960	712.88	258.86	28.50	0.071
1961	531.01	286.80	74.00	0.285
1962	525.30	310.08	92.90	0.472
1963	467.07	267.05	130.30	0.775
1964	585.84	189.25	86.50	0.802
1965	507.38	156.61	122.90	1.213
1966	99.67	83.73	58.40	0.764
1967	39.28	89.31	67.70	1.333
1968	178.65	27.41	16.80	0.779
1969	47.14	16.57	20.91	0.946
1970	33.81	19.82	16.45	1.167
1971	70.37	13.28	11.83	1.584
1972	89.68	10.69	0.37	0.168
1973	418.77	28.96	0.26	0.049
1974	134.22	46.18	1.27	0.029
1975	200.24	117.44	13.28	0.110
1976	554.11	130.19	17.17	0.157
1977	437.00	139.00	28.92	0.220
1978	196.00	184.00	37.33	0.250
1979	249.00	208.00	45.07	0.240
1980	255.00	223.00	53.27	0.300
1981	882.00	195.00	39.54	0.250
1982	240.00	203.00	56.53	0.370
1983	226.00	231.00	58.67	0.220
1984	469.00	245.00	50.29	0.260
1985	1,255.00	264.00	49.09	0.230
1986	656.00	274.00	65.41	0.360
1987	395.00	388.00	75.44	0.390
1988	506.00	455.00	91.76	0.290
1989	337.48	429.00	100.73	0.310
1990	926.00	389.00	105.59	0.350
1991	1,459.00	329.00	109.50	0.370
1992	719.00	378.00	106.83	0.330
1993	1,315.95	544.03	102.80	0.230
1994	600.00	554.00	134.00	0.260
Average	417.13	199.25	49.60	0.424
Unit	Millions	1000 tonnes	1000 tonnes	-

<sup>1)</sup>Fishing mortality at ages 3-12 for the period 1947-1975

**Table 3.2.7.1** The international capelin catch 1964 - 1995 (thousand tonnes).

Year	Winter season			Season	Summer- and autumn season				Season	Total
	Iceland	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	539.8	-	*0.4	540.2						

\* Greenland vessel

**Table 3.2.7.2** Capelin in the Iceland-East Greenland-Jan-Mayen area  
(Sub-areas V and XIV and Division IIa west of 5° W).  
Weights in '000 t and numbers in billions.

Year	Recruitment	Spawning	
	age 2	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	97		1,195
1979	108	600	980
1980	40	300	684
1981	43	170	626
1982	32	140	0
1983	96	260	573
1984	82	440	897
1985	165	460	1,312
1986	65	460	1,333
1987	103	420	1,116
1988	94	400	1,037
1989	53	445	808
1990	42	115	370
1991	77	330	677
1992	87	475	787
1993	107	500	1,179
1994	71	460	864
<b>Average</b>	<b>80</b>	<b>373</b>	<b>605</b>

**Table 3.3.2.1** Nominal catch (tonnes) of SAITHE in Division Vb, by countries, 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	21	255
Faroe Islands	29,682	30,808	38,963	54,344	42,874	40,139	39,301
France	258	130	180	243	839	87	153
Germany Dem Rep.	-	-	-	-	31	-	-
Germany Fed Rep.	20	19	28	73	227	105	49
Netherlands	-	-	-	-	-	-	-
Norway	134	15	5	5	-	24	14
UK (Engl. and Wales)	-	-	-	-	4	-	108
UK (Scotland)	9	1	-	-	630	1,340	140
United Kingdom							
USSR/Russia	-	-	-	-	-	-	-
Total	30,103	30,973	39,176	54,665	44,605	41,716	40,020

Country	1988	1989	1990	1991	1992	1993	1994
Denmark	94	-	2	-	-	-	-
Faroe Islands	44,402	43,624	59,821	53,321	35,979	32,719	32,406
France <sup>3)</sup>	313	...	...	...	1,999	...	...
Germany Dem Rep.	-	9	-	-	-	-	-
Germany Fed Rep.	74	20	15	32	5	2	-
Netherlands	-	22	67	65	-	-	-
Norway	52	51	46	103	34 <sup>1)</sup>	34 <sup>1)</sup>	156
UK (Engl. and Wales)	-	-	-	5	74	280	....
UK (Scotland)	92	9	33	79	98	425	....
United Kingdom							538
USSR/Russia <sup>2)</sup>	-	-	30	-	12	-	-
Total	45,027	43,735	60,014	53,605	38,167	33,426	33,100

1) Provisional data.

2) As from 1991.

3) Quantity unknown 1989-1991 and 1993.

**Table 3.3.2.2** Nominal catch (tonnes) of SAITHE in the Faroes  
(Division Vb), by countries, 1981-1994 as used in assessment.

Country	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	21	255
Faroe Islands							
Vb	29,682	30,808	38,963	54,344	42,874	40,139	39,301
IIIa <sub>4</sub>	-	-	-	-	-	-	-
France	258	130	180	243	839	87	153
Germany Dem Rep.	-	-	-	-	31	-	-
Germany Fed Rep.	20	19	28	73	227	105	49
Netherlands	-	-	-	-	-	-	-
Norway	134	15	5	5	-	24	14
UK (Engl. and Wales)	-	-	-	-	4	-	108
UK (Scotland)	9	1	-	-	630	1,340	140
United Kingdom							
USSR/Russia	-	-	-	-	-	-	-
Total	30,103	30,973	39,176	54,665	44,605	41,716	40,020

Country	1988	1989	1990	1991	1992	1993	1994
Denmark	94	-	2	-	-	-	-
Faroe Islands							
Vb	44,402	43,624	59,821	53,321	35,979	32,719	32,406
IIIa <sub>4</sub>	258	269	988	963	165		
France	313	473	626	283	1,999	9	10
Germany Dem Rep.	-	9	-	-	-	-	-
Germany Fed Rep.	74	20	15	32	5	3	
Netherlands	-	22	67	65	-	-	-
Norway	52	51	46	103	34 <sup>1</sup>	34 <sup>1</sup>	156
UK (Engl. and Wales)	-	-	-	5	74	280	....
UK (Scotland)	92	9	33	79	98	425	....
United Kingdom							604
USSR/Russia <sup>2</sup>	-	-	30	7	12	11	11
Total	45,285	44,477	61,628	54,863	38,366	33,481	33,187

1) Provisional data.

2) As of 1991.



**Table 3.3.2.3** Saithe in the Faroes grounds (fishing area Vb)

Year	Recruitment Age 3	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-8
1960	11	95	12	0.107
1961	9	94	10	0.091
1962	14	95	10	0.110
1963	21	101	13	0.099
1964	15	98	22	0.200
1965	23	102	22	0.187
1966	22	104	26	0.214
1967	24	99	21	0.176
1968	21	109	20	0.151
1969	39	114	27	0.189
1970	33	119	29	0.189
1971	37	127	33	0.186
1972	34	138	42	0.254
1973	24	128	58	0.343
1974	20	128	47	0.284
1975	17	129	42	0.301
1976	20	120	33	0.263
1977	13	115	35	0.316
1978	8	100	28	0.232
1979	9	92	27	0.255
1980	12	102	25	0.215
1981	33	92	30	0.384
1982	15	102	31	0.346
1983	41	82	39	0.399
1984	26	116	55	0.490
1985	22	95	45	0.403
1986	62	110	42	0.509
1987	50	98	40	0.404
1988	45	102	45	0.449
1989	30	107	44	0.354
1990	22	95	62	0.546
1991	26	78	55	0.654
1992	17	59	38	0.493
1993	36	70	33	0.412
1994	33	71	33	0.410
Average	25	103	34	0.303
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.3.3 a.1** Faroe Plateau ( Sub-division Vb1) COD. Nominal catches (tonnes) by countries, 1985-1994, as officially reported to ICES.

Country	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Denmark	-	8	30	10	-	-	-	-	-	-
Faroe Islands	39,422	34,492	21,303	22,272	20,535	12,232	8,203	5,938	5,524	8,724
France <sup>2</sup>	29	4	17	17	-	-	-	318	-	-
Germany	5	8	12	5	7	24	16	12	+	-
Norway	28	83	21	163	285	124	89	41	61	36
UK (England and Wales)	-	-	8	-	-	-	1	79	186	-
UK (Scotland) <sup>3</sup>	-	-	-	-	-	-	-	-	-	283 <sup>4</sup>
<b>Total</b>	<b>39,484</b>	<b>34,595</b>	<b>21,391</b>	<b>22,467</b>	<b>20,827</b>	<b>12,380</b>	<b>8,309</b>	<b>6,388</b>	<b>5,771</b>	<b>9,043</b>

1) Provisional data

2) Sub-division Vb2 included. Quantity unknown 1989-1991 and 1993.

3) Catches included in Sub-division Vb2

4) Reported as Vb.

**Table 3.3.3 a.2** Nominal catch (tonnes) of COD in Sub-division VB, (Faroe Plateau) 1985-1994, as used in the assessment.

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Officially reported	39,484	34,595	21,391	22,467	20,827	12,380	8,309	6,388	5,771	9,043
Faroese catches in IIA within Faroe area jurisdiction				715	1,229	1,090	351	154		
French catches as reported to Faroese authorities					12	17				
Total used in the assessment	39,484	34,595	21,391	23,182	22,068	13,487	8,660	6,542	5,771	9,043
<sup>1</sup> Provisional data										

**Table 3.3.3.a.3** Faroe Plateau Cod (Sub-division Vb<sub>1</sub>).

Year	Recruitment Age 2	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1961	12.02	31.66	25.50	0.606
1962	20.65	29.10	23.20	0.523
1963	20.29	27.77	23.10	0.494
1964	21.83	37.79	24.00	0.502
1965	8.27	47.50	24.86	0.491
1966	18.57	60.04	21.03	0.474
1967	23.45	56.47	25.17	0.390
1968	17.58	66.48	30.28	0.464
1969	9.32	78.53	35.67	0.438
1970	8.61	75.87	29.04	0.388
1971	11.93	67.86	26.15	0.353
1972	21.32	57.80	20.44	0.336
1973	12.57	65.59	22.38	0.289
1974	30.47	79.66	24.58	0.314
1975	38.28	82.23	36.78	0.395
1976	18.55	96.11	39.80	0.475
1977	9.97	77.68	34.93	0.677
1978	10.69	73.34	26.59	0.427
1979	14.99	57.53	23.11	0.429
1980	23.44	46.07	20.51	0.397
1981	13.99	46.13	22.96	0.469
1982	22.16	55.88	21.49	0.419
1983	25.15	98.25	38.13	0.719
1984	47.81	115.06	36.98	0.511
1985	17.32	84.29	39.48	0.717
1986	9.41	73.79	34.60	0.670
1987	9.97	61.82	21.39	0.444
1988	8.63	52.09	23.18	0.609
1989	13.68	38.24	22.07	0.798
1990	2.78	27.34	13.49	0.682
1991	3.88	18.31	8.66	0.571
1992	5.11	15.06	6.54	0.608
1993	3.71	17.88	5.77	0.434
1994	9.07	28.64	9.04	0.563
Average	16.04	57.29	24.73	0.502
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.3.3 b.1** Faroe Bank ( Sub-division Vb2) COD. Nominal catches (tonnes) by countries, 1985-1994, as officially reported to ICES.

Country	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Faroe Islands	2,913	1,836	3,409	2,960	1,270	289	297	122	264	717
France <sup>2</sup>	0	0	0	0	0	0	0	0	0	0
Norway	23	6	23	94	128	72	38	32	2	8
UK (Engl. and Wales)	0	0	0	0	0	0	0	+	1	1
UK (Scotland) <sup>3</sup>	25	63	47	37	14	207	90	172	118	- <sup>4</sup>
<b>Total</b>	<b>2,961</b>	<b>1,905</b>	<b>3,479</b>	<b>3,091</b>	<b>1,412</b>	<b>568</b>	<b>425</b>	<b>326</b>	<b>385</b>	<b>725</b>

1) Provisional data

2) Catches included in Sub-division Vb1

3) Sub-division Vb1 included

4) See Table 3.3.3. a.1

**Table 3.3.3 b.2** Faroe Bank cod (Sub-division Vb<sub>2</sub>).

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	725
Average	1,590
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.

Country	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	1	8
Faroe Islands	10,891	10,319	11,898	11,418	13,597	13,359	13,954
France <sup>1</sup>	113	2	2	20	23	8	22
Germany	+	1	+	+	+	1	1
Norway	20	12	12	10	21	22	13
UK (Engl. and Wales)	-	-	-	-	-	-	2
UK (Scotland) <sup>3</sup>	85	1	-	-	-	-	-
United Kingdom							
Total	11,109	10,335	11,912	11,448	13,641	13,391	14,000
Working Group estimate <sup>4,5</sup>	12,233	11,937	12,894	12,378	15,143	14,477	14,882

Country	1988	1989	1990	1991	1992	1993	1994 <sup>2</sup>
Denmark	4	-	-	-	-	-	-
Faroe Islands	10,867	13,506	11,106	8,074	4,629	3,622	3,675
France <sup>1</sup>	14	-	-	-	164	-	-
Germany	-	+	+	+	-	-	-
Norway	54	111	94	125	71 <sup>2</sup>	29 <sup>2</sup>	22
UK (Engl. and Wales)	-	-	7	-	71	80	-
UK (Scotland) <sup>3</sup>	-	-	-	-	-	-	-
United Kingdom							200 <sup>6)</sup>
Total	10,939	13,617	11,207	8,199	4,935	3,731	3,897
Working Group estimate <sup>4,5</sup>	12,178	14,325	11,726	8,429	5,476	3,814	4,251

1) Including catches from Sub-division Vb2. Quantity unknown 1989-1991 and 1993.

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, 1981-1994, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987
Faroe Islands	1,103	1,533	967	925	1,474	1,050	832
France <sup>1</sup>	-	-	-	-	-	-	-
Norway	7	1	2	5	3	10	5
UK (Engl. and Wales)	-	-	-	-	-	-	-
UK (Scotland) <sup>3</sup>	14	48	13	+	25	26	45
Total	1,124	1,582	982	930	1,502	1,086	882

Country	1988	1989	1990	1991	1992	1993	1994 <sup>2</sup>
Faroe Islands	1,160	659	325	217	338	185	353
France <sup>1</sup>	-	-	-	-	-	-	-
Norway	43	16	97	4	23	8	1
UK (Engl. and Wales)	-	-	-	-	+	+	1)
UK (Scotland) <sup>3</sup>	15	30	725	287	852	102	1)
Total	1,218	705	1,147	508	1,213	295	354

1) Catches included in Sub-division Vb1.

2) Provisional data

3) Since 1983 includes also catches taken in Sub-division Vb1 (see Table 3.3.4.1)

**Table 3.3.4.3 Haddock in the Faroese Grounds (Fishing Area Vb).**

Year	Recruitment Age 2	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1961	51	48	21	0.562
1962	39	52	27	0.651
1963	47	50	28	0.700
1964	30	44	19	0.475
1965	23	46	18	0.526
1966	20	44	19	0.529
1967	25	42	13	0.403
1968	55	45	18	0.438
1969	32	53	23	0.485
1970	36	60	21	0.476
1971	15	63	19	0.457
1972	33	62	16	0.397
1973	24	61	18	0.290
1974	52	65	15	0.221
1975	70	75	21	0.180
1976	56	89	26	0.248
1977	26	96	26	0.389
1978	34	97	19	0.280
1979	3	85	12	0.157
1980	5	81	15	0.181
1981	3	75	12	0.184
1982	16	53	12	0.336
1983	19	53	13	0.270
1984	41	54	12	0.225
1985	38	63	15	0.276
1986	25	61	14	0.224
1987	8	65	15	0.263
1988	16	60	12	0.211
1989	14	47	14	0.309
1990	9	37	12	0.317
1991	3	32	8	0.337
1992	2	23	5	0.272
1993	1	18	4	0.227
1994	8	17	4	0.237
Average	26	56	16	0.345
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), 1974-1994<sup>1</sup>.

Year	Sandeel	Sprat <sup>2</sup>	Herring <sup>3</sup>	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 <sup>4</sup>	45	2	71	8	32	158
1994	55	58	30	7	12	162
Mean 1974-1994	27	41	58	23	14 <sup>5</sup>	160

<sup>1</sup>Data from 1974-1984 from Anon. (1986), 1985-1993 provided by Working Group members.

<sup>2</sup>Total landings from all fisheries.

<sup>3</sup>For years 1974-1985, human consumption landings used for reduction are included in these data.

<sup>4</sup>Preliminary.

<sup>5</sup>Mean 1979-1994.



**Table 3.4.2.a.1** Reported cod landings (t) by country and estimated total landings used by the Working Group) (preliminary for 1995).

Year	Open Skagerrak					Total	Landings used by WG	Norwegian Coast
	Denmark	Sweden	Norway	Others	Germany			Norway
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	-	21,784	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	34	12	18,838	19,648	888
1990	15,788	1,694	143	65	110	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

Table 3.4.2.a.2

## Cod in the Skagerrak

Year	Recruitment <sup>1)</sup> Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1978	21.87	12.79	23.41	0.868
1979	24.70	12.21	13.13	0.468
1980	31.84	16.75	25.11	0.952
1981	14.21	16.50	29.51	0.806
1982	17.27	16.77	27.78	1.231
1983	20.18	14.49	22.58	1.233
1984	14.93	11.11	20.13	0.915
1985	12.17	11.55	17.61	0.841
1986	33.51	11.68	21.14	1.526
1987	10.74	8.02	20.86	1.092
1988	17.63	9.61	16.94	0.917
1989	12.43	11.27	19.65	1.069
1990	9.43	9.83	18.59	0.991
1991	11.80	8.04	12.44	1.014
1992	17.60	7.32	14.79	1.027
1993	27.59	6.93	15.32	1.432
1994	28.75	8.03	13.91	0.615
Average	19.21	11.35	19.11	1.000
Unit	Millions	1000 tonnes	1000 tonnes	-

<sup>1)</sup>Size of recent year classes uncertain

**Table 3.4.2 b.1** Cod landings (in tonnes) from the Kattegat, 1971-1994.

Year	Kattegat			Total
	Denmark	Sweden	Germany <sup>2</sup>	
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	10,673	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	2,066	104	6,834
1992	3,406	2,771	94	6,271
1993	4,464	2,549	157	7,170
1994 <sup>1</sup>	3,968	2,836	98	7,802 <sup>3</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Landings statistics incompletely split on the Kattegat and Skagerrak.  
The figures are estimated by the Working Group members.

<sup>3</sup>Including 900 t reported in Skagerrak.

**Table 3.4.3.1** Landings of HADDOCK in Division IIIa (in tonnes) as supplied by Working Group members.

Year	Denmark		Total	Norway	Sweden	Others	Total consumption	Total reduction and consumption
	Human consumption	Reduction	Human consumption					
1975	-	-	5,015	122	921	57	-	6,115
1976	-	-	7,488	191	1,075	301	-	9,055
1977	-	-	6,907	156	2,485	215	-	9,763
1978	-	-	4,978	168	1,435 <sup>2</sup>	56	-	6,637
1979	-	-	4,120	248	361	56	-	4,785
1980	-	-	7,172	288	373	57	-	7,890
1981	-	-	9,568	271	391	120	-	10,350
1982	-	-	11,151	196	396	329	-	12,072
1983	6,425	7,225	13,650	756	608	221	8,010	15,235
1984	5,516	2,707	8,223	321	499	30	6,366	9,073
1985	6,522	954	7,476	279	351	15	7,167	8,121
1986	3,265	1,682	4,947	226	151	5	3,647	5,329
1987	3,584	1,449	5,033	148	71	36	3,803	5,288
1988	2,543	1,480	4,023	245	64	48	2,852	4,380
1989	3,889	360	4,249	138	66	5	4,098	4,458
1990	3,887	1,968	5,855	84	102	27	4,100	6,068
1991	3,894	2,593	6,487	111	80	1	4,086	6,679
1992	3,811	4,254	8,065	177	744 <sup>2</sup>	14	4,396	9,000
1993	1,570	2,215	3,785	153	436 <sup>3</sup>		1,959	4,374
1994	1,446	2,180	3,626	130	256	1	1,833 <sup>1</sup>	4,013 <sup>1</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Includes ~ 350 tonnes landed for reduction.

<sup>3</sup>Includes ~ 200 tonnes landed for reduction.

**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 <sup>1</sup>	0	5,391	5,391	21	439	1	5,852

<sup>1</sup>Preliminary.

**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 used by WG
	Kattegat	Skagerrak	Kattegat	Skagerrak	Kattegat	Skagerrak	Skagerrak	Skagerrak	Skagerrak	Skagerrak	Kattegat	Skagerrak	Div. IIIa	Total	
1972	15,504	5,095	348	70							15,852	5,165	21,017	21,017	
1973	10,021	3,871	231	80							10,252	3,951	14,203	14,203	
1974	11,401	3,429	255	70							11,656	3,499	15,155	15,155	
1975	10,158	4,888	369	77							10,527	4,965	15,492	15,492	
1976	9,487	9,251	271	81							9,758	9,332	19,090	19,090	
1977	11,611	12,855	300	142							11,911	12,997	24,908	24,908	
1978	12,685	13,383	368	94							13,053	13,477	26,530	26,530	
1979	9,721	11,045	281	105							10,002	11,150	21,152	21,152	
1980	5,582	9,514	289	92							5,871	9,606	15,477	15,477	
1981	3,803	8,115	232	123							4,035	8,238	12,273	12,273	
1982	2,717	7,789	201	140							2,918	7,929	10,847	10,847	
1983	3,280	6,828	291	170			133		14		3,571	7,145	10,716	10,716	
1984	3,252	7,560	323	356	32		27		22		3,607	7,965	11,572	11,572	
1985	2,979	9,646	403	296	4		136		18		3,386	10,096	13,482	13,482	
1986	2,468	10,653	170	215			505		24		2,638	11,397	14,035	14,035	
1987	2,868	11,370	283	222	104		907		25		3,255	12,524	15,779	15,779	
1988	1,818	9,781	210	281	2.8		716		41		2,030.8	10,819	12,850	12,850	
1989	1,596	5,387	135	320	4		230	0.1	33		1,735	5,970.1	7,705	7,705	
1990	1,831	8,726	201	777	2		471	0.7	69		2,034	10,043.7	12,078	12,078	
1991	1,756	5,849	267	472	5.6		315	3.9	68		2,028.6	6,707.9	8,737	8,737	
1992	2,071	8,522	208	381			537		107		2,279	9,547	11,826	11,826	
1993	1,289	9,128	287	175			339		78		1,576	9,720	11,296	11,296	
1994	1,553	8,790	315	227	4		325	33	65		1,872	9,440	11,312	11,312	

**Table 3.4.6.1** Kattegat and Skagerrak.

Sole landings (tonnes) 1952-1994 Official statistics and ACFM corrections.

Danish catches are given for Kattegat and Skagerrak combined 1952-1969.

For Sweden there is no information 1962-1974.

Year	Denmark Kattegat	Sweden Skagerrak	Sweden Skag + Kat	Germany Kattegat	Belgium Skagerrak	Netherlands Skagerrak	ACFM Corrections	Total
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 <sup>1</sup>	746	216	38	11				1011
1992 <sup>1</sup>	856	372	54	12				1294
1993 <sup>1</sup>	1016	355	68					1439
				+				
1994 <sup>1</sup>	890	296	12					1198
				+				

<sup>1</sup> Officially reported landings

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	2891	147	69	116	5104
1993	2490	4081	2133	8704	1985	3421	167	29	516	6118
1994	1987	4389	2526	8902	1337	2425	194	37	35	4028

\* Includes small amounts of other Pandalid shrimp

† 1970 to 1974 includes subarea IV.

Total 1988 and 1989 includes 19 and 21 t. by the Netherlands

1994 figures are preliminary.

Table 3.4.7.2 *Pandalus borealis* landings from Divisions IIIa (Skagerrak) and Iva (eastern part, Norwegian Deep) as estimated by the Working Group.

Year	Denmark	Norway	Sweden	Total landings	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



**Table 3.4.7.3** *Pandalus borealis* in Division IIIa and Division IVa East (Skagerrak and Norwegian Deep).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 1-3
1985	19,233.00	16.76	12.63	0.560
1986	17,481.00	9.21	13.23	0.490
1987	10,523.00	14.94	15.07	0.490
1988	17,343.00	11.68	12.86	0.670
1989	20,352.00	11.70	12.54	0.690
1990	19,607.00	12.48	11.85	0.610
1991	12,657.00	14.38	12.32	0.730
1992	22,624.00	14.50	13.73	1.090
1993	14,985.00	12.09	13.91	0.870
1994	13,628.00	14.53	12.08	0.640
Average	16,843.30	13.23	13.02	0.684
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.4.8.1

HERRING in Division IIIa and Sub-divisions 22-24. 1985 - 1994. Landings in thousands of tonnes by country. (Data provided by Working Group members 1995. These figures do not in all cases correspond to the official statistics).

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994*
<b>Skagerrak</b>										
Denmark	88.2	94.0	105.0	144.4	47.4	62.3	58.7	64.7	87.8	44.9
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
Sweden	40.3	43.0	51.2	57.2	47.9	56.5	54.7	88.0	56.4	66.4
<b>Total</b>	<b>133.5</b>	<b>139.1</b>	<b>157.4</b>	<b>207.3</b>	<b>96.9</b>	<b>124.4</b>	<b>121.5</b>	<b>166.6</b>	<b>168.4</b>	<b>129.0</b>
<b>Kattegat</b>										
Denmark	69.2	37.4	46.6	76.2	57.1	32.2	29.7	33.5	28.7	23.6
Sweden	39.8	35.9	29.8	49.7	37.9	45.2	36.7	26.4	16.7	15.4
<b>Total</b>	<b>109.0</b>	<b>73.3</b>	<b>76.4</b>	<b>125.9</b>	<b>95.0</b>	<b>77.4</b>	<b>66.4</b>	<b>59.9</b>	<b>45.4</b>	<b>39.0</b>
<b>Sub. Div. 22 + 24</b>										
Denmark	15.9	14.0	32.5	33.1	21.7	13.6	25.2	26.9	38.0	39.5
Germany	54.6	60.0	53.1	54.7	56.4	45.5	15.8	15.6	11.1	11.4
Poland	16.7	12.3	8.0	6.6	8.5	9.7	5.6	15.5	11.8	6.3
Sweden	11.4	5.9	7.8	4.6	6.3	8.1	19.3	22.3	16.2	7.4
<b>Total</b>	<b>98.6</b>	<b>92.2</b>	<b>101.4</b>	<b>99.0</b>	<b>92.9</b>	<b>76.9</b>	<b>65.9</b>	<b>80.3</b>	<b>77.1</b>	<b>64.6</b>
<b>Sub. Div. 23</b>										
Denmark	6.8	1.5	0.8	0.1	1.5	1.1	1.7	2.9	3.3	1.5
Sweden	1.1	1.4	0.2	0.1	0.1	0.1	2.3	1.7	0.7	0.3
<b>Total</b>	<b>7.9</b>	<b>2.9</b>	<b>1.0</b>	<b>0.2</b>	<b>1.6</b>	<b>1.2</b>	<b>4.0</b>	<b>4.6</b>	<b>4.0</b>	<b>1.8</b>
<b>Grand Total</b>	<b>349.0</b>	<b>307.5</b>	<b>336.2</b>	<b>432.4</b>	<b>286.4</b>	<b>279.9</b>	<b>257.8</b>	<b>311.4</b>	<b>294.9</b>	<b>234.4</b>

\* Preliminary data.

**Table 3.4.8.2 Herring in Sub-divisions 22-24 and Division IIIa (Spring spawners).**

Year	Landings
1974	200
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
Average	172
Unit	1000 tonnes

**Table 3.4.9.1** Landings of SPRAT in Division IIIa ('000 t). (Data provided by Working Group members. These figures do not in all cases correspond to the official statistics).

Year	Skagerrak				Kattegat			Div. IIIa total
	Denmark	Sweden	Norway	Total	Denmark	Sweden	Total	
1974	17.9	2.0	1.2	21.1	31.6	18.6	50.2	71.3
1975	15.0	2.1	1.9	19.0	60.7	20.9	81.6	100.6
1976	12.8	2.6	2.0	17.4	27.9	13.5	41.4	58.8
1977	7.1	2.2	1.2	10.5	47.1	9.8	56.9	67.4
1978	26.6	2.2	2.7	31.5	37.0	9.4	46.4	77.9
1979	33.5	8.1	1.8	43.4	45.8	6.4	52.2	95.6
1980	31.7	4.0	3.4	39.1	35.8	9.0	44.8	83.9
1981	26.4	6.3	4.6	37.3	23.0	16.0	39.0	76.3

Year	Skagerrak			Kattegat		Div. IIIa	Division IIIa Total
	Denmark	Sweden	Norway	Denmark	Sweden	Sweden	
1982	10.5	-	1.9	21.4	-	5.9	39.7
1983	3.4	-	1.9	9.1	-	13.0	26.4
1984	13.2	-	1.8	10.9	-	10.2	36.1
1985	1.3	-	2.5	4.6	-	11.3	19.7
1986	0.4	-	1.1	0.9	-	8.4	10.8
1987	1.4	-	0.4	1.4	-	11.2	14.4
1988	1.7	-	0.3	1.3	-	5.4	8.7
1989	0.9	-	1.1	3.0	-	4.8	9.8
1990	1.3	-	1.3	1.1	-	6.0	9.7
1991	4.2	-	1.0	2.2	-	6.6	14.0
1992	1.1	-	0.6	2.2	-	6.6	10.5
1993	0.6	4.7	1.3	0.8	1.7	-	9.1
1994 <sup>1</sup>	47.7	32.2	1.8	11.7	2.6	-	96.0

<sup>1</sup>Preliminary.

**Table 3.4.10.1** Norway pout. Annual landings (tonnes) in Division IIIa. (Data as officially reported to ICES).

Country	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 <sup>1</sup>	1994
Denmark	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	23,379 <sup>1</sup>
Norway	50 <sup>2</sup>	104	362	1,182	141	752	1,265	990	947	831	400	1,680	1,178	309	40	23	221 <sup>1</sup>	-	5
Sweden	2,255	318	591 <sup>3</sup>	32	39	60	60	52	+	-	+	-	-	+	+	3	5	-	-
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	84,092	37,208	23,384

<sup>1</sup>Preliminary.

<sup>2</sup>Including by-catch.

<sup>3</sup>Includes North Sea.

**Table 3.4.11.1** Sandeels. Annual landings (tonnes) in Division IIIa. (Data as officially reported to ICES).

Country	1989	1990	1991	1992	1993 <sup>1</sup>	1994
Denmark	17,178	16,109	25,094	52,563	51,224	84,783 <sup>1</sup>
Faroe Islands	-	-	-	-	344	- <sup>1</sup>
Norway	40	99	-	49	- <sup>1</sup>	- <sup>1</sup>
Sweden	-	-	-	88	-	20
Total	17,218	16,208	25,094	52,700	51,568	84,803

<sup>1</sup>Preliminary.

**Table 3.4.12.1** *Nephrops* landings (tonnes) by Functional Unit plus other rectangles in Division IIIa (Management Area E)

Year	FU 3	FU 4	Other	Total
1985	2191	1798		3989
1986	2018	1807		3825
1987	2440	1605		4045
1988	2349	1364		3713
1989	2603	1313		3916
1990	2865	1476		4341
1991	2933	1315		4248
1992	1900	1012		2912
1993	2285	924		3209
1994	1911	862		2773

**Table 3.4.12.2** Total *Nephrops* landings (tonnes) by country in Division IIIa (Management Area E)

Year	Denmark	Norway	Sweden	Total
1985	2943	72	974	3989
1986	2647	64	1114	3825
1987	2839	80	1126	4045
1988	2464	89	1160	3713
1989	3017	70	829	3916
1990	3098	146	1097	4341
1991	2824	194	1230	4248
1992	2052	111	749	2912
1993	2250	100	859	3209
1994	1944	66	763	2773

**Table 3.4.12.3 *Nephrops* in Division IIIa**

Year	Landings
1984	4,712
1985	3,989
1986	3,825
1987	4,045
1988	3,713
1989	3,916
1990	4,341
1991	4,248
1992	2,912
1993	3,209
1994	2,773
Average	3,789
Unit	tonnes



Table 3.5.1.1 Landings of major fish species from the North Sea

year	cod	haddock	haddock	whiting	whiting	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	
1970	219	525	180	79	115	163	59	20	130	238	191	51	563	323	12	1136	898	834	2868
1971	315	235	32	58	72	218	35	24	114	305	382	95	520	243	32	964	795	921	2680
1972	341	193	30	60	61	218	28	21	123	445	359	92	498	125	8	956	631	1015	2602
1973	228	179	11	66	90	195	31	19	130	346	297	228	484	226	42	817	752	1003	2572
1974	202	150	48	75	130	231	42	18	113	736	524	314	275	190	31	789	496	1794	3079
1975	185	147	41	79	86	240	38	21	108	560	428	641	313	138	10	780	461	1794	3035
1976	209	166	48	75	150	253	67	17	114	435	488	622	175	165	9	834	349	1810	2993
1977	182	137	35	73	106	190	6	18	119	390	786	304	46	188	1	719	235	1627	2581
1978	263	86	11	88	55	132	3	20	114	270	787	398	11	103	5	703	119	1524	2346
1979	249	83	16	98	59	113	2	23	145	320	578	380	25	66	1	711	92	1355	2158
1980	265	99	22	92	46	120	0	16	140	471	729	323	71	61	2	732	134	1591	2457
1981	301	130	17	81	67	121	1	15	140	236	569	209	175	60	7	788	242	1099	2129
1982	273	166	19	73	33	161	5	22	155	360	612	153	275	40	3	850	318	1182	2350
1983	234	159	13	81	24	167	1	25	144	423	537	88	387	43	4	810	434	1086	2330
1984	205	128	10	79	19	192	6	27	156	355	669	77	409	67	26	787	502	1136	2425
1985	193	159	6	55	15	192	8	24	160	197	623	50	609	35	24	783	668	899	2350
1986	163	166	3	59	18	163	1	18	165	174	848	16	661	25	21	734	707	1060	2501
1987	175	108	4	64	16	145	4	17	154	147	825	33	773	3	21	663	797	1029	2489
1988	150	105	4	52	49	104	1	22	154	102	893	87	876	6	63	587	945	1136	2668
1989	116	76	2	41	43	90	2	22	170	167	1039	63	769	7	112	515	888	1316	2719
1990	105	51	3	43	51	86	2	35	156	140	591	71	620	10	145	476	775	858	2109
1991	89	45	5	47	38	98	1	34	147	155	843	110	636	10	78	460	724	1152	2336
1992	97	70	11	46	27	92	0	29	125	255	855	124	694	10	113	459	817	1272	2548
1993	105	80	11	48	20	104	1	31	115	174	579	200	656	10	140	483	806	985	2274
1994	88	80	4	42	10	97	0	33	111	172	766	324	600	10	113	451	723	1276	2450

**Table 3.5.1.2** Species composition in the industrial fisheries in the North Sea ('000 t), 1974-1994.

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
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
Mean 1974-1993	690	214	72	303	55	16	52	10	44	1439
1994	769	281	40	172	11	5	10	-	19	1307
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

**Table 3.5.2.1** Nominal catch (in tonnes) of COD in Sub-area IV, 1983-1994, as officially reported to ICES.

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Belgium	5,804	4,815	6,604	6,693	5,508	3,398	2,934	2,331	3,356	3,374	2,648
Denmark <sup>2</sup>	46,751	42,547	32,892	36,948	34,905	25,782	21,601	18,997	18,479	19,547	19,196 <sup>1</sup>
Faroe Islands	-	71	15	57	46	35	96	23	109	46	80 <sup>1</sup>
France	8,129	4,834	8,402	8,199	8,323	2,578 <sup>1,3</sup>	1,641 <sup>1,3</sup>	975 <sup>1,3</sup>	2,146 <sup>1</sup>	2,162 <sup>1,3</sup>	1,830 <sup>1,4</sup>
Germany	13,453	7,675	7,667	8,230	7,707	11,430	11,725	7,278	8,446	6,808	5,974
Netherlands	25,460	30,844	25,082	21,347	16,968 <sup>4</sup>	12,028	8,445 <sup>1</sup>	6,830 <sup>1</sup>	11,133	10,220	6,512
Norway <sup>2</sup>	7,005	5,766	4,864	5,000	3,585	4,813	5,168	5,425	10,053 <sup>1</sup>	8,760 <sup>1</sup>	8,268 <sup>1</sup>
Poland	7	-	10	13	19	24	53	15	-	-	-
Sweden	575	748	839	688	367	501	620	784	823	646	630
UK (Engl. & Wales)	35,605	29,692	25,361	29,960	23,496	18,250	15,596	14,481	14,836	14,894	13,942
UK (Isle of Man)	-	-	-	-	-	1	-	-	15	-	-
UK (N. Ireland)	-	-	-	-	-	124	26	70	72	47	54
UK (Scotland)	54,359	60,931	45,748	49,671	41,382	31,480	31,120	28,748	28,204	28,191	28,841
Russia	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>197,148</b>	<b>187,923</b>	<b>157,484</b>	<b>166,806</b>	<b>142,306</b>	<b>110,444</b>	<b>99,025</b>	<b>85,957</b>	<b>97,672</b>	<b>94,687</b>	<b>87,975</b>
Unallocated landings	7,723	5,043	5,745	8,671	7,815	5,180	5,726	2,554	332	10,009	479
Landings as used by Working Group	204,871	192,966	163,229	175,477	150,121	115,624	104,751	88,511	97,340	104,565	88,454

<sup>1</sup>Preliminary.

<sup>2</sup>Figures do not include cod caught as industrial by-catch, and not sorted for human consumption.

<sup>3</sup>Includes Division IIa (EC).

<sup>4</sup>Includes VIIe.

**Table 3.5.2.2 Cod in Sub-area IV (North Sea)**

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-8
1963	198.00	140.00	108.00	0.473
1964	367.00	168.00	116.00	0.481
1965	422.00	194.00	173.00	0.544
1966	512.00	231.00	212.00	0.517
1967	485.00	249.00	242.00	0.620
1968	197.00	284.00	277.00	0.619
1969	205.00	282.00	194.00	0.578
1970	766.00	269.00	219.00	0.556
1971	903.00	262.00	315.00	0.674
1972	174.00	228.00	341.00	0.840
1973	307.00	209.00	228.00	0.714
1974	253.00	218.00	202.00	0.681
1975	461.00	197.00	185.00	0.711
1976	208.00	167.00	209.00	0.706
1977	770.00	148.00	182.00	0.707
1978	451.00	149.00	263.00	0.809
1979	476.00	151.00	249.00	0.688
1980	851.00	164.00	265.00	0.787
1981	288.00	168.00	301.00	0.769
1982	594.00	173.00	273.00	0.897
1983	285.00	145.00	234.00	0.905
1984	566.00	123.00	205.00	0.857
1985	110.00	111.00	193.00	0.831
1986	600.00	98.00	163.00	0.864
1987	244.00	89.00	175.00	0.909
1988	151.00	85.00	150.00	0.886
1989	240.00	76.00	116.00	0.989
1990	112.00	63.00	105.00	0.715
1991	142.00	62.00	89.00	0.927
1992	281.00	60.00	97.00	0.857
1993	108.00	57.00	105.00	0.911
1994	465.00	59.00	88.00	0.847
Average	381.00	158.72	196.06	0.746
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.5.3.1** Nominal catch (in tonnes) of HADDOCK in Sub-area IV, 1983-1994, as officially reported to ICES.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 <sup>1</sup>
Belgium	985	494	719	317	165	220	145	192	168	415	292	306
Denmark	25,653	16,368	23,821	16,397	7,767	9,174	2,789	1,993	1,330	1,476	3,582	3,190
Faroe Islands	51	-	5	4	23	35	16	6	15	13	25	43
France	11,250	8,103	5,389	4,802	3,889	2,193	1,702 <sup>1,3</sup>	1,115 <sup>1,3</sup>	631 <sup>1,3</sup>	508 <sup>3</sup>	1,215 <sup>3</sup>	678 <sup>3</sup>
Germany, Fed. Rep.	3,654	2,571	2,796	1,984	1,231	802	447	749	535	764	348	1,829
Netherlands	1,722	1,052	3,875	1,627	1,093	894	328	102	100	148	192	96
Norway <sup>2</sup>	3,862	3,959	3,498	5,190	2,610	1,590	1,697 <sup>1</sup>	1,572	2,069	3,133	2,651	2,519
Poland	150	17	-	1	-	-	-	-	-	-	-	-
Sweden	1,360	1,518	1,942	1,550	937	614	1,051	900	957	1,289	908	551
UK (Engl. & Wales)	15,476	12,340	13,614	8,137	7,491	5,537	2,704	2,093	2,154	3,228	4,241	4,045
UK (Isle of Man)	-	-	-	-	-	-	-	-	-	11	-	-
UK (N. Ireland)	-	-	-	-	-	-	137	11	48	73	18	9
UK (Scotland)	100,390	87,479	112,549	126,650	84,063	84,104	53,252	34,459	36,443	39,512	66,732	73,746
Total	164,553	133,901	168,208	166,659	109,269	105,163	64,268	43,192	44,450	50,570	80,204	87,012
WG estimates human consumption landings	159,000	128,000	159,000	166,000	108,000	105,000	76,000	51,000	45,000	70,000	80,000	80,000
Unallocated landings	-5,553	-5,901	-9,208	-659	-1,269	-163	11,732	7,808	550	19,430	-203	-7,012

<sup>1</sup>Preliminary.

<sup>2</sup>Figures do not include haddock caught as industrial by-catch.

<sup>3</sup>Includes Division IIa (EC).

n/a = Not available.

**Table 3.5.3.2** Haddock in Sub-area IV (North Sea). Weights in '000 t and recruitment in billions.

Year	Recruitment	Spawning	Landings	Landings	Total	Fishing mortality			
	age 0	Stock Biomass	HC	IB	HC+IB	Discards	HC+D age 2-6	IB age 0-3	Total age 2-6
1963	2.087	136	68	14	82	189	0.71	0.05	0.75
1964	6.298	412	131	89	220	160	0.80	0.11	0.92
1965	19.932	525	162	75	237	62	0.75	0.18	0.80
1966	70.976	443	226	47	273	74	0.84	0.13	0.88
1967	357.997	229	147	21	168	78	0.82	0.09	0.85
1968	14.331	256	105	34	139	162	0.57	0.07	0.62
1969	10.187	765	331	338	669	260	0.98	0.18	1.18
1970	83.304	825	525	180	705	101	0.96	0.12	1.04
1971	78.326	417	235	32	267	177	0.74	0.06	0.77
1972	21.484	304	193	30	223	128	1.04	0.05	1.06
1973	72.462	303	179	11	190	115	0.91	0.03	0.92
1974	131.714	261	150	48	198	167	0.79	0.10	0.89
1975	11.283	239	147	41	188	260	0.98	0.09	1.04
1976	16.011	304	166	48	214	154	0.98	0.12	1.07
1977	24.915	234	137	35	172	44	0.95	0.17	1.08
1978	38.532	127	86	11	97	77	1.08	0.06	1.11
1979	70.493	104	83	16	99	42	1.03	0.06	1.07
1980	15.291	147	99	22	121	95	0.92	0.09	1.00
1981	31.845	234	130	17	147	60	0.72	0.06	0.74
1982	19.839	292	166	19	185	41	0.66	0.07	0.71
1983	65.309	246	159	13	172	66	0.95	0.05	0.98
1984	16.951	192	128	10	138	75	1.00	0.03	1.03
1985	24.106	230	159	6	165	86	0.94	0.02	0.96
1986	48.614	213	166	3	169	52	1.06	0.02	1.06
1987	3.931	151	108	4	112	59	1.00	0.02	1.01
1988	7.591	155	105	4	109	62	1.02	0.02	1.05
1989	8.22	122	76	2	78	27	0.93	0.02	0.96
1990	28.19	69	51	3	54	32	0.81	0.02	0.84
1991	27.925	62	45	5	50	40	0.76	0.02	0.78
1992	40.711	103	70	11	81	48	0.99	0.03	1.00
1993	12.504	133	80	11	91	80	0.85	0.04	0.87
1994	57.236	158	80	4	84	65	0.85	0.04	0.89
<b>Average</b>	<b>45</b>	<b>262</b>	<b>147</b>	<b>38</b>	<b>184</b>	<b>98</b>	<b>0.89</b>	<b>0.07</b>	<b>0.93</b>

**Landings**

HC = Human consumption.

IB = Industrial by-catch.

**Fishing mortality**

HC + D = Human consumption and discards Ages 2-6.

IB = Industrial by-catch Ages 0-3.

Total = Human consumption and discards plus fishing mortality on ages 2-6 in industrial fishery.

**Table 3.5.4.1** Nominal catch (in tonnes) of WHITING in Sub-area IV, 1982-1994, as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 <sup>1</sup>	1994
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
Denmark	27,043	18,054	19,771	16,152	9,076	2,047	12,112	803	1,207	1,529	1,377	1,418	546
Faroe Islands	57	18	-	6	-	12	222	1	26	-	16	7	2
France	23,780	21,263	19,209	10,853	8,250	10,493	10,569	5,277 <sup>1,2</sup>	4,951 <sup>1</sup>	5,188 <sup>1,2</sup>	5,115 <sup>1</sup>	5,503 <sup>1,2</sup>	5020 <sup>2</sup>
Germany, Fed.Rep.	223	317	286	226	313	274	454	415	692	865	511	441 <sup>1</sup>	239
Netherlands	12,218	10,935	8,767	6,973	13,741	8,542	5,087 <sup>3</sup>	3,860	3,272 <sup>1</sup>	4,028 <sup>1</sup>	5,390	4,799	3,864
Norway	17	39	88	103	103	74	52	32	55	103	232	125 <sup>1</sup>	80
Poland	-	1	2	-	-	-	-	-	-	-	-	-	-
Sweden	11	44	53	22	33	17	5	17	16	48	22	18	10
UK (Engl.& Wales)	4,743	4,366	5,017	5,024	3,805	4,485	4,007	1,896	2,124	2,423	2,691	2,769	2,723
UK (Isle of Man)	-	-	-	-	-	-	-	-	-	-	6	-	-
UK (N. Ireland)	-	-	-	-	-	-	1	61	30	47	9	3	+
UK (Scotland)	29,640	41,248	42,967	30,398	29,113	37,630	31,804	26,491	27,632	30,452	30,643	31,254	28,971
Total	100,004	99,149	99,958	71,934	66,709	64,978	66,294	40,124	41,046	46,596	47,042	47,281	42,497
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	42,000

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Division IIa (EC).

n/a = Not available.

**Table 3.5.4.2** Whiting in Sub-area IV (North Sea). Weights in '000 t and recruitment in billions.

Year	Recruitment	Spawning Stock	Landings	Landings	Total	Fishing Mortality			
	age 0	Biomass	HC	IB	HC+IB Discards	HC+D age 2-6	IB age 0-4	Total age 2-6	
1960	42.215	322	48	11	59 122	1.485	0.014	1.5	
1961	75.774	381	68	16	84 241	1.379	0.017	1.386	
1962	84.536	285	56	8	64 157	1.238	0.013	1.261	
1963	18.459	465	58	45	103 154	0.917	0.054	0.955	
1964	35.901	519	60	28	88 59	0.645	0.039	0.672	
1965	31.305	457	86	22	108 77	0.612	0.032	0.643	
1966	58.732	393	105	51	156 84	1.097	0.131	1.207	
1967	114.247	309	68	23	91 143	0.818	0.033	0.845	
1968	13.743	433	88	58	146 115	0.948	0.07	1.003	
1969	25.787	599	57	152	209 115	0.594	0.282	0.746	
1970	42.462	362	79	115	194 74	0.798	0.214	0.879	
1971	73.171	231	58	72	130 63	0.482	0.065	0.503	
1972	96.385	290	60	61	121 67	0.777	0.112	0.85	
1973	47.406	400	66	90	156 110	0.839	0.161	0.979	
1974	97.398	459	75	130	205 85	0.718	0.295	1.033	
1975	60.169	476	79	86	165 135	1.067	0.142	1.195	
1976	59.041	606	75	150	225 136	0.808	0.272	1.072	
1977	59.817	438	73	106	179 125	0.673	0.217	0.866	
1978	62.193	422	88	55	143 35	0.692	0.103	0.781	
1979	56.837	483	98	59	157 78	0.662	0.104	0.764	
1980	21.986	497	92	46	138 77	0.874	0.093	0.948	
1981	25.518	466	81	67	148 36	0.728	0.171	0.888	
1982	22.462	360	73	33	106 27	0.596	0.098	0.716	
1983	35.872	324	81	24	105 50	0.707	0.068	0.763	
1984	24.707	264	79	19	98 41	0.869	0.076	0.94	
1985	54.044	262	55	15	70 29	0.808	0.053	0.866	
1986	42.654	281	59	18	77 79	0.852	0.116	0.978	
1987	29.382	291	64	16	80 54	1.094	0.069	1.15	
1988	56.909	286	52	49	101 28	0.808	0.159	0.909	
1989	25.284	271	41	43	84 36	0.772	0.161	1.044	
1990	25.033	303	43	51	94 55	0.738	0.189	0.951	
1991	29.478	259	47	38	85 34	0.642	0.111	0.76	
1992	29.814	256	46	27	73 31	0.65	0.081	0.723	
1993	30.565	249	48	20	68 43	0.688	0.073	0.761	
1994	23.495	256	42	10	52 33	0.651	0.058	0.727	
<b>Average</b>	<b>46.65</b>	<b>370.14</b>	<b>67.09</b>	<b>51.83</b>	<b>118.91 80.8</b>	<b>0.82</b>	<b>0.11</b>	<b>0.92</b>	



**Table 3.5.5.1** Nominal catch (in tonnes) of Saithe in Sub-area IV and Division IIIa, 1983-1994, as officially reported to ICES.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Belgium	7	32	31	16	4	60	13	23	29	70	113	130
Denmark	10,530	8,526	9,033	10,343	7,928	6,868	6,550	5,800	6,314	4,669	4,232	4,305 <sup>1</sup>
Faroe Islands	806	-	895	224	691	276	739	1,650	671	2,480	2,875	1,780 <sup>1</sup>
France	38,782	43,592	42,200	43,958	38,356	28,913	30,761 <sup>1,2</sup>	29,892 <sup>1,2</sup>	14,795 <sup>1,2</sup>	9,061 <sup>1</sup>	22,615 <sup>1,2</sup>	18,220 <sup>1,2</sup>
Germany	13,649	25,262	22,551	22,277	22,400	18,528	14,339	15,006	19,574	13,177	14,813 <sup>1</sup>	10,013
Netherlands	89	181	233	134	334	345	257	206	199	180	79	18
Norway	81,330	88,420	101,808	67,341	66,400	40,021	24,737	19,122	36,240	48,205	48,725 <sup>1</sup>	50,282 <sup>1</sup>
Poland	415	413	-	495	832	1,016	809	1,244	1,336	1,238	937 <sup>1</sup>	151
Sweden	548	522	1,764	1,987	1,732	2,064	797	838	1,514	3,302	4,955	5,366
UK (Engl. & Wales)	6,845	8,183	5,455	4,480	3,233	3,790	4,441	3,654	4,709	3,158	2,426	2,354
UK (N. Ireland)	-	-	-	-	-	-	24	-	-	2	3	1
UK (Scotland)	6,321	6,970	9,932	15,520	11,911	10,850	8,726	7,383	7,962	6,593	5,913	5,562
USSR	-	-	-	-	-	-	-	-	116 <sup>3</sup>	-	-	-
Total reported to ICES	159,322	182,101	193,902	166,775	153,821	112,731	92,193	84,818	93,459	92,135	107,705	98,182
Unreported landings	9,562	15,900	5,839	-2,459	-4,627	-7,630	-200	3,257	5,464	371	-3,106	-1,012
Landings as used by WG	168,884	198,001	199,741	164,297	149,194	105,101	91,993	88,075	98,923	92,506	104,599	97,170

<sup>1</sup>Preliminary.

<sup>2</sup>Includes IIa(EC), IIIa-d(EC).

<sup>3</sup>Includes Estonia.

n/a = not available.

**Table 3.5.5.2** Saithe in Sub-area IV and Division IIIa (North Sea)

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1970	237.00	276.00	222.00	0.449
1971	231.00	432.00	253.00	0.340
1972	242.00	450.00	246.00	0.409
1973	267.00	485.00	226.00	0.434
1974	542.00	457.00	273.00	0.589
1975	188.00	370.00	278.00	0.510
1976	141.00	278.00	320.00	0.730
1977	127.00	227.00	196.00	0.642
1978	104.00	195.00	135.00	0.486
1979	269.00	191.00	114.00	0.406
1980	165.00	184.00	120.00	0.463
1981	197.00	193.00	123.00	0.313
1982	325.00	161.00	166.00	0.504
1983	473.00	169.00	169.00	0.615
1984	394.00	136.00	198.00	0.774
1985	157.00	107.00	200.00	0.852
1986	184.00	97.00	164.00	0.930
1987	91.00	100.00	149.00	0.689
1988	162.00	108.00	105.00	0.657
1989	199.00	89.00	92.00	0.723
1990	146.00	78.00	88.00	0.558
1991	262.00	78.00	99.00	0.599
1992	136.00	84.00	93.00	0.680
1993	160.00	95.00	105.00	0.549
1994	204.00	99.00	97.00	0.451
Average	224.12	205.56	169.24	0.574
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.6.1 North Sea PLAI CE. Nominal landings (tonnes) in Sub-area IV as officially reported to ICES, 1984-1994.

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Belgium	10,220	9,965	7,232	8,554	11,527	10,939	13,940	14,328	12,006	10,814	7,951
Denmark	23,361	28,236	26,332	21,597	20,259	23,481	26,474	24,356	20,891	16,452	17,058 <sup>1</sup>
Faroe Islands	-	-	-	-	43	-	-	-	-	-	-
France	1,145	1,010	751	1,580	1,773	2,037 <sup>1</sup>	1,339	508 <sup>1</sup>	537 <sup>1</sup>	593 <sup>1</sup>	438 <sup>1</sup>
Germany	2,485	2,197	1,809	1,794	2,566	5,341	8,747	7,926	6,818	6,896 <sup>1</sup>	5,697
Netherlands	61,478	90,950	74,447	76,612	77,724	84,173	78,204	67,945	51,064	48,552	50,289
Norway	17	23	21	12	21	321	1,756	560	843 <sup>1</sup>	753	551 <sup>1</sup>
Sweden	14	18	16	7	2	12	169	103	53	7	6
UK (Engl. & Wales)	12,988	11,335	12,428	14,891	17,613	19,735	17,563	17,672	20,191	19,238	17,805
UK (N.Ireland)	-	-	-	-	-	540	176	992	1,268	1,384	1,323
UK (Scotland)	4,195	4,577	4,866	5,747	6,884	5,516	6,789	9,047	9,743	10,541	9,944
UK (Isle of Man)	-	-	-	-	-	-	-	-	64	-	-
Total reported	115,903	148,311	127,902	130,794	138,412	152,095	155,157	143,437	123,478	115,230	111,062
Unallocated landings <sup>2</sup>	40,244	11,526	37,445	22,876	16,063	17,548	1,050	4,041	1,234	-1	1
Landings as used by WG	156,147	159,837	165,347	153,670	154,475	169,643	156,207	147,478	124,712	115,229	111,063

<sup>1</sup>Provisional.

<sup>2</sup>Estimated by the Working Group.

**Table 3.5.6.2 North Sea plaice**

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-10
1957	296.17	354.63	70.56	0.197
1958	429.99	340.64	73.35	0.212
1959	433.45	345.20	79.30	0.227
1960	405.34	368.32	87.54	0.247
1961	359.40	352.89	85.98	0.233
1962	318.83	446.59	87.47	0.235
1963	315.20	440.00	107.12	0.264
1964	1,022.01	422.97	110.54	0.273
1965	309.60	414.40	97.14	0.276
1966	305.44	416.44	101.83	0.259
1967	277.28	493.09	108.82	0.243
1968	245.60	456.19	111.53	0.221
1969	327.58	418.39	121.65	0.254
1970	370.55	399.71	130.34	0.333
1971	275.70	372.52	113.94	0.315
1972	234.86	376.03	122.84	0.341
1973	542.53	335.00	130.43	0.380
1974	451.76	309.20	112.54	0.391
1975	337.42	320.49	108.54	0.365
1976	326.52	315.21	113.67	0.314
1977	473.31	330.18	119.19	0.333
1978	433.05	324.06	113.98	0.327
1979	446.13	311.46	145.35	0.454
1980	661.87	297.86	139.95	0.394
1981	427.85	308.84	139.75	0.395
1982	1,030.72	302.30	154.55	0.433
1983	593.78	326.39	144.04	0.411
1984	612.97	328.31	156.15	0.376
1985	536.17	361.52	159.84	0.370
1986	1,276.14	364.14	165.35	0.431
1987	549.47	394.74	153.67	0.428
1988	576.08	380.04	154.48	0.402
1989	394.63	424.00	169.64	0.373
1990	386.04	398.32	156.21	0.354
1991	452.11	339.84	147.48	0.431
1992	456.74	324.77	124.71	0.433
1993	316.00	284.02	115.23	0.435
1994	267.00	251.91	111.06	0.441
Average	459.88	361.86	122.26	0.337
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, 1982-1994

Year	Belgium	Denmark	France	Germany Fed. Rep.	Netherlands	UK (Engl. & Wales)	Other countries	Total reported	Unallocated 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	966	65	14,443	7,378	21,821
1990	2,389	1,428	352	2,296	18,202	1,484	276	26,427	8,706	35,133
1991	2,977	1,307	465	2,107	18,758	1,605	361	27,580	5,955	33,535
1992	2,058	1,359	548	1,880	18,601	1,237	321	26,004	3,345	29,349
1993	2,783	1,661	484	1,379	22,015	1,131	318	29,771	1,657	31,428
1994	2,935	1,802	498	1,744	22,874	1,137	353	31,343	1,326	32,669

all landings reported to ICES  
unallocated landings estimated by the Working Group  
1994 data are provisional  
No data on discards available

**Table 3.5.7.2 North Sea Sole**

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-8
1957	165.50	78.90	12.07	0.137
1958	144.95	85.57	14.29	0.160
1959	559.01	93.19	13.83	0.132
1960	66.86	101.25	18.62	0.167
1961	115.73	148.95	23.57	0.160
1962	28.35	148.79	26.88	0.181
1963	23.01	148.40	26.16	0.261
1964	554.35	53.58	11.34	0.228
1965	121.49	48.95	17.04	0.246
1966	41.18	104.79	33.34	0.240
1967	75.33	100.87	33.44	0.308
1968	100.10	88.92	33.18	0.373
1969	50.59	70.37	27.56	0.423
1970	141.49	62.94	19.69	0.351
1971	41.93	52.38	23.65	0.444
1972	76.95	55.73	21.09	0.393
1973	106.43	41.87	19.31	0.452
1974	110.79	42.28	17.99	0.463
1975	41.92	43.02	20.77	0.462
1976	114.19	43.48	17.33	0.405
1977	140.66	36.04	18.00	0.382
1978	47.11	38.56	20.28	0.494
1979	11.87	46.18	22.60	0.461
1980	155.03	36.04	15.81	0.443
1981	149.59	24.74	15.40	0.448
1982	153.58	34.83	21.58	0.495
1983	144.52	42.23	24.93	0.465
1984	72.08	45.50	26.84	0.550
1985	82.61	42.75	24.25	0.512
1986	161.77	35.85	18.20	0.499
1987	72.60	31.23	17.37	0.430
1988	458.69	41.65	21.59	0.496
1989	114.38	36.26	21.82	0.391
1990	188.15	92.82	35.13	0.442
1991	62.69	80.87	33.54	0.469
1992	384.09	82.49	29.35	0.434
1993	84.43	58.06	31.43	0.508
1994	50.63	82.33	32.67	0.498
Average	137.23	65.86	22.68	0.379
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, 1981-1993. 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
Belgium	5,969	5,080	3,482	414	39	4
Denmark	10,467	38,777	129,305	121,631	138,596	263,006
Faroe Islands	-	-	-	623	2,228	810
France	16,353	20,320	14,400	9,729	7,266	8,384
Germany, Fed.Rep.	1,837	11,609	8,930	3,934	5,552	13,824
Netherlands	40,045	44,308	79,335	85,998	91,478	82,267
Norway <sup>4</sup>	32,512	98,706	159,947	223,058	241,765	222,719
Sweden	284	886	2,442	1,872	1,725	1,819
UK (England)	111	1,689	5,564	1,404	873	8,097
UK (Scotland)	17,260	31,393	55,795	77,459	76,413	64,108
UK (N.Ireland)	-	-	-	-	-	-
Unallocated landings	181,116	64,487	74,220	21,089	58,972	33,411
Total landings	305,954	317,255	533,420	547,211	624,907	698,449
Discards <sup>3</sup>	-	-	-	-	-	-
Total catch	305,954	317,255	533,420	547,211	624,907	698,449
Catches of spring spawners (included above)						
IIIa type	-	-	6,958	17,386	19,654	23,306
Coastal type	-	-	520	905	490	250

Country	1989	1990-	1991	1992	1993	1994 <sup>1</sup>
Belgium	434	180	163	242	56	144
Denmark	210,315 <sup>2</sup>	159,280 <sup>2</sup>	194,358 <sup>2</sup>	193,968 <sup>2</sup>	164,817	121,559
Faroe Islands	1,916	633	334	-	-	-
France	29,085	23,480	24,625	16,587	12,627	27,941
Germany, Fed.Rep.	38,707	43,191	41,791	42,665	41,669	38,394
Netherlands	84,178	69,828	75,135	75,683	79,190	76,155
Norway <sup>4</sup>	221,891 <sup>2</sup>	157,850 <sup>2</sup>	124,991 <sup>2</sup>	116,863	122,815	125,522
Sweden	4,774	3,754	5,866	4,939	5,782	5,425
UK (England)	7,980	8,333	11,548	11,314	19,853	14,215
UK (Scotland)	68,106	56,812	57,572	56,171	55,531	49,919
UK (N.Ireland)	-	-	92	-	-	-
Unallocated landings	26,749 <sup>2</sup>	21,081	24,435	25,867	18,410	5,749
Total landings	694,135 <sup>2</sup>	544,422	560,910	544,299	520,550	465,023
Discards <sup>3</sup>	4,000	8,660	4,617	4,950	3,470	2,510
Total catch	698,135	553,082	565,527	549,249	524,020	467,533
Catches of spring spawners (included above)						
IIIa type	19,869	8,357	7,894	7,854	8,928	13,228
Coastal type	2,283	1,136	252 <sup>5</sup>	202 <sup>5</sup>	201 <sup>5</sup>	215 <sup>5</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Working Group estimates.

<sup>3</sup>Any discards prior to 1989 were included in unallocated landings.

<sup>4</sup>Catches of Norwegian spring spawners removed (taken under a separate TAC).

<sup>5</sup>Landings 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	1985	1986	1987	1988	1989
Denmark	77,788	48,590	50,184	25,268	29,298
Faroe Islands	-	275	102	810	1,916
France	2,075	462	285	266	<sup>1</sup>
Germany, Fed.Rep.	4,790	2,510	3,250	9,308	26,528
Netherlands	49,965	42,900	44,358	32,639	24,600
Norway	10,507	63,848	55,311	30,657	41,768
Sweden	<sup>1</sup>	<sup>1</sup>	768	1,197	742
UK (N.Ireland)	-	-	-	-	-
UK (England)	-	-	4,820	4,820	5,104
UK (Scotland)	52,100	71,285	66,774	48,791	58,455
Unallocated landings	4,249	-	16,092	-	3,173
Total Landings	197,225	229,870	221,032	153,751	191,584
Discards <sup>2</sup>	-	-	-	-	900
Total catch	201,474	229,870	237,124	153,751	192,484

Country	1990	1991	1992	1993 <sup>3</sup>	1994
Denmark	9,037	5,980	10,751	10,604	20,017
Faroe Islands	633	334	-	-	-
France	2,581	3,393	4,714 <sup>4</sup>	3,362	11,658
Germany, Fed.Rep.	20,422	20,608	21,836	17,342 <sup>4</sup>	18,364
Netherlands	29,729	29,563	29,845	28,616	16,944
Norway	24,239	37,674	39,244	33,442	56,422
Sweden	-	1,130	985	1,372	2,159
UK (N.Ireland)	-	92	-	-	-
UK (England)	3,337	4,873	4,916	4,742	3,862
UK (Scotland)	46,431	42,745	39,269	36,628 <sup>4</sup>	44,687
Unallocated landings	4,621	5,492	4,855	-8,271 <sup>5</sup>	2,944
Total Landings	141,030	151,884	156,415	127,837	177,327
Discards <sup>2</sup>	750	883	850	825	550
Total catch	141,780	152,767	157,265	128,662	177,877

<sup>1</sup>Included in Division IVb.

<sup>2</sup>Any discards prior to 1989 were included in unallocated.

<sup>3</sup>Preliminary.

<sup>4</sup>Including IVa East.

<sup>5</sup>Negative 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	1984	1985	1986	1987	1988
Denmark	126	-	4,540	7,101	47,183
Faroe Islands	-	-	-	2,126	-
France	-	-	-	159	45
Netherlands	-	-	-	-	200
Norway <sup>1</sup>	51,581	109,975	118,408	145,843	153,496
Sweden	-	-	-	957	622
UK (Scotland)	74	-	-	-	-
Germany, Fed.Rep.	-	-	-	-	-
Unallocated landings	-	-	-	-	-
Total landings	51,781	109,975	122,348	156,186	201,546
Discards <sup>2</sup>	-	-	-	-	-
Total catch	51,781	109,975	122,948	156,186	201,546

Country	1989	1990	1991	1992 <sup>3</sup>	1993	1994
Denmark	44,269	44,364	48,875	53,692	43,224	43,787
Faroe Islands	-	-	-	-	-	-
France	-	892	-	<sup>4</sup>	4	14
Netherlands	-	-	-	-	-	-
Norway <sup>1</sup>	168,365	121,405	77,465	61,379	56,215	40,658
Sweden	612	2,482	114	508	711	1,010
UK (Scotland)	-	-	173	196	<sup>4</sup>	<sup>4</sup>
Germany, Fed.Rep.	-	5,604	<sup>4</sup>	<sup>4</sup>	<sup>4</sup>	<sup>4</sup>
Unallocated landings	-	-	-	-	-	-
Total landings	213,246	174,747	126,627	115,775	100,154	85,469
Discards <sup>2</sup>	-	-	-	-	-	-
Total catch	213,246	174,747	126,627	115,775	100,154	85,469

<sup>1</sup>Catches of Norwegian spring spawners herring removed (taken under a separate TAC).

<sup>2</sup>Any discards prior to 1989 would have been included in unallocated.

<sup>3</sup>Preliminary.

<sup>4</sup>Included 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	1985	1986	1987	1988	1989
Denmark	51,517	67,966	81,280	190,555	136,239
Belgium	-	-	-	-	-
France	1,037	605	387	617	14,415 <sup>5</sup>
Faroe Islands	-	348	-	-	-
Germany, Fed.Rep.	4,139	1,424	2,302	4,516	11,880
Netherlands <sup>4</sup>	- <sup>3</sup>	21,101	31,371	37,192	47,388
Norway	39,465	40,682	40,111	38,566	11,758
Sweden	2,442 <sup>2</sup>	1,872 <sup>2</sup>	-	-	3,420
UK (England)	5,214	1,101 <sup>1</sup>	329	2,011	957
UK (Scotland)	2,894	6,057	9,639	15,317	9,651
Unallocated landings	47,799	1,594	20,829	1,969	-23,947 <sup>7</sup>
Total landings	154,507	142,750	186,248	290,743	211,711
Discards <sup>4</sup>	-	-	-	-	1,900
Total catch	154,507	142,750	186,248	290,743	213,611

Country	1990	1991	1992	1993	1994 <sup>6</sup>
Denmark	105,614	138,555	125,229	109,994	55,060
Belgium	-	3	13	-	-
France	10,289	4,120	2,313	2,086	5,492
Faroe Islands	-	-	-	-	-
Germany, Fed.Rep.	17,165	20,479	20,005	23,628	14,796
Netherlands <sup>4</sup>	28,402	26,266	26,987	31,370	39,052
Norway	12,207	9,852	16,240	33,158	28,442
Sweden	1,276	4,622	3,446	3,699	2,256
UK (England)	3,200	2,715	3,026	3,804	7,337
UK (Scotland)	10,381	14,587	16,707	18,904	5,101
Unallocated landings	-15,616 <sup>7</sup>	3,180	-13,637 <sup>7</sup>	-16,415 <sup>7</sup>	-26,988 <sup>7</sup>
Total landings	172,914	224,376	200,329	210,228	130,548
Discards <sup>4</sup>	2,560	1,072	1,900	245	460
Total catch	175,474	225,448	202,229	210,473	131,008

<sup>1</sup>Includes catches misreported from Division IVc.

<sup>2</sup>Includes Division IVa catches.

<sup>3</sup>Included in Division IVa.

<sup>4</sup>Any discards prior to 1989 were included in unallocated.

<sup>5</sup>Includes catch in Division IVa.

<sup>6</sup>Preliminary.

<sup>7</sup>Negative unallocated catches due to misreporting from other areas.

**Table 3.5.8.5** HERRING, catch in tonnes in Divisions IVc and VIIId. 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
Belgium	3,482	414	39	4	434
Denmark	-	535	31	-	509
France	11,288	8,662	6,435	7,456	14,670
Germany, Fed.Rep.	-	-	-	-	299
Netherlands	32,370	21,997	15,749	12,236	12,240
Norway	-	-	-	-	-
UK (England)	350	303	544	1,266	1,919
UK (Scotland)	799	117	-	-	-
Unallocated landings	21,595	19,495	22,051	31,442	47,523
Total landings	69,884	51,523	44,849	52,404	77,594
Discards <sup>1</sup>	-	-	-	-	1,200
Total catch	69,884	51,523	44,849	52,404	78,794
Coastal spring spawners included above	905	496	250	250	2,283

Country	1990	1991	1992	1993	1994 <sup>2</sup>
Belgium	180	163	229	56	144
Denmark	265	948	4,296	995	2,695
France	9,718	17,112	9,560	7,171	10,777
Germany, Fed.Rep.	-	704	824	649	4,964
Netherlands	11,697	19,306	18,851	19,204	20,159
Norway	-	-	-	-	-
UK (England)	1,796	3,960	3,372	11,307	3,016
UK (Scotland)	-	67	-	-	131
Unallocated landings	32,076	15,763	34,649	43,096	29,792
Total landings	55,732	58,023	71,781	82,478	71,678
Discards <sup>1</sup>	5,350	2,662	2,200	2,400	2,400
Total catch	78,794	61,082	60,685	73,981	74,078
Coastal spring spawners included above	1,136	252	202	201	215

<sup>1</sup>Any discards prior to 1989 would have been included in unallocated.

<sup>2</sup>Preliminary.

**Table 3.5.8.6 Herring in Sub-area IV, Division VIIId and Division IIIa.**

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	Max <sup>1</sup>	Min	Mean <sup>1</sup>
<b>TAC (IV and VIId)</b>												
SUB-AREA IV AND DIVISION VIIId												
Recommended Div. IVa,b <sup>4</sup>	600	500	484	373/332	363 <sup>9</sup>	352	290 <sup>10</sup>	296 <sup>10</sup>	389 <sup>14</sup>			
Recommended Div. IVc, VIId	10	15	30	30	50-60 <sup>9</sup>	54	50	50	50			
Expected catch of spring spawners						10	8					
Agreed Div. IVa,b <sup>5</sup>	560	500	484	385	370 <sup>9</sup>	380	380	390	390			
Agreed Div. IVc, VIId	40	30	30	30	50 <sup>9</sup>	50	50	50	50			
<b>CATCH (IV and VIId)</b>												
National landings Div. IVa,b <sup>6</sup>	543	644	639	499	495	481	463	421				
Unallocated landings Div. IVa,b	37	2	-21	-11	8	-9	-25	-24				
Discard/slipping Div. IVa,b <sup>7</sup>			3	4	2	3	1	1				
Total Catch Div. IVa,b <sup>8</sup>	580	646	621	492	505	475	439	394		646	10	331
National landings Div. IVc, VIId <sup>6</sup>	23	21	30	24	42	37	40	42				
Unallocated landings Div. IVc, VIId	22	31	48	32	16	35	43	30				
Discard/slipping Div. IVc, VIId			1	5	3	2	2	2				
Total Catch Div. IVc, VIId	45	52	79	61	61	74	85	74				
Total catch IV and VIId as used by ACFM <sup>8</sup>	625	698	700	553	566	549	524	468				
<b>CATCH BY FLEET/STOCK (IV and VIId)<sup>13</sup></b>												
North Sea autumn spawners directed fisheries	Not available				421	419	418	414				
North Sea autumn spawners small mesh fishery	Not available				134	124	101	38				
North Sea autumn spawners total	611	675	678	544	555	543	519	452				
Baltic-IIIa-type spring spawners	14	23	20	8	8	8	9	13				
Coastal-type spring spawners	0.3	0.3	2.3	1.1	0.3	0.2	0.2	0.2				
<b>TAC (IIIa)</b>												
DIVISION IIIa												
Predicted catch of autumn spawners						96	153	88	82			
Recommended spring spawners	112	99	84	67	91	90	93-113	- <sup>12</sup>	- <sup>15</sup>			
Recommended mixed clupeoids	80	80	80	60	0	0	0	-	-			
Agreed herring TAC	138	138	138	120	104.5	124	165	148	140			
Agreed mixed clupeoid TAC	80	80	80	65	50	50	45	43	43			
<b>CATCH (IIIa)</b>												
National landings	234	333	192	202	188	227	214	168				
Catch as used by ACFM	220	330	162	195	191	227	214	168				
<b>CATCH BY FLEET/STOCK (IIIa)</b>												
Autumn spawners human consumption	Not available				26	47	44	42				
Autumn spawners mixed clupeoid	Not available				13	23	25	12				
Autumn spawners other industrial landings	Not available				38	82	63	32				
Autumn spawners total	161	201	91	77 <sup>11</sup>	77	152	132	86				
Spring spawners human consumption	Not available				68	53	68	59				
Spring spawners mixed clupeoid	Not available				5	2	1	1				
Spring spawners other industrial landings	Not available				40	20	12	24				
Spring spawners total	59	129	71	118	113	75	81	84				
<b>NORTH SEA AUTUMN SPAWNERS</b>												
Total catch as used by ACFM	773	876	769	620	635	694	647	538		876	11	442

<sup>1</sup>Over period 1970-1994. <sup>2</sup>Forward projection. <sup>3</sup>Assumed. <sup>4</sup>Includes catches in directed fishery and catches of 1-ringers in small mesh fishery up to 1992. <sup>5</sup>IVa,b and EC zone of IIa. <sup>6</sup>Provided by Working Group members. <sup>7</sup>One fleet only. <sup>8</sup>Includes spring spawners not included in assessment. <sup>9</sup>Revised during 1991. <sup>10</sup>Based on F=0.3 in directed fishery only; TAC advised for IVc,VIIId subtracted. <sup>11</sup>Estimated. <sup>12</sup>130-180 for spring spawners in all areas. <sup>13</sup>Based on sum-of-products (number x mean weight at age) Weights in '000t. <sup>14</sup>Status quo F catch for fleet A. <sup>15</sup>The catch should not exceed recent catch levels.

**Table 3.5.8.a.1 Herring in Sub-area IV, Division VIId and Division IIIa (autumn spawners).**

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1947	61,106.00	4,939.30	586.60	0.193
1948	42,024.90	4,064.81	502.10	0.204
1949	33,752.00	3,751.41	508.50	0.222
1950	45,157.50	3,269.58	491.70	0.216
1951	45,244.30	2,618.72	600.40	0.321
1952	53,162.80	2,406.57	664.40	0.337
1953	60,785.10	2,087.93	698.50	0.368
1954	47,146.80	1,901.79	762.90	0.421
1955	50,472.80	1,806.21	806.40	0.396
1956	28,544.80	1,876.70	675.20	0.407
1957	140,782.00	1,746.53	682.90	0.397
1958	34,940.80	1,397.31	670.50	0.400
1959	44,713.70	2,601.47	784.50	0.447
1960	12,115.30	2,133.60	696.20	0.311
1961	108,895.00	1,830.97	696.70	0.396
1962	46,320.80	1,239.82	627.80	0.473
1963	47,660.70	2,329.72	716.00	0.218
1964	62,821.10	2,138.50	871.20	0.338
1965	34,899.40	1,527.90	1,168.80	0.691
1966	27,854.30	1,319.59	895.50	0.617
1967	40,260.20	929.25	695.50	0.795
1968	38,700.50	418.66	717.80	1.328
1969	21,585.10	427.03	546.70	1.098
1970	41,088.90	377.23	563.10	1.097
1971	32,333.50	272.90	520.10	1.390
1972	20,866.40	289.42	497.50	0.698
1973	10,159.20	234.25	484.00	1.129
1974	21,752.20	162.86	275.10	1.046
1975	2,936.83	83.63	312.80	1.440
1976	2,781.77	80.72	174.80	1.359
1977	4,379.43	51.75	46.00	0.731
1978	4,658.47	70.21	11.00	0.048
1979	10,592.00	112.89	25.10	0.061
1980	16,672.50	137.38	70.76	0.272
1981	37,771.30	202.16	174.88	0.333
1982	64,452.30	283.47	275.08	0.259
1983	61,779.80	438.30	387.20	0.333
1984	53,477.70	725.83	409.49	0.429
1985	81,928.30	747.97	609.11	0.623
1986	97,353.40	797.78	660.55	0.539
1987	84,373.00	912.50	773.41	0.531
1988	41,558.20	1,098.29	875.92	0.523
1989	37,832.00	1,301.95	768.89	0.539
1990	37,030.60	1,138.77	619.96	0.425
1991	36,561.40	992.40	635.93	0.485
1992	63,556.00	778.65	694.21	0.574
1993	52,876.70	483.89	647.00	0.650
1994	35,488.70	790.18	538.00	0.526
Average	43,400.14	1,277.68	564.93	0.555
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.5.9.1** Sprat catches in the North Sea ('000 t) 1983-1994. 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).

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 <sup>†</sup>
<b>Division IVa West</b>												
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
<b>Division IVa East (North Sea) stock</b>												
Denmark	-	-	+	0.2	+	+	+	-	-	-	+	+
Norway	-	-	-	-	-	-	-	-	-	0.54	2.5	+
Sweden	-	-	-	-	-	-	-	+ <sup>5</sup>	2.5	-	-	-
Total	-	-	+	0.2	+	+	+	+	2.5	0.64	2.5	+
<b>Division IVb West</b>												
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
Faroe Islands	-	-	-	-	-	-	-	-	-	-	-	-
Norway	0.9	0.5	-	-	-	3.5	0.1	1.2	4.4	18.4	16.8	12.6
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
<b>Division IVb East</b>												
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
Germany	-	0.6	0.6	0.6 <sup>3</sup>	-	-	-	-	-	-	-	-
Norway	10.8	3.1	-	-	-	0.6	-	0.6	25.1	9.5	24.1	19.1
Sweden	-	-	-	-	-	-	-	+ <sup>2</sup>	+ <sup>2</sup>	-	-	-
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
<b>Division IVc</b>												
Belgium	-	-	+	+	+	-	+ <sup>2</sup>	+ <sup>2</sup>	+ <sup>2</sup>	-	-	-
Denmark	1.0	0.5	+	0.1	+	0.1	0.5	1.5	1.7	2.49	3.5	-
France	-	-	-	+	-	-	+ <sup>2</sup>	-	+ <sup>2</sup>	-	+	+
Netherlands	-	0.1	-	-	-	0.4	0.4 <sup>2,3</sup>	-	+ <sup>2,3</sup>	-	-	-
Norway	0.5	3.4	-	-	-	-	-	-	-	-	0.4	4.6
UK (England)	3.6	0.9	3.4	4.1	0.7	0.6	0.9	0.2	1.8	6.12 <sup>1</sup>	2.0	2.9
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
<b>Total North Sea</b>												
Belgium	-	-	+	+	+	-	+	+ <sup>2</sup>	+ <sup>2</sup>	-	-	-
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
Faroe Islands	-	-	-	-	-	-	-	-	-	-	-	-
France	-	-	-	+	-	-	+	-	+ <sup>2,3</sup>	-	+	-
Germany	-	0.6	-	0.6	-	-	-	-	-	-	-	-
Netherlands	-	0.1	0.6	-	0.5	0.4	0.4	-	+ <sup>2,3</sup>	-	-	-
Norway	12.0	7.0	6.1	-	-	4.1	0.1	1.8	29.6	28.5	43.8	36.3
Sweden	-	-	-	-	-	-	-	+ <sup>2</sup>	+ <sup>2</sup>	-	0.1	-
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
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

<sup>†</sup>Preliminary. <sup>2</sup>Official statistics. <sup>3</sup>Includes Divisions IVa-c. <sup>4</sup>Includes Division IVb East.

+ = less than 0.1. - = magnitude known to be nil.

**Table 3.5.9.2** Sprat in the North Sea (Sub-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
Average	218
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
Belgium	8	34	7	55	20
Denmark	199	3,576	1,612	1,590	23,730
Faroe Islands	260	-	-	-	-
France	292	421	567	366	827
Germany, Fed.Rep.	+	139	30	52	+
Ireland	1,161	412	-	-	-
Netherlands	101	355	559	2,029 <sup>4</sup>	824
Norway	119	2,292	7	322	<sup>4</sup>
Poland	-	-	-	2	94
Sweden	-	-	-	-	-
UK (Engl. + Wales)	11	15	6	4	-
UK (Scotland)	-	-	-	-	3
USSR	-	-	-	-	489
<b>Total</b>	<b>2,151</b>	<b>7,245</b>	<b>2,788</b>	<b>4,420</b>	<b>25,987</b>

Country	1985	1986	1987	1988	1989	1990	1991	1992 <sup>7</sup>	1993	1994
Belgium	13	13	9	10	10	13	-	+	74	57
Denmark	22,495	18,652 <sup>2</sup>	7,290 <sup>2</sup>	20,323 <sup>2</sup>	23,329 <sup>2</sup>	20,605 <sup>2</sup>	6,982 <sup>2</sup>	7,755	6,120	3,921
Estonia	-	-	-	-	-	-	-	293	-	-
Faroe Islands	-	-	-	-	-	942	340	-	360	275
France	298	231 <sup>3</sup>	189 <sup>3</sup>	784 <sup>3</sup>	248	220	174	162	302	-
Germany, Fed.Rep.	+	-	3	153	506	2,469 <sup>6</sup>	5,995	2,801	1,570	1,014
Ireland	-	-	-	-	-	687	2,657	2,600	4,086	415
Netherlands	160 <sup>4</sup>	600 <sup>4</sup>	850 <sup>4</sup>	1,060 <sup>4</sup>	14,172	1,970	3,852	3,000	2,470	1,329
Norway <sup>2</sup>	203	776	11,728 <sup>5</sup>	34,425 <sup>5</sup>	84,161	117,903 <sup>2</sup>	50,000 <sup>2</sup>	96,000	126,800	94,000
Poland	-	-	-	-	-	-	-	-	-	-
Sweden	-	2 <sup>2</sup>	-	-	-	102	953 <sup>2</sup>	800	697	2,087
UK (Engl. + Wales)	71	3	339	373	10	10	132	4	115	389
UK (N. Ireland)	-	-	-	-	-	-	350	-	-	-
UK (Scotland)	998	531	487	5,749	2,093	458	7,309	996	1,059	7,582
USSR	-	-	-	-	-	-	-	-	-	-
Unallocated + discards	-	-	-	-	-12,482 <sup>5</sup>	-317 <sup>5</sup>	-750 <sup>5</sup>	-278	-3,270	1,511
<b>Total</b>	<b>24,238</b>	<b>20,746</b>	<b>20,895</b>	<b>62,892</b>	<b>112,047</b>	<b>145,062</b>	<b>77,994</b>	<b>113,141</b>	<b>140,383</b>	<b>112,580</b>

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Division IIIa.

<sup>3</sup>Includes Division IIa.

<sup>4</sup>Estimated from biological sampling.

<sup>5</sup>Assumed to be misreported.

<sup>6</sup>Includes 13 t from the German Democratic Republic.

<sup>7</sup>Includes 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	VIIIa	Total	IIa	IVa	Vla	VIIa-c,e-k	VIIIa,b,d,e	Discards	Total	VIIIc	IXa	Total	
1982	-	2,788 <sup>3</sup>	-	1,247	4,035	-	-	6,283	32,231	3,073	-	41,587	19,610	39,726	59,336	104,958
1983	-	4,420 <sup>3</sup>	-	3,600	8,020	412	-	24,881	36,926	2,643	-	64,862	25,580	48,733	74,313	147,195
1984	-	25,893 <sup>3</sup>	-	3,585	29,478	23	94	31,716	38,782	2,510	500	73,625	23,119	23,178	46,297	149,400
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	150,830
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	201,806
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	223,512
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	268,163
1989	913	25,830	-	6,522	33,265	4,809	85,304 <sup>2</sup>	34,870	131,218	11,516	1,150	268,867	27,170	29,231	56,401	358,533
1990	14,872 <sup>1</sup>	17,437	-	1,325	18,762	11,414	112,753 <sup>2</sup>	20,794	182,580	21,120	9,930	373,463	25,182	24,023	49,205	441,430
1991	2,725 <sup>1</sup>	11,400	-	600	12,000	4,487	63,869 <sup>2</sup>	34,415	196,926	25,693	5,440	333,555	23,733	21,778	45,511	391,066
1992	2,374 <sup>1</sup>	13,955	400	688	15,043	13,457	101,752	40,881	180,937	29,329	1,820	370,550	24,243	26,713	50,955	436,548
1993	850 <sup>1</sup>	3,895	930	8,792	13,617	3,168	134,908	53,782	204,318	27,519	8,600	433,145	25,483	31,945	57,428	504,190
1994	2,492 <sup>1</sup>	2,496	630	2,503	5,689	759	106,911	69,546	194,188	11,044	3,935	388,875	24,147	28,442	52,589	447,153

<sup>1</sup>Norwegian and Danish catches are included in the Western horse mackerel.

<sup>2</sup>Norwegian catches in Division IVb included in the Western horse mackerel.

<sup>3</sup>Divisions IIIa and IVb, c combined.

**Table 3.5.12.1** Norway pout annual landings ('000 t) in Sub-area IV, the North Sea, by countries in 1958–1994. (Data provided by Working Group members).

Year	Denmark	Faroes	Norway	Sweden	UK (Scotland)	Others	Total
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	21.9	75.4	-	3.0	-	320.2
1980	366.2	34.1	70.2	-	0.6	-	471.1
1981	167.5	16.6	51.6	-	+	-	235.7
1982	256.3	15.4	88.0	-	-	-	359.7
1983	301.1	24.5	97.3	-	+	-	422.9
1984	251.9	19.1 <sup>1</sup>	83.8	-	0.1	-	354.9
1985	163.7	9.9	22.8	-	0.1	-	196.5
1986	146.3	6.6	21.5	-	-	-	174.4
1987	108.3	4.8	34.1	-	-	-	147.2
1988	79.0	1.5	21.1	-	-	-	101.6
1989	95.6	0.8	65.3	-	0.1	0.3	162.1
1990	61.5	0.9	77.1	-	-	-	139.5
1991	85.0	1.3	68.3	-	-	+	154.6
1992	146.9	2.6	105.5	-	0	0.1	255.1
1993	97.3	n/a	76.7	-	-	-	174.0
1994	97.9	n/a	74.2	-	-	-	172.1

**Table 3.5.12.2 Norway pout in Sub-rea IV**

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 1-2
1974	176,064.00	171.01	735.80	1.840
1975	212,259.00	208.37	559.70	1.206
1976	197,659.00	199.83	435.40	1.204
1977	101,987.00	242.37	389.90	0.835
1978	200,901.00	240.75	270.10	0.907
1979	232,819.00	197.91	320.20	1.006
1980	61,114.00	332.24	471.10	1.233
1981	306,115.00	277.92	235.70	0.777
1982	238,371.00	173.97	359.70	1.016
1983	153,788.00	372.33	422.90	0.795
1984	79,640.00	376.99	354.90	1.203
1985	57,202.00	182.00	196.50	1.071
1986	116,234.00	95.16	174.40	0.990
1987	32,348.00	104.70	147.20	0.782
1988	90,706.00	150.37	101.60	0.526
1989	100,086.00	98.64	162.10	0.627
1990	96,446.00	149.28	139.50	0.623
1991	165,882.00	174.47	154.60	0.536
1992	83,887.00	219.89	255.10	0.600
1993	93,127.00	269.70	174.00	0.615
1994	625,036.00	183.71	172.10	0.521
Average	162,936.71	210.55	297.02	0.901
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.5.13.1 Landings ('000 t) of sandeel from the North Sea, 1952-1994. (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

+ = less than half unit.

- = no information or no catch.

**Table 3.5.13.a.1** Sandeel in Sub-area IV

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 1-2
1976	486,725.00	779.65	488.00	0.548
1977	657,469.00	546.18	786.00	0.543
1978	532,024.00	700.56	787.00	0.677
1979	543,000.00	881.16	578.00	0.641
1980	212,902.00	841.00	729.00	0.679
1981	984,959.00	706.03	569.00	0.677
1982	200,596.00	426.75	611.00	0.621
1983	861,497.00	1,237.30	537.00	0.475
1984	244,862.00	658.34	669.00	0.386
1985	1246158.00	1,065.66	622.00	0.951
1986	646,777.00	445.65	848.00	0.487
1987	274,811.00	1,703.49	825.00	0.424
1988	753,232.00	1,593.86	893.00	0.635
1989	314,077.00	704.77	1,039.00	0.530
1990	675,384.00	846.27	591.00	0.767
1991	849,074.00	488.70	843.00	0.702
1992	378,917.00	755.00	854.00	0.430
1993	1288619.00	1,217.14	578.00	0.310
1994	50,941.00	989.00	769.00	0.326
Average	589,580.21	872.97	716.63	0.569
Unit	Millions	1000 tonnes	1000 tonnes	-

**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.)

Year	Area											Assessment areas <sup>1</sup>	
	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

<sup>1</sup>Assessment areas: Northern - Areas 1B, 1C, 2B, 2C, 3.  
Southern - Areas 1A, 2A, 4, 5, 6.

**Table 3.5.14.a.1** Landings (t) 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	-	44	2,027	2,998
1979	565	-	76	268	877
1980	1,122	-	1	377	1,575
1981	685	-	-	347	1,033
1982	283	-	8	352	635
1983	5,729	-	13	1,827	7,564
1984	4,553	-	-	25	4,591
1985	3,649	-	-	1,341	4,990
1986	3,416	-	-	301	3,717
1987	7,326	-	2	686	8,012
1988	1,077	-	25	84	1,163
1989	2,438	-	3	547	3,010
1990	1,681	4	31	365	2,053
1991	422	-	-	53	506
1992	1,448	-	-	116	1,564
1993	1,521	-	-	509	2,059
1994 <sup>1</sup>	1,207	-	-	35	1,242

<sup>1</sup>Provisional

**Table 3.5.14.b1** Landings (t) of *Pandalus borealis* from Division IVb, the Farn Deeps as estimated by the Working Group.

Year	UK (England)	UK (Scotland)	Denmark	Total	CPUE kg/hr (Scotland)
1977	227	-	No data	-	-
1978	91	2	-	-	No data
1979	235	34	-	-	No data
1980	203	17	-	-	60
1981	1	-	-	-	-
1982	-	-	-	-	-
1983	65	-	-	-	-
1984	30	-	-	-	-
1985	2	6	-	-	70
1986	137	57	106	300	127
1987	212	86	92	390	101
1988	91	25	384	500	67
1989	168	8	72	248	44
1990	144	+	1	145	-
1991	3	-	-	3	-
1992	1	-	-	1	-
1993	-	-	-	0	-
1994	4	-	-	4	-



**Table 3.5.15 a.1** *Nephrops* landings (tonnes) by Functional Unit plus other rectangles in Management Area F (IVa 44-48 E6-E7 44E8)

Year	FU 9	FU 10	Other	Total
1985	2081	22	15	2118
1986	2143	68	44	2255
1987	1991	44	30	2065
1988	1959	76	45	2080
1989	2576	85	44	2705
1990	2038	217	69	2324
1991	1517	196	65	1778
1992	1587	188	43	1818
1993	1807	376	69	2252
1994	1501	491	137	2129

**Table 3.5.15 a.2** Total *Nephrops* landings (tonnes) by country in Management Area F (IVa 44-48 E6 -E7 44E8)

Year	UK	Total
1985	2118	2118
1986	2255	2255
1987	2065	2065
1988	2080	2080
1989	2705	2705
1990	2324	2324
1991	1778	1778
1992	1818	1818
1993	2252	2252
1994	2129	2129

**Table 3.5.15 a.3 *Nephrops* in Division IVa Rectangles 44-48 E6-E-7 + 44E8**

Year	Landings
1984	1,284
1985	2,118
1986	2,255
1987	2,065
1988	2,080
1989	2,705
1990	2,324
1991	1,778
1992	1,818
1993	2,252
1994	2,129
Average	2,073
Unit	tonnes

**Table 3.5.15 b.1** *Nephrops* landings (tonnes) by Functional unit plus other rectangles in Management Area G (IVa Remainder)

Year	FU 7	Other*	Total
1985	1148	>34	1182
1986	1543	>17	1560
1987	1721	>14	1735
1988	1574	57	1631
1989	2363	75	2438
1990	2594	117	2711
1991	4241	242	4483
1992	3283	200	3483
1993	3498	359	3857
1994	4288	556	4844

\* includes Norwegian and Danish landings from Norwegian Deeps (see section 5.1.1)

**Table 3.5.15 b.2** Total *Nephrops* landings (tonnes) by country in Management Area G (IVa Remainder)

Year	UK	Denmark	Norway	Belgium	Total
1985	1182	?	0	?	1182
1986	1510	50	0	0	1560
1987	1411	323	1	0	1735
1988	1501	127	3	0	1631
1989	2154	275	9	0	2438
1990	2318	353	38	>2	2711
1991	3848	528	107	0	4483
1992	2998	369	113	3	3483
1993	3320	434	103	0	3857
1994	4086	601	157	0	4844

**Table 3.5.15 b.3 *Nephrops* in Division Iva (Rectangles not included under Section 3.5.15 a).**

Year	Landings
1984	657
1985	1,182
1986	1,560
1987	1,735
1988	1,631
1989	2,438
1990	2,711
1991	4,483
1992	3,483
1993	3,857
1994	4,844
Average	2,598
Unit	tonnes

**Table 3.5.15 c.1** *Nephrops* landings (tonnes) by Functional Unit plus other rectangles in Management Area H (IVb and IVc east of 1° east).

Year	FU 5	Other	Total
1985	>680	>1	>681
1986	>451	>10	>461
1987	>513	>4	>517
1988	643	71	714
1989	763	127	890
1990	878	122	1000
1991	893	161	1054
1992	606	203	809
1993	706	246	952
1994	503	346	849

**Table 3.5.15 c.2** Total *Nephrops* landings (tonnes) by country in Management Area H (IVb and IVc east of 1° east).

Year	Belgium*	Denmark	UK	Total
1985	680	?	1	>681
1986	457	?	4	>461
1987	511	?	6	>517
1988	587	122	5	714
1989	677	210	3	890
1990	730	266	4	1000
1991	734	315	5	1054
1992	583	208	18	809
1993	693	253	6	952
1994	515	313	21	849

\* Data for 1986-1994 revised to include non-reported landings

**Table 3.5.15 c.3** *Nephrops* in Divisions IVb,c east of 1° E.

Year	Landings
1984	613
1985	681
1986	461
1987	517
1988	714
1989	890
1990	1,000
1991	1,054
1992	809
1993	952
1994	849
Average	776
Unit	tonnes

**Table 3.5.15 d.1** *Nephrops* landings (tonnes) by Functional Unit plus other rectangles in Management Area I (IVb, c West of 1° East).

Year	FU 6	FU 8	Other	Total
1985	2028	1969	107	4104
1986	2015	2263	143	4421
1987	2193	1674	138	4005
1988	2504	2528	310	5342
1989	3098	1885	157	5140
1990	2498	1931	132	4561
1991	2063	1402	355	3820
1992	1463	1755	257	3475
1993	3030	2369	255	5654
1994	3676	1812	392	5880

**Table 3.5.15 d.2** Total *Nephrops* Landings (tonnes) by country in Management Area I (IVb,c West of 1°East).

Year	UK	Denmark	Belgium	Total
1985	4104	+	?	4104
1986	4421	+	0	4421
1987	4005	+	0	4005
1988	5330	12	0	5342
1989	5138	2	0	5140
1990	4555	1	5	4561
1991	3815	1	4	3820
1992	3471	3	1	3475
1993	5654	0	1	5655
1994	5879	1	0	5880

**Table 3.5.15 d.3 *Nephrops* in Divisions IVb,c west of 1° E.**

Year	Landings
1984	3,694
1985	4,104
1986	4,421
1987	4,005
1988	5,342
1989	5,140
1990	4,561
1991	3,820
1992	3,475
1993	5,655
1994	5,880
Average	4,554
Unit	tonnes

**Table. 3.6.2.1**

**COD in Division VIIId.**

**Nominal landings (tonnes) as officially reported to ICES, 1976 to 1994.**

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 <sup>1</sup>	-	530	2	n/a	-	2430
1994*	228	n/a	9	-	312	+	n/a	-	2850

\* Preliminary; 1 Includes VIIe.



**Table 3.6.2.2** Cod in Division VIId (Eastern English Channel)

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-4
1976	17.51	1.88	4.00	1.196
1977	30.66	1.45	7.00	0.714
1978	8.56	2.28	10.00	1.246
1979	11.75	3.00	6.00	0.894
1980	9.38	2.83	5.00	0.819
1981	5.76	2.34	5.00	1.024
1982	8.22	2.63	3.98	0.780
1983	7.15	1.60	3.84	1.516
1984	12.44	1.41	3.52	1.005
1985	19.52	1.75	3.33	0.606
1986	48.47	2.43	12.82	1.418
1987	11.42	2.87	14.22	1.176
1988	6.90	3.44	9.36	1.096
1989	4.42	2.67	5.54	1.304
1990	1.26	1.32	2.73	1.144
1991	2.13	0.97	1.92	1.351
1992	6.82	0.51	2.68	1.022
1993	0.72	0.43	2.43	1.986
1994	11.51	0.42	2.85	1.411
Average	11.82	1.91	5.59	1.143
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.6.3.1** WHITING in Division VIId. Nominal landings (tonnes) as officially reported to ICES, 1976 to 1994.

Year	Belgium	France	Netherlands	UK (E+W)	UK (S)	Total	Unreported landings	Total as used by Working Group
1982	93	7012	2	170	-	7277	633	7910
1983	84	5057	1	198	-	5340	1600	6940
1984	79	6914	-	88	-	7081	289	7370
1985	82	7563	-	186	-	7831	- 491	7340
1986	65	4551	-	180	-	4796	704	5500
1987	136	6730	-	287	-	7153	- 2463	4690
1988	69	7501	-	251	-	7821	- 3391	4430
1989	38	n/a	-	231	-	n/a	-	4160
1990	83	n/a	-	237	1	n/a	-	3480
1991	83	n/a	-	292	1	n/a	-	5780
1992	66	5414	-	417	24	5921	-	5760
1993	74	n/a	-	321	2	n/a	-	5200
1994*	61	n/a	-	293	+	n/a	-	6623

\* Preliminary

**Table 3.6.3.2** Whiting in Division VIId (Eastern English Channel)

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-4
1976	491.00	62.00	7.72	0.157
1977	283.00	60.00	4.95	0.073
1978	262.00	60.00	9.11	0.150
1979	117.00	47.00	8.91	0.205
1980	157.00	34.00	9.17	0.296
1981	115.00	25.00	8.93	0.460
1982	162.00	16.00	7.91	0.565
1983	241.00	15.00	6.94	0.513
1984	224.00	18.00	7.37	0.494
1985	30.00	21.00	7.34	0.374
1986	59.00	16.00	5.50	0.464
1987	114.00	10.00	4.69	0.532
1988	90.00	9.00	4.43	0.538
1989	81.00	10.00	4.16	0.467
1990	93.00	10.00	3.48	0.380
1991	133.00	11.00	5.78	0.606
1992	65.00	11.00	5.76	0.484
1993	85.00	9.00	5.20	0.794
1994	163.00	9.00	6.62	0.549
Average	156.05	23.84	6.52	0.426
Unit	Millions	1000 tonnes	1000 tonnes	--

**Table 3.6.4.1** Sole in VIId Nominal landings (tonnes) as officially reported to ICES and used by the Working Group.

Year	Belgium	France	UK (E&W)	others	Total reported	Unallocated <sup>1</sup>	SOP corr. factor	Total used by WG
1974	159	469	309	3	940	-56	1.06	884
1975	132	464	244	1	841	41	1.01	882
1976	203	599	404	.	1206	99	0.99	1305
1977	225	737	315	.	1277	58	1.01	1335
1978	241	782	366	.	1389	200	0.91	1589
1979	311	1129	402	.	1842	473	0.85	2215
1980	302	1075	159	.	1536	387	0.88	1923
1981	464	1513	160	.	2137	340	0.90	2477
1982	525	1828	317	4	2674	516	0.84	3190
1983	502	1120	419	.	2041	1417	0.89	3458
1984	592	1309	505	.	2406	1169	0.90	3575
1985	568	2545	520	.	3633	204	1.00	3837
1986	858	1528	551	.	2937	1087	0.99	4024
1987	1100	2086	655	.	3841	1133	1.00	4974
1988	667	2057	578	.	3302	680	1.00	3982
1989	646	1610	689	.	2945	1242	1.00	4187
1990	996	1255	742	.	2993	1067	0.99	4060
1991	904	2054	825	.	3783	599	0.98	4382
1992	891	2187	706	10	3794	348	0.98	4142
1993	917	1907	610	13	3447	1064	0.98	4511
1994	940	2001	701	15	3657	984	0.98	4641

<sup>1</sup> Includes landings corrected for SOP discrepancies and unreported landings estimated by the WG

**Table 3.6.4.2 Sole in Division VIId (Eastern English Channel)**

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-8
1982	12.97	7.17	3.19	0.398
1983	21.91	9.01	3.46	0.436
1984	22.26	8.53	3.58	0.441
1985	13.38	9.70	3.84	0.325
1986	26.85	10.53	4.02	0.399
1987	11.29	9.63	4.97	0.612
1988	26.77	9.81	3.98	0.423
1989	16.25	7.58	4.19	0.587
1990	46.37	8.49	4.06	0.420
1991	34.18	7.11	4.38	0.465
1992	29.64	9.77	4.14	0.399
1993	8.59	11.26	4.51	0.351
1994	35.29	11.46	4.64	0.423
Average	23.52	9.23	4.07	0.437
Unit	Millions	1000 tonnes	1000 tonnes	-

**Table 3.6.5.1** PLAICE in Division VIId. Nominal landings (tonnes) as officially reported to ICES, 1976-1994.

Year	Belgium	Denmark	France	UK (E+W)	Others	Total reported	Un- allocated <sup>1</sup>	Total as used by WG
1976	147	1 <sup>1</sup>	1,439	376	-	1,963	-	1,963
1977	149	81 <sup>2</sup>	1,714	302	-	2,246	-	2,246
1978	161	156 <sup>2</sup>	1,810	349	-	2,476	-	2,476
1979	217	28 <sup>2</sup>	2,094	278	-	2,617	-	2,617
1980	435	112 <sup>2</sup>	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 <sup>2</sup>	5,762	1,072	6,834
1987	1,807	-	4,768	1,292	-	7,867	499	8,366
1988	2,165	-	5,688 <sup>2</sup>	1,250	-	9,103	1,317	10,420
1989	2,019	+	3,265 <sup>1</sup>	1,382	-	6,666	2,092	8,758
1990	2,149	-	4,170	1,404	-	7,725	1,322	9,047
1991	2,265	-	3,606 <sup>1</sup>	1,565	-	7,436	377	7,813
1992 <sup>3</sup>	1,560	1	2,762 <sup>1</sup>	1,545	26	5,865	472	6,337
1993 <sup>3</sup>	0,877	+ <sup>2</sup>	2,408 <sup>1</sup>	1,075	27	4,387	944	5,331
1994	1,418	+ <sup>3</sup>	2,740 <sup>1</sup>	993	23	5,174	648	5,822

<sup>1</sup>Estimated by the Working Group.<sup>2</sup>Includes Division VIIe.<sup>3</sup>Provisional.

**Table 3.6.5.2** Plaice in Division VIId (Eastern English Channel)

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1980	27.41	5.85	2.65	0.348
1981	13.98	6.81	4.77	0.457
1982	27.18	7.87	4.87	0.474
1983	21.50	8.46	5.04	0.479
1984	26.69	7.82	5.16	0.556
1985	31.97	8.58	6.02	0.485
1986	64.72	10.66	6.83	0.519
1987	34.23	14.24	8.37	0.446
1988	28.53	13.93	10.42	0.482
1989	17.31	15.26	8.76	0.523
1990	20.10	14.54	9.05	0.534
1991	23.60	11.15	7.81	0.646
1992	31.64	8.93	6.34	0.542
1993	20.07	9.54	5.33	0.376
1994	24.28	10.16	5.82	0.463
Average	27.55	10.25	6.48	0.489
Unit	Millions	1000 tonnes	1000 tonnes	-

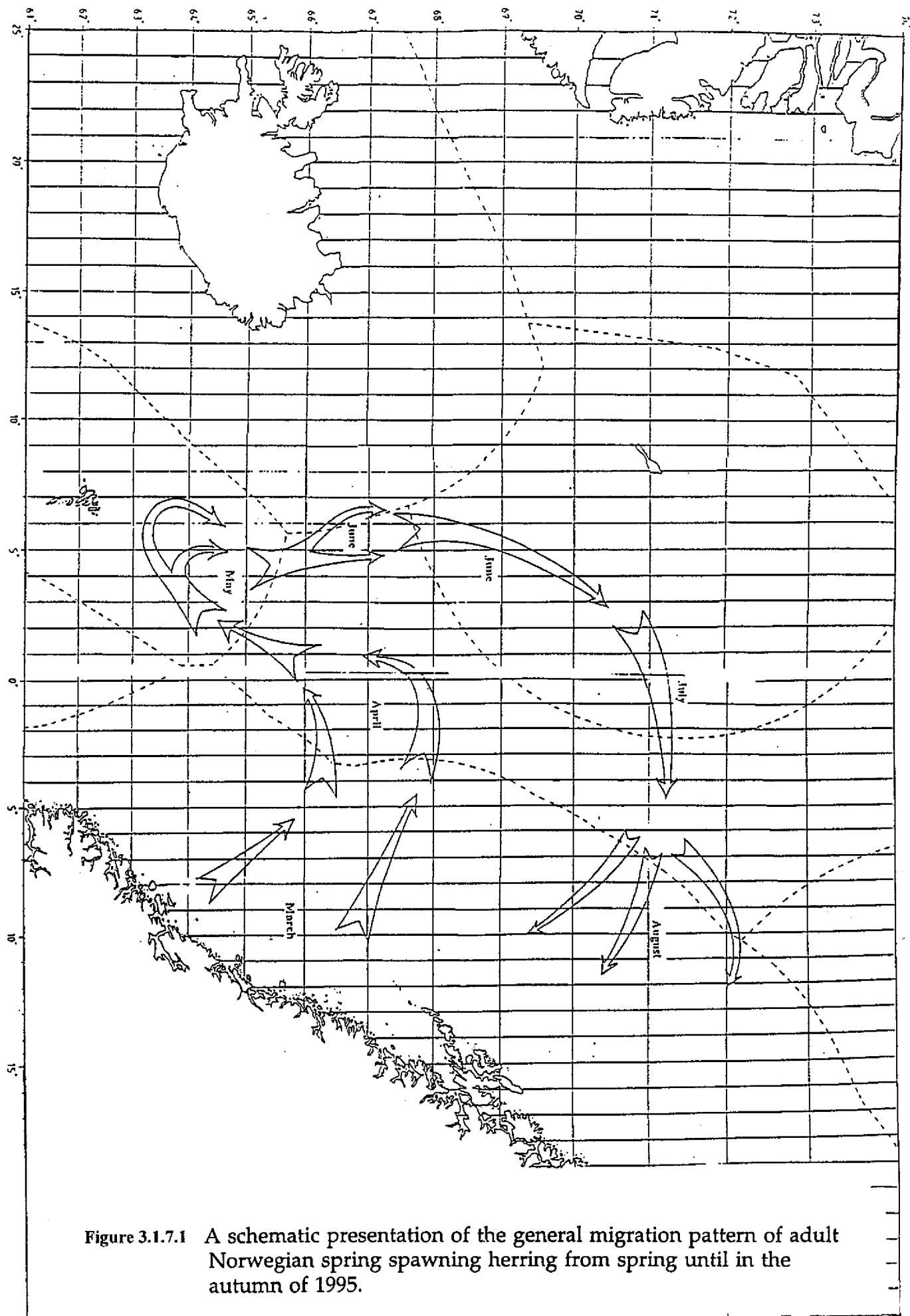


Figure 3.1.7.1 A schematic presentation of the general migration pattern of adult Norwegian spring spawning herring from spring until in the autumn of 1995.

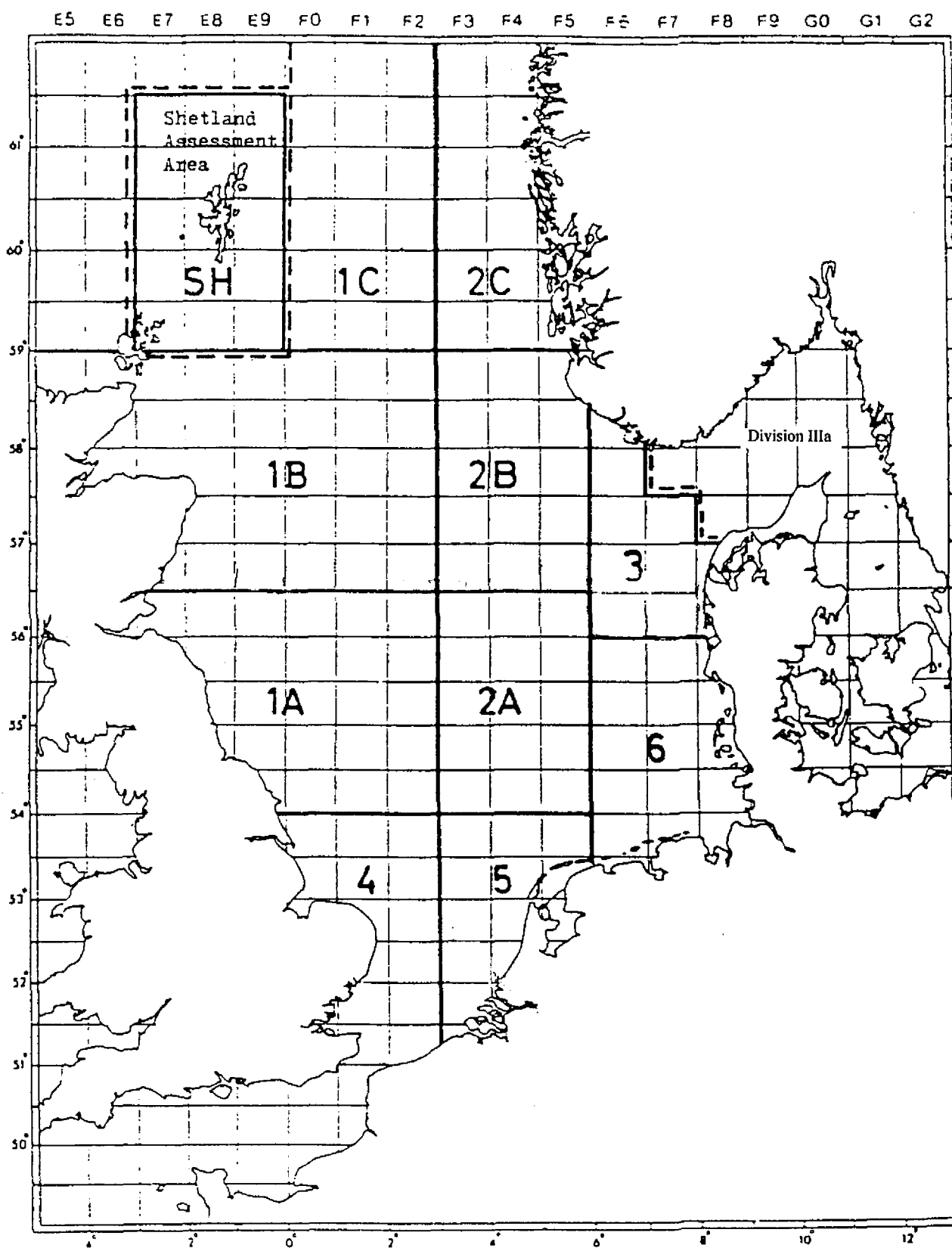


Figure 3.5.13.1 Danish sandeel areas and assessment areas used by ACFM.

